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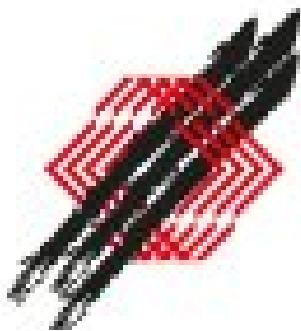
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Vipac Engineers & Scientists

Duralie Coal

Duralie Operations - Environmental Quarterly Survey 2015

February 2015 Compliance Survey




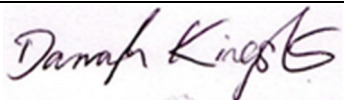

DURALIECOAL

Part of the Yancoal Australia Group

29N-15-0008-TRP-472651-3

10 April 2015



Report Title: February 2015 Compliance Survey Job Title: Duralie Operations - Environmental Quarterly Survey 2015														
DOCUMENT NO: 29N-15-0008-TRP-472651-2 PREPARED FOR: Duralie Coal P O Box 168 Gloucester, New South Wales, 2422, Australia CONTACT: Michael Plain Tel: 02 4999 5222 Fax: +61 2 6558 8207		REPORT CODE: TRP PREPARED BY: Vipac Engineers & Scientists Ltd. 4/5 Leo Lewis Close, Toronto, NSW 2283, Australia Tel: +61 2 4950 5833 Fax: +61 2 4950 4276												
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REVISION HISTORY <table border="1"><thead><tr><th>Revision No.</th><th>Date Issued</th><th>Reason/Comments</th></tr></thead><tbody><tr><td>0</td><td>27 Mar 2015</td><td>Initial Issue</td></tr><tr><td>1 & 2</td><td>30 Mar 2015</td><td>Formatting Change</td></tr><tr><td>3</td><td>10 April 2015</td><td>Minor Amendments</td></tr></tbody></table>			Revision No.	Date Issued	Reason/Comments	0	27 Mar 2015	Initial Issue	1 & 2	30 Mar 2015	Formatting Change	3	10 April 2015	Minor Amendments
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DISTRIBUTION <table border="1"><thead><tr><th>Copy No. _____</th><th>Location</th></tr></thead><tbody><tr><td>1</td><td>Project</td></tr><tr><td>2</td><td>Client (PDF Format)</td></tr><tr><td>3</td><td></td></tr><tr><td>4</td><td></td></tr></tbody></table> <p>Uncontrolled Copy</p>			Copy No. _____	Location	1	Project	2	Client (PDF Format)	3		4			
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2	Client (PDF Format)													
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10 April 2015

ENVIRONMENTAL NOISE SURVEY

An Environmental Compliance Noise Monitoring Survey has been carried out in the rural environment surrounding the Duralie Coal Mine (DCM) Site, Stroud Road, NSW. The survey was requested by Duralie Coal Pty Ltd to ascertain the degree of compliance of noise emissions generated from the operation of Duralie Coal Mine with licence and project approval conditions.

Direct temperature inversion measurements were conducted during the entire survey utilising the Duralie Coal Inversion Tower Infrastructure. These measurements were used to ascertain temperature lapse rates and atmospheric stability classes during the survey period, the results of which are presented in **Appendix A** of this report.

The mine operating noise emissions were within the noise criteria of $35\text{dBL}_{\text{Aeq}}$ at all monitoring locations for the Day, Evening and Night 1 & 2 survey periods during the February 2015 compliance survey.

Noise levels measured at the Mahony residence during the day and evening period were above $35\text{dBL}_{\text{Aeq}}$ limit that is applicable to private properties. The noise level monitored at the Mahony residence during the daytime survey was $36\text{dBL}_{\text{Aeq}}$ and the noise level monitored at the residence during the evening survey was $37\text{dBL}_{\text{Aeq}}$. However, the Mahony property is currently under private agreement with DCM and noise limits are not applicable to this property.

It is Vipac's professional opinion that the noise emissions produced by Duralie Coal Mine during the February 2015 DCM Environmental Quarterly Survey complied with the noise criteria set out in **Section 4** of this report.

RAIL NOISE SURVEY

As outlined in **Section 4** of this report, all the train-monitoring results presented in this assessment are to be used for general information purposes only and are not DCM compliance requirements.

