Appendix 7

NOISE MONITORING RESULTS

ATTENDED NOISE MONITORING

June 2010

September 2010

December 2010

March 2011

19 July 2010

Ref: 05168/3612

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

RE: JUNE 2010 ATTENDED NOISE MONITORING RESULTS – NARRABRI MINE

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) commencing Wednesday 23rd June 2010. Noise monitoring was carried out in accordance with the conditions of the NCM Noise Management Plan (NMP) as detailed below.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

Noise impact assessment criteria for the various stages and activities associated with the mine's development were established in the *Environmental Assessment* using relevant DECC guidelines. These criteria have been incorporated in PA 05_0102 *Condition 3(12)* which is reproduced below. Additionally, PA 05_0102 *Condition 3(13)* identifies criteria for ensuring continuous improvement in noise mitigation actions at the mine site.

Noise Limits

3(12) The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately-owned residence.

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	**$L_{Aeq(15\ minute)}$**	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

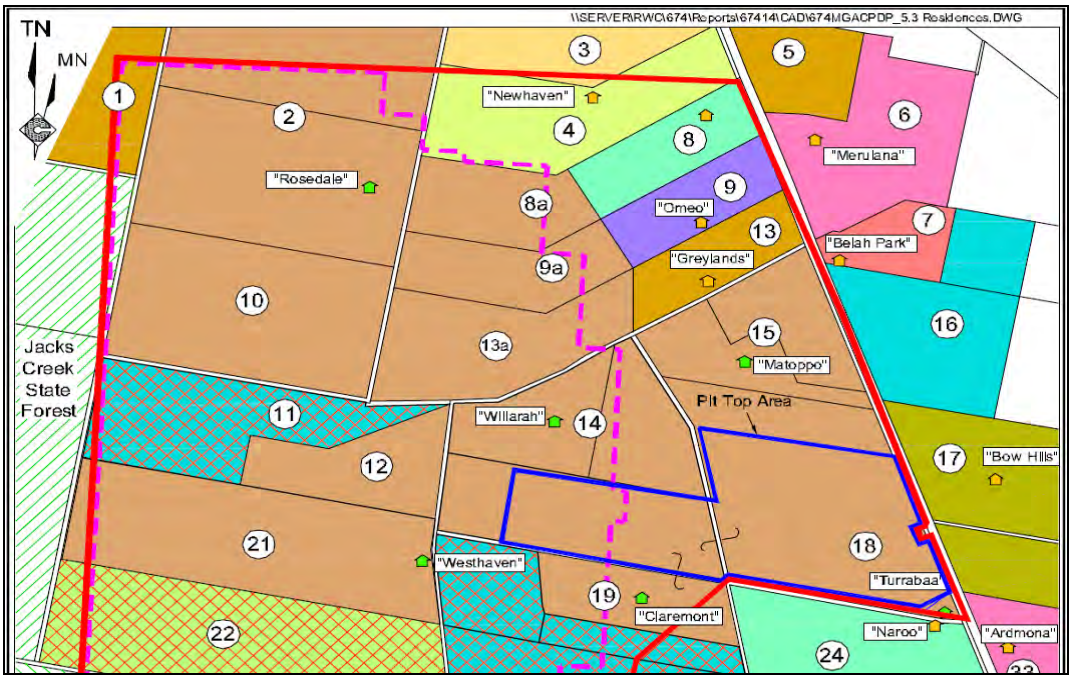
- *To determine compliance with the $LA_{eq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC 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.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $LA1_{(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below and shown in the accompanying figure:

Location N1:	Bow Hills
Location N2:	Westhaven
Location N3:	Naroo
Location N4:	Greylands
Location N5:	Kurrajong*

*It was not possible to conduct monitoring at a point within 30m of the residence, as access to the property was denied by the land owner. An alternative location was chosen at the edge of mine owned land in the direction of "Kurrajong". Measurements were taken near the boundary fence with "Claremont", which is approximately half way between the works for construction of the box cut and the "Kurrajong" residence. An indeterminate correction factor between 4 and 8 dB should be subtracted from these results to estimate the noise level at "Kurrajong".



NOISE MEASUREMENTS

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.

Meteorological data used in this report was obtained from a hand held weather station with measurements made at approximately 2m above ground level. The weather throughout the survey was generally mild with clear skies. Winds were moderate from the south to southeast at 1.0-1.5 m/s during the day and evening of June 23 then decreasing in speed during the night.

RESULTS

The measured noise levels, over 1 second intervals, were analysed using Brüel & Kjær "*Evaluator*" software. The software enables the contributions of the mine and other significant noise sources to the overall to be quantified.

Noise levels were recorded for each of the Leq (15 min), Lmax, L1, L10, L90 and Lmin percentiles. As shown in Table 1, the noise criterion for the operational phase of the NCM project is **35 dB(A) $L_{eq\ (15\ min)}$** for all operating times.

The results shown in **Tables 1**, **2** and **3**, below, represent the total 15 minute Leq noise level for all noise sources and the relative contributions of each. This is the compliance criterion for the operation of the mine. Levels for the other percentiles are not shown as they have no compliance criteria for comparison but are available on request. The exception is the L1 (1 min) noise level (which is the standard measure of sleep disturbance) which is applicable to noise emissions at night (i.e. between 10 pm and 7 am).

Measured noise levels are shown in **Tables 1-3**. Where the noise from NCM was audible the Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level.

Noise from NCM is shown in bold type. Where noise from NCM is listed as inaudible, this means the maximum levels from the mine were at least 10 dB below the minimum level during the measurement and not measurable.

Table 1
NCM Noise Monitoring Results – 23 June 2010 (Day)

Location	Time	dB(A),L_{eq}	Wind speed/ direction	Identified Noise Sources
Bow Hills	12:41 pm	44.0	1.0-1.5 m/s SE	Traffic (43), Birds (35), NCM inaudible
Naroo	11:03 am	50.0	1.0-1.5 m/s SE	Traffic (47), Birds (45), Wind (40), NCM (35)
Claremont*	11:23 am	45.0	1.0-1.5 m/s SE	Wind (41),Birds (40), Tractor (38), NCM (25)
Westhaven	11:49 am	45.0	1.0-1.5 m/s SE	Birds (42), Wind (38), NCM (34)
Greylands	12:16 pm	43.0	1.0-1.5 m/s SE	Traffic (42), Birds (35), Wind (35), NCM (33)

* Correction of 4-8dB to be subtracted from the *mine noise component only* measured at "Claremont" boundary to estimate levels at "Kurrajong".