Vipac conducted Duralie Shuttle Rail Pass-by monitoring at TN1 (Craven) and has augmented the monitoring program conducted at TN2 (Wards River) by splitting the monitoring location into two separate locations TN2-South (southern end of Wards River village) and TN2-North (northern end of Wards River village) to better assess the rail noise from the Duralie shuttle within Wards River. This is the first quarterly rail monitoring survey that has been conducted in such a manner. In order to meet the requirements set out in Section 4 of this report, attended monitoring has to be conducted at only one location in Wards River (i.e. TN2-South or TN2-North), however where possible measurements will be conducted at both sites.

An unattended noise logger was located at all three locations TN1, TN2-North and TN2-South. Attended Measurements were conducted at TN1 and TN2-North as part of this survey. No additional attended measurement was conducted at TN2-South due to a low number of train pass-bys during the period the survey was conducted.

The attended noise levels measured at TN1 Craven and TN2-North have been assessed against the L_{Amax} and $L_{\text{Aeq15-hour}}$ noise goals as set out in **Section 4.1** of this report.

The noise emanating from the Duralie shuttle was predicted to comply with the L_{Amax} noise goal at residential receivers from monitoring conducted at the TN1 Craven and TN2-North (North Wards River Village) for this the February 2015 noise compliance assessment.

TABLE OF CONTENTS

1	INTRODUCTION	5
1.1	Definitions of Acoustic Terms	5
2	DURALIE COAL MINE	6
2.1	Site Description	6
2.2	Description of Operation	6
3	METHODOLOGY	6
3.1	Operator Attended Noise Surveys	6
3.2	Instrumentation	7
3.2.1	Attended Measurements	7
3.2.2	Unattended Noise Logging	7
3.3	Monitoring Locations	8
4	NOISE CRITERIA	9
4.1	EPL Noise Limits	9
4.2	Project Approval Limits	9
4.3	Rail Noise	10
5	TEMPERATURE INVERSION CONDITIONS	11
6	NOISE SURVEY RESULTS	12
6.1	Noise Survey Weather Conditions	12
6.2	Noise Survey Mine Operations	12
6.3	Day Survey	13
6.3.1	Attended Measurement Results – Day Survey	13
6.3.2	Analysis of Day Attended Survey	16
6.4	Evening Survey	17
6.4.1	Attended Measurement Results - Evening Survey	17
6.4.2	Analysis of Evening Attended Survey	20
6.5	Night Survey 1	21
6.5.1	Attended Measurement Results - Night Survey 1	21
6.5.2	Analysis of Night Attended Survey 1	24
6.6	Night Survey 2	25
6.6.1	Attended Measurement Results - Night Survey 2	25
6.6.2	Analysis of Night Attended Survey 2	28
7	RAIL NOISE RESULTS	29
7.1	Compliance Assessment	30
7.1.1	Compliance Assessment Summary – Day Survey Period	30
7.1.2	Compliance Assessment Summary – Evening Survey Period	30
7.1.3	Compliance Assessment Summary – Night Survey Period	31
7.2	Rail Noise Monitoring Assessment Summary	31
8	NOISE MODEL PREDICTION	32
9	DISCUSSION & CONCLUSION	34
9.1	ENVIRONMENTAL NOISE SURVEY	34
9.2	RAIL NOISE SURVEY	34
APPENDIX A:	WEATHER DATA	35
APPENDIX B:	LOCALITY MAP & SURVEY LOCATIONS	42
APPENDIX C:	DURALIE COAL MINE OPERATIONAL DATA	45

1 INTRODUCTION

Vipac Engineers & Scientists Ltd. (Vipac) was commissioned to conduct an Environmental Noise Compliance Assessment in the rural environment surrounding the Duralie Coal Mine (DCM) Site, located off Bucketts Way, NSW.

The purpose of the assessment was to conduct an ambient noise survey in accordance with the NSW Project Approval (08_0203) Condition 2 - Schedule 3, as amended by order of the Land and Environment Court on 10th November 2011, first modified on the 1st November 2012 and further modified on the 5th December 2014, the Environmental Protection Authority (EPA) Environment Protection License (EPL 11701) Section L4 "Noise Limits", and the Duralie Coal Mine Noise Management Plan.