Table 2 NCM Noise Monitoring Results – 23 June 2010 (Evening)				
Location	Time	dB(A),L_{eq}	Wind speed/ direction	Identified Noise Sources
Bow Hills	8:35 pm	43.0	1.0-1.5 m/s SE	Traffic (42), Insects (35), NCM inaudible
Naroo	8:16 pm	38.0	1.0-1.5 m/s SE	Traffic (36), Insects (31), NCM inaudible
Claremont*	7:52 pm	37.3	1.0-1.5 m/s SE	Wind (36), Pump (32), NCM inaudible
Westhaven	7:28 pm	36.0	1.0-1.5 m/s SE	NCM (34), Insects (31), Sheep (26)
Greylands	7:06 pm	41.0	1.0-1.5 m/s SE	Traffic (38), Insects (34), NCM (33)

* Correction of 4-8dB to be subtracted from the *mine noise component only* measured at "Claremont" boundary to estimate levels at "Kurrajong".

Table 3 NCM Noise Monitoring Results – 23 June 2010 (Night)				
Location	Time	dB(A),L_{eq}	Wind speed/ direction	Identified Noise Sources
Bow Hills	10:05 pm	44.0	0.5 m/s SE	Traffic (43), Insects (36), NCM inaudible
Naroo	10:23 pm	37.5	0.5 m/s SE	Traffic (35), Insects (34), NCM inaudible
Claremont*	10:46 pm	34.0	0.5 m/s SE	NCM (32), Insects (30)
Westhaven	11:18 pm	34.1	0.5 m/s SE	NCM (33), Insects (28)
Greylands	11:41 pm	38.0	0.5 m/s SE	Insects (35), Traffic (34), NCM (30)

* Correction of 4-8dB to be subtracted from the *mine noise component only* measured at "Claremont" boundary to estimate levels at "Kurrajong".

The results shown in Tables 1-3 indicate that noise emissions from the NCM were below the criterion of 35 dB(A),$L_{eq(15min)}$ at all receivers.

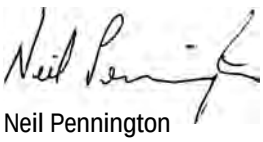
Data for the 15 minute Leq noise levels were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from NCM must not exceed 45 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. During the night time measurement circuit the L1 (1 min) noise from NCM 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.

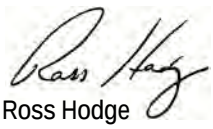
Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

5 October 2010

Ref: 05168/3705

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

RE: SEPTEMBER 2010 ATTENDED NOISE MONITORING RESULTS – NARRABRI MINE

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) commencing Tuesday 28th September 2010. Noise monitoring was carried out in accordance with the conditions of the NCM Noise Management Plan (NMP) as detailed below.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

Noise impact assessment criteria for the various stages and activities associated with the mine's development were established in the *Environmental Assessment* using relevant DECC guidelines. These criteria have been incorporated in PA 05_0102 *Condition 3(12)* which is reproduced below. Additionally, PA 05_0102 *Condition 3(13)* identifies criteria for ensuring continuous improvement in noise mitigation actions at the mine site.

Noise Limits

3(12) The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately-owned residence.

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

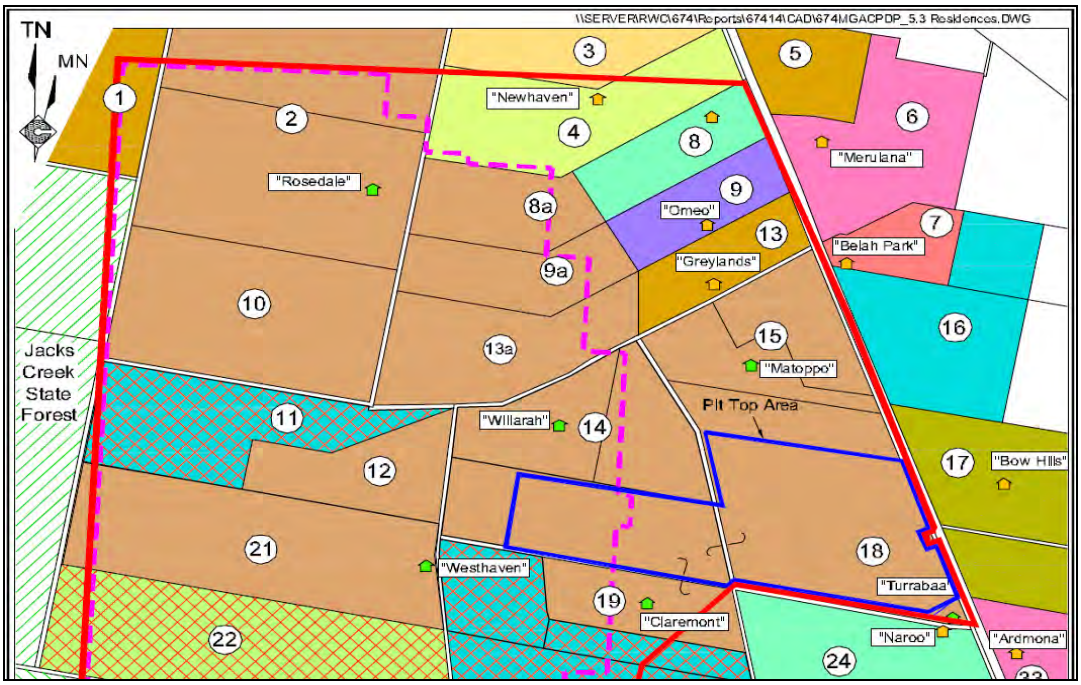
- *To determine compliance with the $LA_{eq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC 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.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $LA1(1\ minute)$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below and shown in the accompanying figure:

Location N1: Bow Hills
Location N2: Westhaven
Location N3: Naroo
Location N4: Greylands
Location N5: Kurrajong*

*It was not possible to conduct monitoring at a point within 30m of the residence, as access to the property was denied by the land owner. An alternative location was chosen at the edge of mine owned land in the direction of "Kurrajong". Measurements were taken near the boundary fence with "Claremont", which is approximately half way between the box cut and the "Kurrajong" residence. An indeterminate correction factor between 4 and 8 dB should be subtracted from these results to estimate the noise level at "Kurrajong".



NOISE MEASUREMENTS

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.

Meteorological data used in this report was obtained from a hand held weather station with measurements made at approximately 2m above ground level. The weather throughout the survey was generally warm with clear skies. Winds were light from the north west during the day time survey but swung around to the south during the evening and night. Wind speeds abated as the survey progressed.

RESULTS

The measured noise levels, over 1 second intervals, were analysed using Brüel & Kjær "*Evaluator*" software. The software enables the contributions of the mine and other significant noise sources to the overall to be quantified.

Noise levels were recorded for each of the Leq (15 min), Lmax, L1, L10, L90 and Lmin percentiles. As shown in Table 1, the noise criterion for the operational phase of the NCM project is **35 dB(A) $L_{eq\ (15\ min)}$** for all operating times.

The results shown in **Tables 1**, **2** and **3**, below, represent the total 15 minute Leq noise level for all noise sources and the relative contributions of each. This is the compliance criterion for the operation of the mine. Levels for the other percentiles are not shown as they have no compliance criteria for comparison but are available on request. The exception is the L1 (1 min) noise level (which is the standard measure of sleep disturbance) which is applicable to noise emissions at night (i.e. between 10 pm and 7 am).

Measured noise levels are shown in **Tables 1-3**. Where the noise from NCM was audible the Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level.

Noise from NCM is shown in bold type. Where noise from NCM is listed as inaudible, this means the maximum levels from the mine were at least 10 dB below the minimum level during the measurement and not measurable.

Table 1
NCM Noise Monitoring Results – 28 September 2010 (Day)

Location	Time	dB(A),L_{eq}	Wind speed/ direction	Identified Noise Sources
Bow Hills	2:30 pm	40	1.5 m/s NW	Traffic (40), birds (30), NCM inaudible
Naroo	2:48 pm	40	1.5 m/s NW	Birds & insects (39), NCM (31), traffic (30)
Claremont*	3:07 pm	33	1.5 m/s NW	Birds & insects (29), NCM (29), sheep (25)
Westhaven	See text			
Greylands	3:52 pm	41	1.5 m/s NW	Birds & insects (40), NCM (35)

* Correction of 4-8dB to be subtracted from the *mine noise component only* to estimate levels at "Kurrajong".

Table 2 NCM Noise Monitoring Results – 28 September 2010 (Evening)				
Location	Time	dB(A),L_{eq}	Wind speed/ direction	Identified Noise Sources
Bow Hills	8:32 pm	50	<1 m/s S	Traffic (49), birds & insects (41), NCM (27)
Naroo	8:12 pm	44	<1 m/s S	Frogs & insects (44), NCM inaudible
Claremont	7:50 pm	34	<1 m/s S	Insects & frogs (34), NCM inaudible
Westhaven	9:02 pm	29	<0.5 m/s S	Insects & frogs (29), NCM (<20)
Greylands	9:25 pm	40	<0.5 m/s S	Insects (40), NCM (30)

Table 3 NCM Noise Monitoring Results – 28 September 2010 (Night)				
Location	Time	dB(A),L_{eq}	Wind speed/ direction	Identified Noise Sources
Bow Hills	10:01 pm	49	<0.5 m/s S	Traffic (48), birds & insects (42), NCM (28)
Naroo	10:20 pm	39	<0.5 m/s S	Frogs & insects (39), NCM inaudible
Claremont	10:41 pm	30	<0.5 m/s S	Insects (30), NCM barely audible
Westhaven	11:03 pm	33	<0.5 m/s S	Frogs & insects (32), NCM (27)
Greylands	11:25 pm	38	<0.5 m/s S	Birds & insects (37), traffic (30), NCM (27)

The results shown in Tables 1-3 indicate that noise emissions from the NCM were below the criterion of 35 dB(A),$L_{eq(15min)}$ at all receivers. During the day time survey construction activity in the vicinity of the Westhaven monitoring location meant that safe access to the site was not possible. The day time monitoring was, therefore, not carried out. Westhaven is a project related residence.

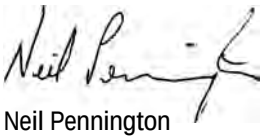
Data for the 15 minute Leq noise levels were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from NCM must not exceed 45 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. During the night time measurement circuit the L1 (1 min) noise from NCM 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.

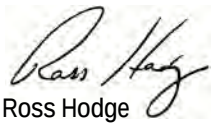
Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

21 December 2010

Ref: 05168/3810

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

RE: DECEMBER 2010 ATTENDED NOISE MONITORING RESULTS – NARRABRI MINE

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) commencing Monday 13th December 2010. Noise monitoring was carried out in accordance with the conditions of the NCM Noise Management Plan (NMP) as detailed below.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

Noise impact assessment criteria for the various stages and activities associated with the mine's development were established in the *Environmental Assessment* using relevant DECC guidelines. These criteria have been incorporated in PA 05_0102 *Condition 3(12)* which is reproduced below. Additionally, PA 05_0102 *Condition 3(13)* identifies criteria for ensuring continuous improvement in noise mitigation actions at the mine site.

Noise Limits

3(12) The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately-owned residence.