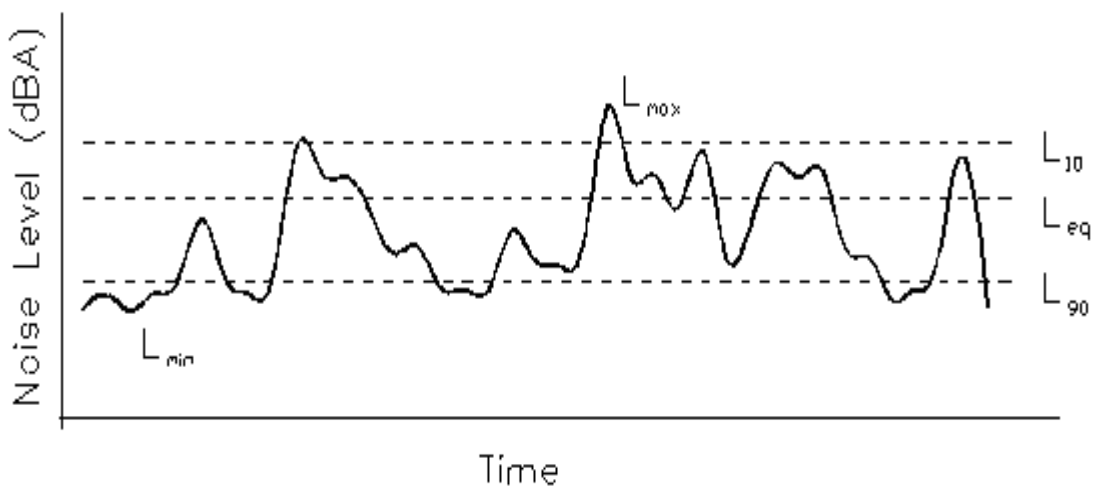
Noise monitoring surveys were conducted at five locations and a reference site surrounding the DCM, which commenced at 11.30 hrs, 10/2/2015 and concluded at 11.30 hrs, on 13/2/2015.

1.1 DEFINITIONS OF ACOUSTIC TERMS

Table 1 provides the definitions of common acoustic terms and is presented as an aid to understanding this report.

Table 1: Acoustical Terms and Definitions

Term	Definition
dB(A)	A unit of measurement in decibels (A), of sound pressure level which has its frequency characteristics modified by a filter ("A-weighted") so as to more closely approximate the frequency response of the human ear.
L_w	Sound Power Level radiated by a noise source per unit time re 1pW.
L_p	Sound pressure level (SPL) or sound level L_p is a logarithmic measure of the root-mean-square (rms) sound pressure of a sound relative to a reference value.
L_{eq}	Equivalent Continuous Noise Level – which, lasting for as long as a given noise event has the same amount of acoustic energy as the given event.
L_{90}	The noise level that is equalled or exceeded for 90% of the measurement period. An indicator of the mean minimum noise level, and is used in Australia as the descriptor for background noise (usually in dB(A)).
L_{10}	The noise level that is equalled or exceeded for 10% of the measurement period. L_{10} is an indicator of the mean maximum noise level, and is generally used in Australia as the descriptor for intrusive noise (usually in dB(A)).
L_{50}	The noise level that is equalled or exceeded for 50% of the measurement period.
L_1	The noise level equalled or exceeded for 1% of the measurement period.



2 DURALIE COAL MINE

2.1 SITE DESCRIPTION

Duralie Coal Mine (DCM) is located east of Bucketts Way between the villages of Stroud Road and Wards River, NSW.

2.2 DESCRIPTION OF OPERATION

The following activities have the potential to generate noise during DCM operations:

- Operation of mobile equipment (e.g. excavators, loaders, haul trucks, dozers, graders, water carts and drilling rigs) for:
 - Vegetation removal and stripping/stockpiling of soil resources;
 - Open cut development and production; and
 - Haulage of Run Of Mine (ROM) Coal and mine waste;
- Operation of fixed plant (e.g. ROM bin, ROM coal conveyor, bin loading/unloading, lighting plant and pit pumps); and,
- Rail transportation of coal from the mining lease.

3 METHODOLOGY

Ambient noise level measurements were conducted in accordance with the requirements of the EPA (and the Office of Environment and Heritage (OEH)), and as detailed in the Australian Standard AS1055-1989, "Acoustics – Description and Measurement of Environmental Noise, Part 1 General Procedures" and the NSW Industrial Noise Policy (INP).

3.1 OPERATOR ATTENDED NOISE SURVEYS

Operator-attended noise surveys were conducted at each monitoring location to quantify ambient noise levels and the contributed levels of noise emitted from current DCM operations. The compliance noise survey consists of a day, an evening and two night surveys for each monitoring location. The timing of each of the survey periods is presented below: -

- Daytime - conducted between 14.12 to 15.35, 10th February & 11.21 to 15.00, 11th February 2015
- Evening - conducted between 19.17 to 21.36, 10th February 2015
- Night Survey 1 - conducted between 22.00, 10th February to 00.45 11th February 2015
- Night Survey 2 - conducted between 22.00 11th Feb to 00.30 12th Feb 2015 & 22.00 to 22.15 12th February 2015

The mine noise contribution can be determined using the following methods:

- When the Mine noise emissions are continuous in nature, the contribution is determined by noting the instantaneous sound level meter reading when the mine operations are clearly audible and dominate the measurement environment.
- When the mine noise emissions are transient or frequency specific the contribution is determined by analysing the time trace and frequency spectra recordings to remove extraneous noise source/s from the measurement environment.
- Alternatively, the contribution from the mine can be determined by noting the relative audibility of the operations/activities, at otherwise quiet times, compared to the current background noise levels.

3.2 INSTRUMENTATION

3.2.1 ATTENDED MEASUREMENTS

Attended noise measurements were taken with a Brüel & Kjær (B&K) 2250 integrating sound level meter (SLM), fitted with a B&K 4189 ½ inch diameter Electret microphone and a windshield. This instrument has performance characteristics within the requirements of Class 1 accuracy in accordance with AS 1259 and AS IEC 61672 and has the capability to measure steady, fluctuating, intermittent and/or impulsive sound, and to compute and display percentile noise levels for the measuring period.

During attended surveys, the B&K 2250 SLM was used to record a 1/3-octave time trace of each 15-minute measurement enabling detailed analysis of the acoustic environment.

Noise levels over the 15-minute measurement periods were calculated and stored in the B&K 2250 at the monitoring location during the surveys. The identifiable noise sources and their contributions were ranked in order of prominence.

A Rion Sound Level Calibrator was used to calibrate the SLM prior to measurement and checked at the conclusion of the surveys. The calibration check results are summarised in **Table 2**.

3.2.2 UNATTENDED NOISE LOGGING

Continuous noise level measurements were conducted using 2 Larson Davis 870 and 1 Larson Davis 824 environmental noise loggers at 3 monitoring locations along the rail line between the Duralie and Stratford Coal Mines. These locations are TN1 South Wards River, TN1 North Wards River and TN2 Craven. Two monitoring locations are utilised in Wards River, 1 toward the South of the village away from the level crossing and one at the north end of the village near the level crossing.

Loggers were programmed to accumulate environmental noise data continuously over sampling periods of fifteen minutes duration for the entire survey period. The internal software of each logger is capable of calculating and storing the L_{An} percentile noise levels for the chosen sampling period, which can subsequently be retrieved for detailed analysis.

A Rion Sound Level Calibrator was used to calibrate the SLM and loggers prior to commencement of measurement and checked at the conclusion of the surveys. These calibration check results are also summarised in **Table 2**.

Table 2: Instrumentation Parameters

Equipment Calibration Parameters			
Equipment	Serial No.	Last NATA Lab Cal	Next Lab Cal Due
Attended Measurements			
Bruel & Kjaer 2250 Class 1 Integrating Sound Level Meter	21273	16/07/2013	16/07/2015
Hand Held Calibration Check Results	Check		Acceptable?
Tuesday 10/2/2015	94.0, Δ = 0.0		Yes
Wednesday 11/2/2015	94.0, Δ = 0.0		Yes
Thursday 12/2/2015	94.1, Δ = 0.1		Yes
Unattended Measurements			
Larson Davis 824, Set 12	2595	26/02/2013	26/02/2015
Larson Davis 870B, Set 2	1466	03/04/13	03/04/2015
Larson Davis 870B, Set 5	1464	21/05/2013	21/05/2015

3.3 MONITORING LOCATIONS

Monitoring locations for the attended noise survey are summarised in **Table 3** and illustrated in **Appendix B**.