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

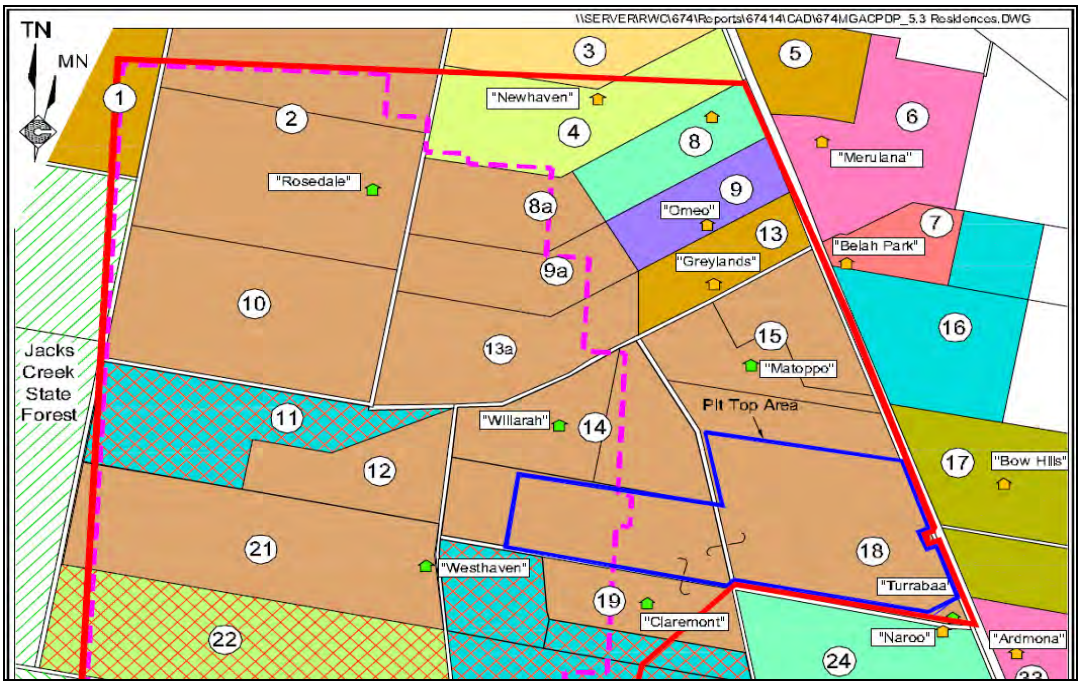
- *To determine compliance with the $LA_{eq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC 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.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $LA1(1\ minute)$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below and shown in the accompanying figure:

Location N1: Bow Hills
Location N2: Westhaven
Location N3: Naroo
Location N4: Greylands
Location N5: Kurrajong*

*It was not possible to conduct monitoring at a point within 30m of the residence, as access to the property was denied by the land owner. An alternative location was chosen at the edge of mine owned land in the direction of "Kurrajong". Measurements were taken near the boundary fence with "Claremont", which is approximately half way between the box cut and the "Kurrajong" residence. An indeterminate correction factor between 4 and 8 dB should be subtracted from these results to estimate the noise level at "Kurrajong".



NOISE MEASUREMENTS

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Meteorological data used in this report was obtained from a hand held weather station with measurements made at approximately 2m above ground level. The weather throughout the survey was generally warm with clear skies. Winds were light from the south east during the day time survey and dropped to be almost calm during the evening and night.

RESULTS

The measured noise levels, over 1 second intervals, were analysed using Brüel & Kjær "*Evaluator*" software. The software enables the contributions of the mine and other significant noise sources to the overall to be quantified.

Noise levels were recorded for each of the Leq (15 min), Lmax, L1, L10, L90 and Lmin percentiles. As shown in Table 1, the noise criterion for the operational phase of the NCM project is **35 dB(A) $L_{eq\ (15\ min)}$** for all operating times.

The results shown in **Tables 1**, **2** and **3**, below, represent the total 15 minute Leq noise level for all noise sources and the relative contributions of each. This is the compliance criterion for the operation of the mine. Levels for the other percentiles are not shown as they have no compliance criteria for comparison but are available on request. The exception is the L1 (1 min) noise level (which is the standard measure of sleep disturbance) which is applicable to noise emissions at night (i.e. between 10 pm and 7 am).

Measured noise levels are shown in **Tables 1-3**. Where the noise from NCM was audible the Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level.

Noise from NCM is shown in bold type. Where noise from NCM is listed as inaudible, this means the maximum levels from the mine were at least 10 dB below the minimum level during the measurement and not measurable.

Table 1
NCM Noise Monitoring Results – 13 December 2010 (Day)

Location	Time	dB(A),L_{eq}	Wind speed/ direction	Identified Noise Sources
Bow Hills	5:27 pm	42	1.5 m/s SE	Tractor (39), traffic (38), insects (33), NCM inaudible
Naroo	3:30 pm	46	1.5 m/s SE	Birds & insects (44), traffic (40), NCM inaudible
Claremont*	3:50 pm	37	1.5 m/s SE	Birds & insects (36), traffic (30), NCM inaudible
Westhaven	4:28 pm	41	1.5 m/s SE	NCM** (38), insects (37), birds (32)
Greylands	5:00 pm	40	1.5 m/s SE	Birds & insects (39), traffic (32), NCM faintly audible

* Correction of 4-8dB to be subtracted from the *mine noise component only* to estimate levels at "Kurrajong".
** Road construction associated with NCM

Table 2 NCM Noise Monitoring Results – 13 December 2010 (Evening)				
Location	Time	dB(A),L_{eq}	Wind speed/ direction	Identified Noise Sources
Bow Hills	9:26 pm	49	<0.5 m/s SE	Traffic (49), insects (36), NCM inaudible
Naroo	9:05 pm	50	<0.5 m/s SE	Frogs & insects (50), traffic (35), NCM inaudible
Claremont	8:46 pm	42	<1 m/s SE	Birds & insects (41), NCM (35)
Westhaven	8:20 pm	43	<1 m/s SE	Birds & insects (41), NCM (38)
Greylands	8:00 pm	44	<1 m/s SE	Birds & insects (44), traffic (34), NCM (32)

Table 3 NCM Noise Monitoring Results – 13 December 2010 (Night)				
Location	Time	dB(A),L_{eq}	Wind speed/ direction	Identified Noise Sources
Bow Hills	10:30 pm	42	Calm	Insects (42), NCM inaudible
Naroo	10:49 pm	52	Calm	Frogs & insects (52), NCM (30)
Claremont	11:10 pm	49	Calm	Insects (49), NCM barely audible (<25)
Westhaven	11:35 pm	44	Calm	Frogs & insects (44), NCM (28)
Greylands	12:01 pm	45	Calm	Insects (45), NCM (34)

The results shown in Tables 1-3 indicate that noise emissions from the NCM exceeded the criterion of 35 dB(A),$L_{eq(15min)}$ at the Westhaven monitoring location during the day and evening time surveys. During the day road construction activity near the monitoring point dominated the noise measurement. In the evening the noise was related to drilling activities at the site of the vent fan construction. Westhaven is a project related residence.

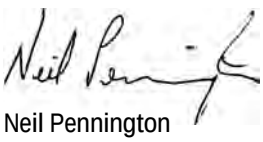
Data for the 15 minute Leq noise levels were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, emissions from NCM must not exceed 45 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. During the night time measurement circuit the L1 (1 min) noise from NCM 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.

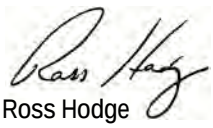
Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

8 April 2011

Ref: 05168/3936

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

RE: MARCH 2011 ATTENDED NOISE MONITORING RESULTS – NARRABRI MINE

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) on Thursday 24th, Friday 25th Monday 28th March 2011. Excessive wind speeds precluded measurements being taken on the evening of 24 March, so the evening survey was conducted on 28 March. Noise monitoring was carried out in accordance with the conditions of the NCM Noise Management Plan (NMP) as detailed below.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

Noise impact assessment criteria for the various stages and activities associated with the mine's development were established in the *Environmental Assessment* using relevant DECC guidelines. These criteria have been incorporated in PA 05_0102 *Condition 3(12)* which is reproduced below. Additionally, PA 05_0102 *Condition 3(13)* identifies criteria for ensuring continuous improvement in noise mitigation actions at the mine site.

Noise Limits

3(12) The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately-owned residence.

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $LA_{eq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point 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. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC 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.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $LA1(1\ minute)$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below and shown in Figure 1:

Location R17: Bow Hills
Location R21: Westhaven
Location R24: Naroo
Location R13: Greylands
Location R22: Kurrajong*

*Measurements were taken near the boundary fence with R19 "Claremont", which is approximately half way between the box cut and the "Kurrajong" residence. An indeterminate correction factor between 4 and 8 dB should be subtracted from these results to estimate the noise level at "Kurrajong".

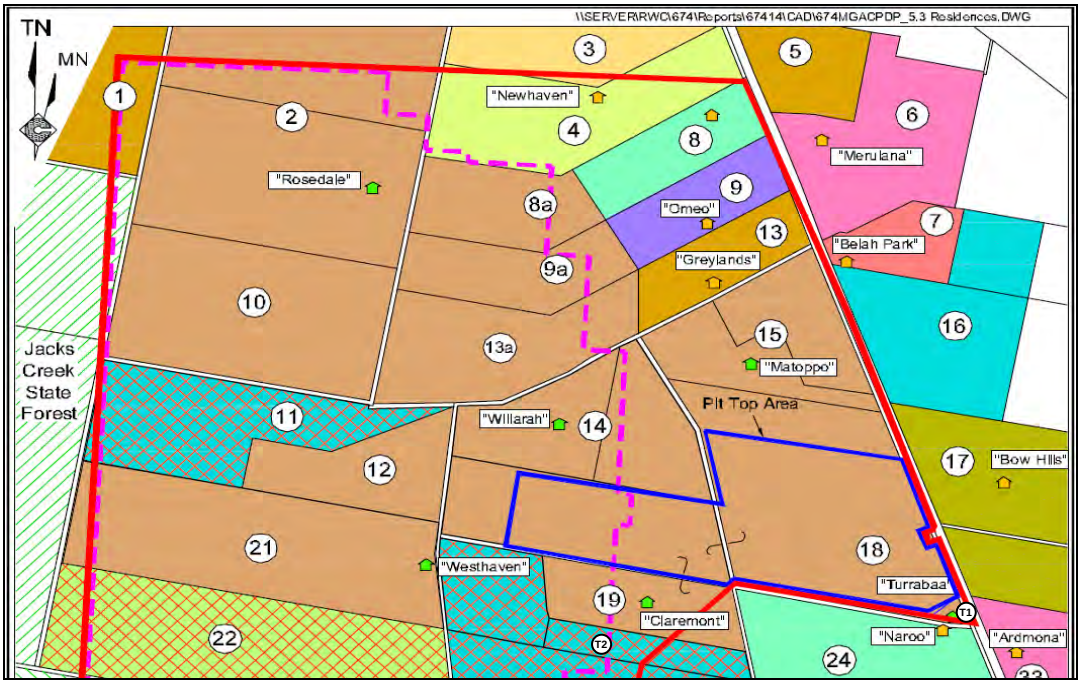


FIGURE 1. Noise monitoring locations.

NOISE MEASUREMENTS

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.

Meteorological data used in this report was obtained from a hand held weather station with measurements made at approximately 2m above ground level. The weather throughout the survey was generally warm with clear skies. Winds were strong from the west during the day and evening of 24 March but dropped off to allow the night time survey to be conducted. The daytime survey was conducted the following morning and the evening survey was conducted on 28 March.

INVERSION MONITORING

Gemini Tiny Tag temperature loggers were attached to star pickets at a height of approximately 2m above ground level at locations marked T1 and T2 in Figure 1 for the period 24-28 March to coincide with the attended noise surveys. Location T1 is at 246m AHD and Location T2 is at 296m AHD to give the required 50m vertical separation for calculation of temperature gradients in accordance with the INP. Temperature gradients (normalised to ^{0}C/100m) during noise monitoring events are included in the following Tables of results. Positive gradients indicate inversion conditions and negative gradients indicate a temperature lapse.

RESULTS

The measured noise levels, over 1 second intervals, were analysed using Brüel & Kjær "*Evaluator*" software. The software enables the contributions of the mine and other significant noise sources to the overall to be quantified.

Noise levels were recorded for each of the Leq (15 min), Lmax, L1, L10, L90 and Lmin percentiles. As shown in Table 1, the noise criterion for the operational phase of the NCM project is **35 dB(A) $L_{eq\ (15\ min)}$** for all operating times.

The results shown in **Tables 1**, **2** and **3**, below, represent the total 15 minute Leq noise level for all noise sources and the relative contributions of each. This is the compliance criterion for the operation of the mine. Levels for the other percentiles are not shown as they have no compliance criteria for comparison but are available on request. The exception is the L1 (1 min) noise level (which is the standard measure of sleep disturbance) which is applicable to noise emissions at night (i.e. between 10 pm and 7 am).