Table 3: Monitoring Locations

Location ID	Resident/ Owner	Address
NM1	Woodley ¹	See map of noise monitoring locations in Appendix B
NM2	Zulumovski North	
NM3	Mahony	
NM4	Fisher-Webster	
REF	Duralie Road	
Additional Monitoring Location 1	Wards River Village	

Note: Duralie Road is the GCL owned land used as a Reference noise monitoring location. An additional monitoring survey is carried out within Wards River Village due to complaints that have been received on occasion from receptors in the village and also due to variations noted under adverse weather conditions during previous surveys.

In addition, one train pass-by measurement was conducted at each of the monitoring locations listed in **Table 4**.

Table 4: Rail Monitoring Locations

Location ID	Monitoring Site	Address
TN1- South End of Village	Wards River Village	See map of noise monitoring locations in Appendix B
TN1 – North of End of Village		
TN2	Craven	

Weather Data was sourced from the Duralie Weather station for this DCM survey. The Duralie Mine weather station compound is located on the mining lease. Meteorological data from this location is collected by the mine management and provided to Vipac for analysis. Additionally temperature data is sourced from Duralie Coal's Inversion tower infrastructure in order to calculate the localised temperature inversion for each 15-minute period.

Data is presented in 15-minute intervals in **Appendix A** including meteorological parameters such as wind direction, average wind speed, temperature, sigma-theta, rainfall and calculated inversion strength.

¹ Woodley property has recently been purchased by the Thompson Family but will retain the title of the Woodley until a License revision.

4 NOISE CRITERIA

4.1 EPL NOISE LIMITS

The EPA's Environmental Protection Licence (EPL 11701 dated 20th Aug 2014) Section *L4 Noise Limits* part *L4.1* specifies the following noise limits and locations as presented in **Table 5**.

Table 5: EPL Noise Limits and Locations

Location	Noise Limits (Day, Evening, Night)	Noise Limits (Night)
	Intrusive Criteria dB LAeq 15-minute	Noise Criteria dB LA1 (1-minute)
NM1 Woodley	35	45
NM2 Zulumovski North	35	45
NM3 Mahony	35	45
NM4 Fisher-Webster	35 (day/evening), 37 (night)	45
REF Duralie Road	N/A	N/A
Additional Monitoring Location: Wards River	35	45

Parts *L4.2 (a)* and *L4.8* specify additional conditions regarding noise:

L4.2 (a) with the L_{eq} (15-minute) noise limits in condition 4.1, the noise measurement equipment must be located:

Approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or

Within 30 metres of a dwelling façade, but not closer than 3 m, where any dwelling on the property is situated more than 30 metres from the boundary closest to the premises.

*Noise from the premises is to be measured at a distance within 30 metres of the locations identified in *L4.1* to determine compliance with this condition.*

*L4.8 The noise limits set out in condition in *L4.1* apply under all meteorological conditions except for the following:*

- wind speeds greater than 3 metres/second at 10 metres above ground level; or*
- Temperature Inversion conditions up to 3 degrees Celsius/100m and wind speeds greater than 2 metres/second at 10 metres above the ground level; or*
- Temperature inversion conditions greater than 3 degrees Celsius/100m.*

4.2 PROJECT APPROVAL LIMITS

Duralie Coal Pty Ltd (DCPL) obtained approval from the Department of Planning for the Duralie Coal Mine extension Section 96(2) Modification – Notice of Modification dated 30th July 2006 (DA No. 169/99). Additionally DCPL was granted approval for the Duralie Extension Project under Section 75J of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) on 26th November 2010 (NSW Project Approval [08_0203]). On 10th November 2011, the NSW Project Approval (08_0203) was amended by Order of The Land and Environment Court of NSW and additional approval for extension to the operation hours of the Duralie Coal Shuttle was granted to DCPL.

The relevant noise criteria are described in Schedule 3, Condition No. 2 of the NSW Projects Approval (08_0203) and are reproduced below.

SCHEDULE 3 ENVIRONMENTAL PERFORMANCE CONDITIONS

Noise Criteria

2. Except for the land referred to in Table 1 (of Schedule 3), the Proponent shall ensure that the noise generated by the project does not exceed the criteria in Table 2 (of Schedule 3) at any residence on privately owned land or on more than 25 per cent of any privately-owned land.