Measured noise levels are shown in **Tables 1-3**. Where the noise from NCM was audible the Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level.

Noise from NCM is shown in bold type. Where noise from NCM is listed as inaudible, this means the maximum levels from the mine were at least 10 dB below the minimum level during the measurement and not measurable.

Table 1

NCM Noise Monitoring Results – 24 March 2011 (Night)					
Location	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Temp Grad (^{0}C/100m)	Identified Noise Sources
Bow Hills	10:07 pm	43	0.5-1 m/s, W	0	Traffic (41), insects (38), NCM inaudible
Naroo	10:29 pm	49	0.5-1 m/s, W	-0.3	Birds & insects (47), traffic (43), NCM inaudible
Claremont*	10:51 pm	41	0.5-1 m/s, W	-0.3	Birds & insects (40), traffic (28), NCM inaudible
Westhaven	11:15 pm	37	0.5-1 m/s, W	-0.3	NCM# (35), insects (33), birds (28)
Greylands	11:41 pm	38	0.5-1 m/s, W	0	Birds & insects (35), NCM^ (33), traffic (30)

* Correction of 4-8dB to be subtracted from the *mine noise component only* to estimate levels at "Kurrajong".
# Vent shaft construction associated with NCM.
^ Drilling associated with NCM.

Table 2 NCM Noise Monitoring Results – 25 March 2011 (Day)					
Location	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Temp Grad (^{o}C/100m)	Identified Noise Sources
Bow Hills	9:22 am	50	1-2 m/s, SW	+0.8	Traffic (49), Birds & insects (42), NCM inaudible
Naroo	9:01 am	43	1-2 m/s, SW	+1.2	Traffic (41), Birds & insects (39), NCM inaudible
Claremont	8:38 am	26	Calm	+0.4	Birds & insects (26), NCM inaudible
Westhaven	8:17 am	41	Calm	+0.4	Birds & insects (40), NCM (34)
Greylands	7:53 am	39	Calm	0	Birds & insects (35), traffic (34), NCM (33)

Table 3 NCM Noise Monitoring Results – 28 March 2011 (Evening)					
Location	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Temp Grad (^{o}C/100m)	Identified Noise Sources
Bow Hills	7:37 pm	49	Calm	+1.1	Traffic (49), Insects (36), NCM inaudible
Naroo	6:04 pm	48	0.5-1 m/s, S	+0.3	Car (47), Traffic (32), NCM (<25)
Claremont	6:23 pm	36	0.5-1 m/s, S	+0.3	Insects (34), Birds (31), NCM barely audible (<20)
Westhaven	6:48 pm	36	Calm	+2.1	Birds (35), cattle (30), NCM (<25)
Greylands	7:14 pm	36	Calm	+1.1	Traffic (35), Birds (31), NCM inaudible

The results shown in Tables 1-3 indicate that noise emissions from the NCM did not exceed the criterion of 35 dB(A),$L_{eq(15min)}$ at any location.

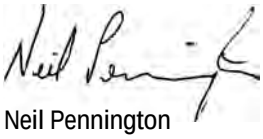
Data for the 15 minute Leq noise levels were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, emissions from NCM must not exceed 45 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. During the night time measurement circuit the L1 (1 min) noise from NCM 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.

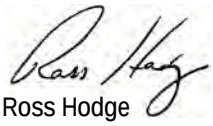
Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

UNATTENDED NOISE MONITORING

June 2010

30 July 2010

Ref: 05168/3632

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

RE: JUNE 2010 UNATTENDED NOISE MONITORING RESULTS

This letter report presents the results of unattended operational noise monitoring conducted for the Narrabri Coal Mine (NCM) in June 2010.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

Noise impact assessment criteria for the various stages and activities associated with the mine's development were established in the *Environmental Assessment* using relevant DECC guidelines. These criteria have been incorporated in PA 05_0102 *Condition 3(12)* which is reproduced below. Additionally, PA 05_0102 *Condition 3(13)* identifies criteria for ensuring continuous improvement in noise mitigation actions at the mine site.

Noise Limits

3(12) The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately-owned residence.

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $LA_{eq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point 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. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC 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.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $LA1(1\ minute)$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

Noise measurement locations for the unattended noise survey are listed below and indicated in Figure 1.

Location N4: Entrance gate to Matoppo (north of site)
Location N3: Naroo (south of site)