Table 2: Noise criteria dB(A) (Table 2 of Schedule 3)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (1 minute)
172 - Lyall	35	39	40	45
126 – Hamamn Pixalu PI	35	35	39	45
123 – Oleksiuk & Carmody				
173 – Trigg & Holland	35	36	37	45
116 - Weismantel				
127 – Fisher-Webster	35	35	37	45
131(1) - Relton				
180(1) - Thompson	35	36	36	45
95 – Smith & Ransley	35	35	36	45
144 - Wielgosinski				
169 - Williams	35	36	35	45
177 - Thompson				
All other privately-owned land	35	35	35	45

Notes:

- To identify the locations referred to in Table 2, refer to the figure in Appendix 3; and
- Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

However these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

4.3 RAIL NOISE

Duralie Coal Mine - Noise Management Plan Section 4.2.2 specifies the following noise limits in clause L2.2:

“It is the objective of this license to progressively reduce noise levels to the goals of 65dB(A)Leq , (daytime from 7am – 10pm), 60dB(A)Leq (night-time from 10pm –7am) and 85dB(A) (24hr) max pass-by noise, at one metre from the façade of affected residential properties through the implementation of the Pollution Reduction Programs”.

In addition Section 7.6 of the Duralie Coal Mine Noise Management Plan stipulates the following with regard to rail noise:

“Rail Noise monitoring and reporting against the other rail noise performance criteria described in Section 4 will be undertaken for general information purposes only (i.e. they are not DCM compliance requirements).”

Additionally Schedule 3 Condition 4(e) of the DCPL Extension Project Approval stipulates:

“On privately owned land between the Stratford and Duralie mines where the maximum pass-by rail traffic noise from the Project exceeds 85dBA, the Proponent shall implement additional noise mitigation measures (such as double glazing, insulation, and/or air conditioning) at the residence in consultation with the owner. These measures must be reasonable and feasible.”

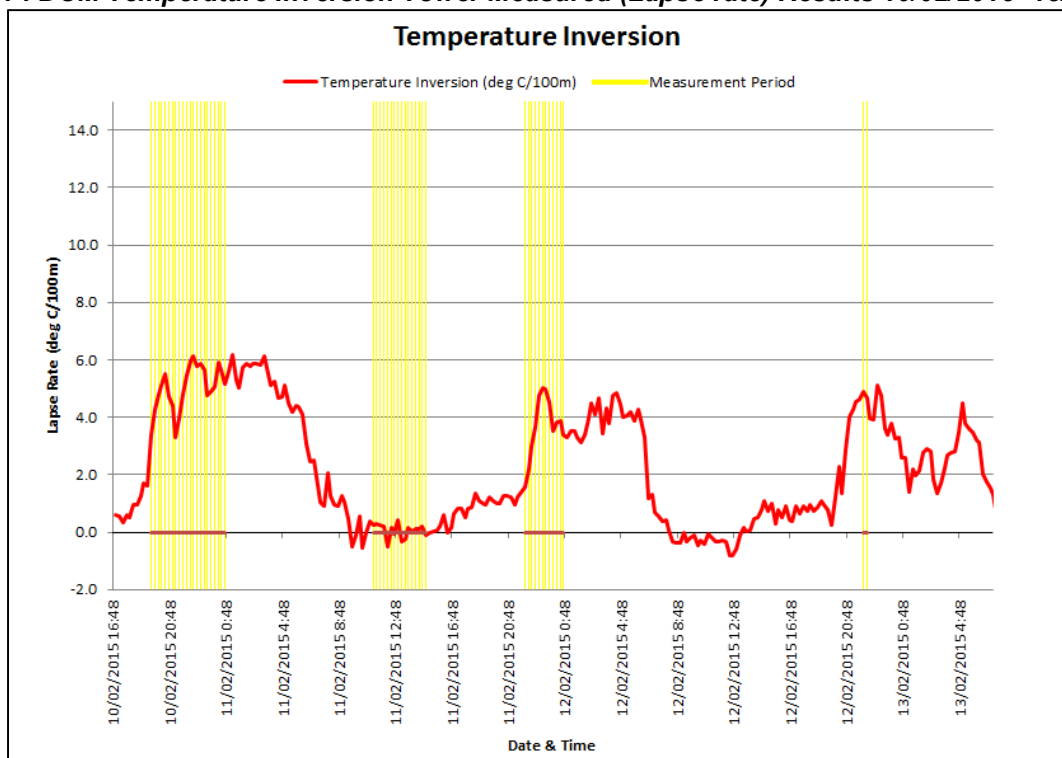
5 TEMPERATURE INVERSION CONDITIONS

Typically at DCM, temperature inversion strength and occurrence is determined by utilizing the inversion tower data provided by the Duralie Coal Mine and calculating the lapse rate and Pasquill Stability Categories.