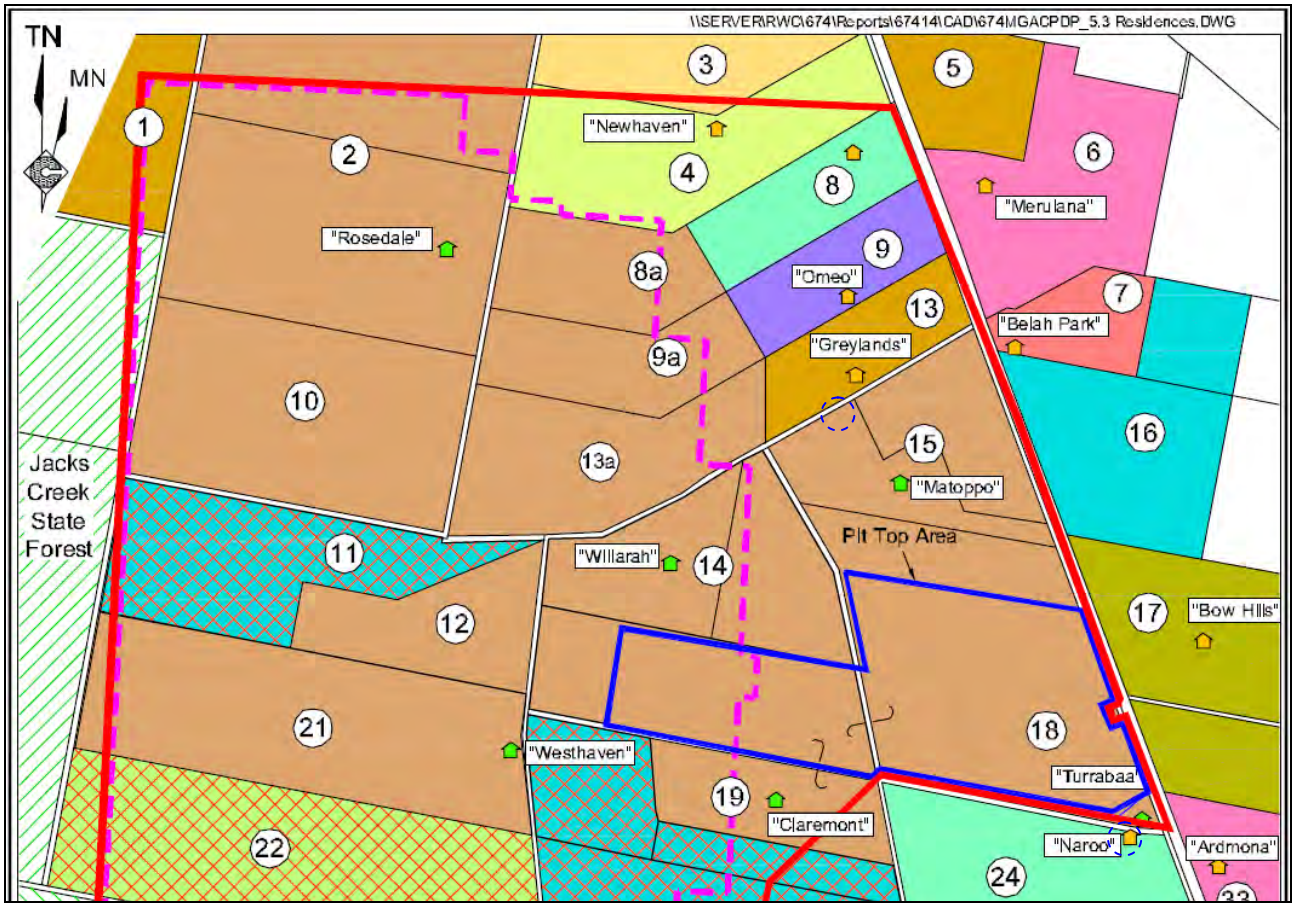


Figure 1. Unattended noise monitoring locations.

NOISE MONITORING PROGRAM

Noise levels were measured at each location for a period of at least three days. Noise levels were measured at 15 minute statistical intervals using Svan 949 sound and vibration analysers used as environmental noise loggers. The measurements were done in accordance with relevant DECCW guidelines and AS 1055-1997 "Acoustics – Description and Measurement of Environmental Noise". The noise loggers used comply with the requirements of AS 1259.2-1990 "Acoustics – Sound Level Meters".

Each logger was programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period. Calibration of the logger was performed as part of the instrument's initialisation procedures, with calibration results being within the allowable ± 0.5 dB(A) range. Since noise loggers record the total acoustic environment, it is not possible to identify or assign noise levels to the various contributing sources. Accordingly, this report does not attempt to interpret the logger results.

MEASURED NOISE LEVELS

Measured noise levels at each location are summarised below. Tabulated results show overall L_{Aeq} and L_{90} levels for the day, evening and night time periods using procedures specified in the NSW Industrial Noise Policy. Graphs showing full data sets are shown in **Appendix A**.

Matoppo

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
24-Jun-10	46.1	40.4	41.3	27.6	23.5	20.1
25-Jun-10	46.3	39.5	40.0	30.5	21.0	19.3
26-Jun-10	49.7	36.1	40.1	27.3	25.7	25.5
LAeq	48	39	41	--	--	--
L90	--	--	--	28	23	20

Naroo

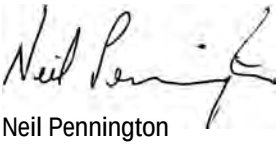
Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
24-Jun-10	45.9	36.2	41.1	29.5	27.0	25.8
25-Jun-10	48.3	43.4	43.0	33.5	30.5	26.0
26-Jun-10	50.8	51.9	48.4	31.0	35.8	26.3
LAeq	49	48	45	--	--	--
L90	--	--	--	31	31	26

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 or 0409 181888.

Yours faithfully,

SPECTRUM ACOUSTICS PTY LIMITED

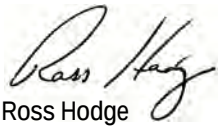
Author:



Neil Pennington

Acoustical Consultant

Review:

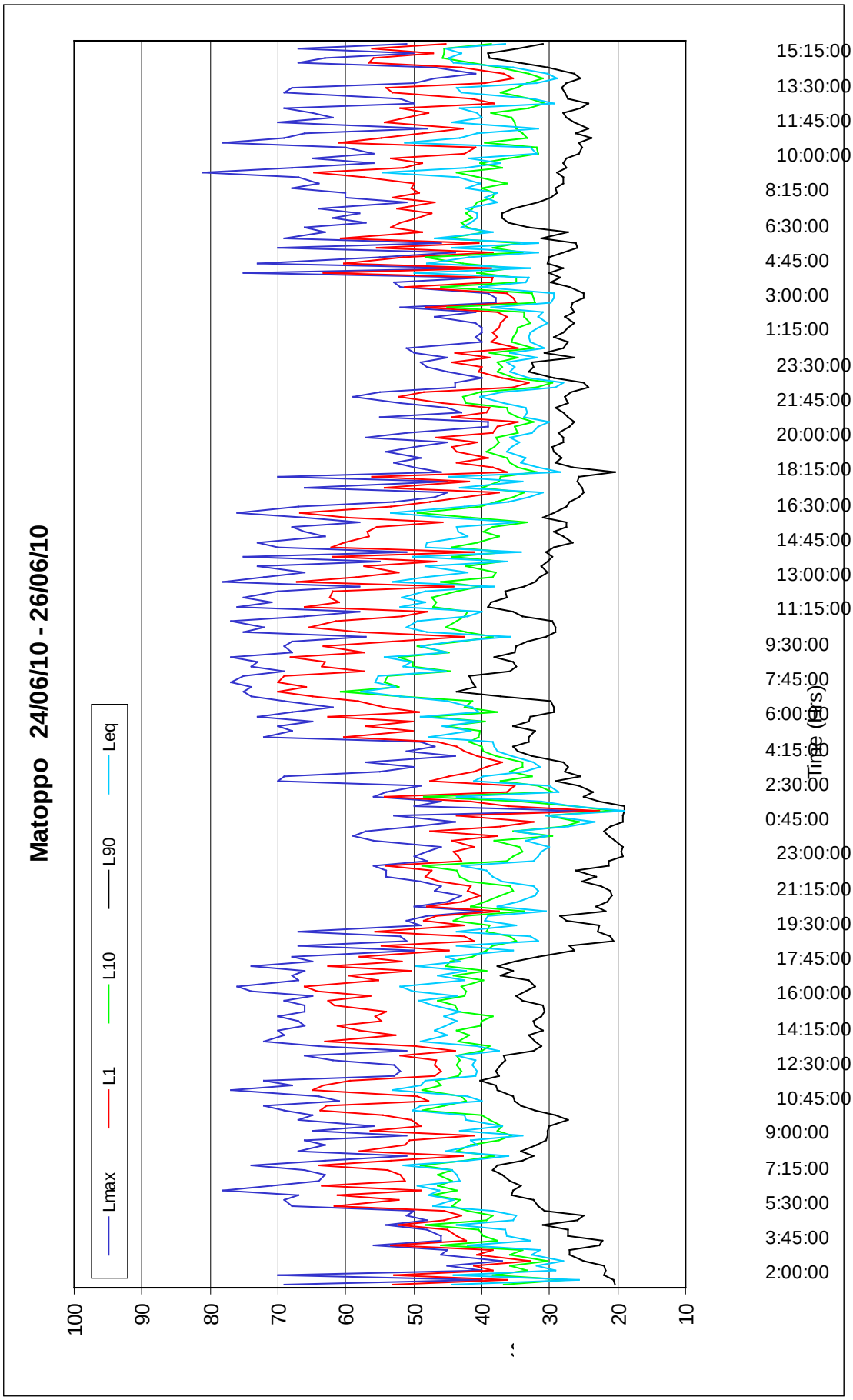


Ross Hodge

Acoustical Consultant

APPENDIX A

NOISE DATA CHARTS


Matoppo 24/06/10 - 26/06/10
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L10
L90
Leq
100
90
80
70
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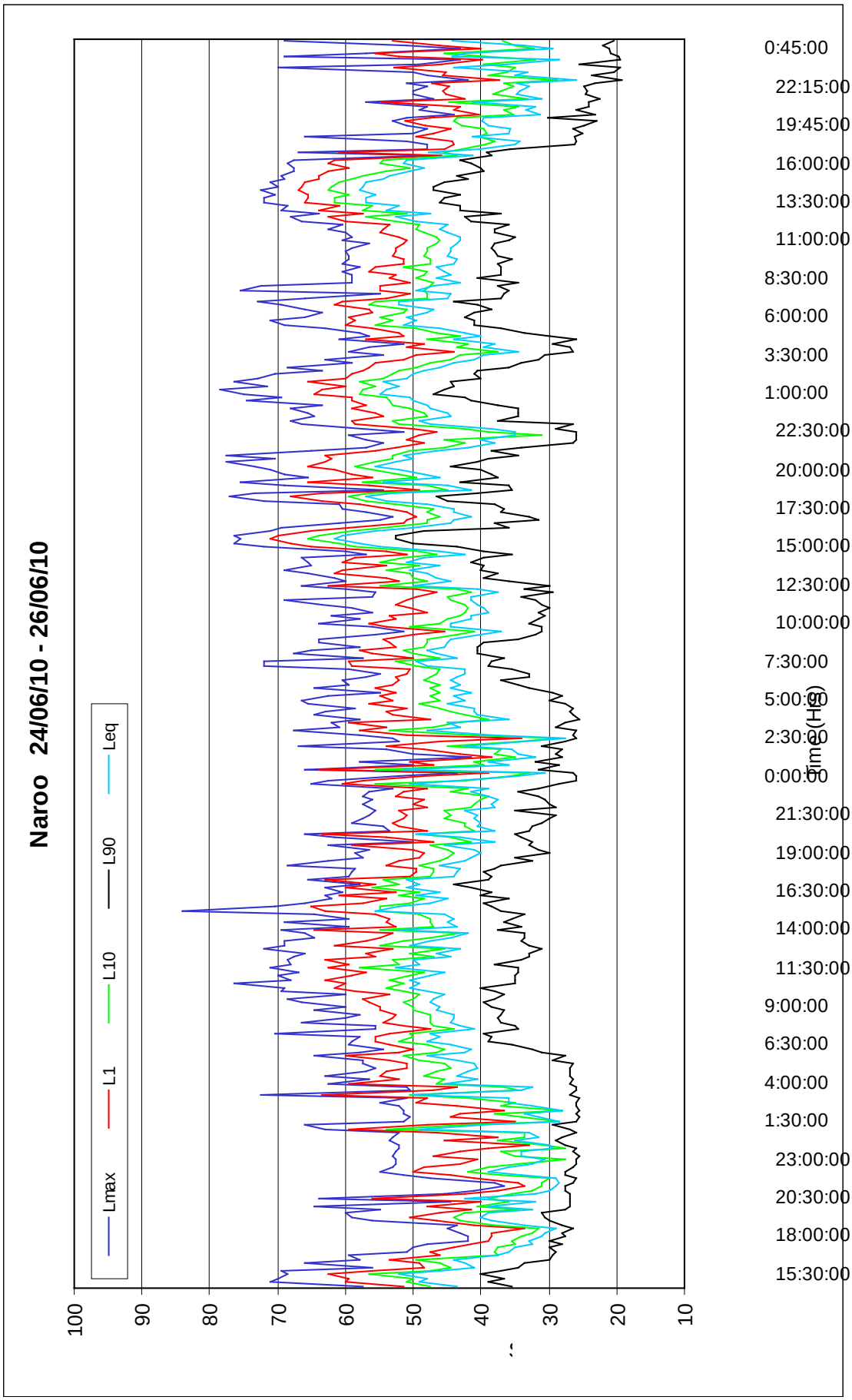
Naroo 24/06/10 - 26/06/10
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