This section presents graphically the calculated temperature inversion results for the survey period. A comparison against predicted inversion results is presented in **Appendix A** of this report.

Figure 1 below presents the calculated lapse rate from the measurement data collect by the inversion towers and indicates that there is a high occurrence of moderate to strong temperature inversions. Due to the presence of strong to moderate temperature inversions throughout the evening and night survey periods there is a strong probability of noise enhancements. The times at which each of the compliance surveys were conducted are highlighted in yellow for ease of presentation.

Figure 1 : DCM Temperature Inversion Tower Measured (Lapse rate) Results 10/02/2015- 13/02/2015



6 NOISE SURVEY RESULTS

The results of the day, evening, and night-time operator attended surveys under prevailing weather conditions are presented in the following sections, together with a description of audible sounds and their contribution. Noise events such as passing road, rail and air traffic, wildlife noise and other extraneous noise sources have been excluded from the measurement data, with the excluded periods being highlighted in yellow in the survey graphs (*Figures 2 - 25*).

6.1 NOISE SURVEY WEATHER CONDITIONS

The weather conditions at the time of each attended noise measurement as obtained from direct measurement at each monitoring location are presented in **Table 6**.

Table 6: Attended Noise Measurements & Prevailing Weather Conditions

Weather Parameters						
Location	Measurement Start Time (hrs.)	Temp. °C	Cloud Cover (Okta)	Wind Speed ¹ (ms ⁻¹)	Wind Direction	Rainfall (mm)
Day Survey 10/02/2015 – 11/02/2015						
Woodley	10/2/15 14:12	26.2	5/8	1.6	North East	0
Zulumovski	11/2/15 11:42	24.6	5/8	0.3	South	0
Mahony	10/2/15 14:56	28.0	4/8	1.7	East north East	0
Fisher- Webster	11/2/15 11:21	21.8	3/8	0.0	Still Conditions	0
Duralie Road	10/2/15 15:20	27.8	4/8	1.0	North East	0
Wards River Village	11/2/15 14:44	32.4	5/8	0.4	South West	0
Evening Survey 10/02/2015						
Woodley	10/2/15 19:17	25.6	1/8	0.6	North-North-East	0
Zulumovski	10/2/15 20:38	22.8	1/8	0.3	North-North-East	0
Mahony	10/2/15 19:57	22.4	0/8	0.5	North-North-East	0
Fisher- Webster	10/2/15 20:57	21.3	0/8	0.6	North-North-East	0
Duralie Road	10/2/15 20:18	24.2	0/8	0.6	North-North-East	0
Wards River Village	10/2/15 11:55	21.0	0/8	0.1	Still Conditions	0
Night Survey 1, 10/02/2015 – 11/02/2015						
Woodley	10/2/2015 22:00	22.8	0/8	0.3	North East	0
Zulumovski	10/2/2015 22:44	20.4	2/8	0.0	Still Conditions	0
Mahony	10/2/2015 23:00	22.3	0/8	0.0	Still Conditions	0
Fisher- Webster	10/2/2015 23:23	18.0	3/8	0.0	Still Conditions	0
Duralie Road	10/2/2015 22:29	21.2	0/8	0.1	Still Conditions	0
Wards River Village	11/2/2015 00:05	21.0	3/8	0.0	Still Conditions	0
Night Survey 2, 11/02/2015 – 12/02/2015						
Woodley	11/2/2015 22:00	22.7	0/8	0.5	North	0
Zulumovski	11/2/2015 23:44	18.6	0/8	0.0	Still Conditions	0
Mahony	12/2/2015 22:00	23.0	0/8	0.4	North	0
Fisher- Webster	11/2/2015 23:24	19.0	0/8	0.0	Still Conditions	0
Duralie Road	11/2/2015 22:30	22.4	0/8	0.4	North	0
Wards River Village	12/2/2015 00:07	18.4	0/8	0.1	Still Conditions	0

Note 1 Wind speed was checked at each location during attended noise monitoring. Noise measurements were only conducted where weather conditions were within acceptable levels at the microphone position.

6.2 NOISE SURVEY MINE OPERATIONS

DCM provided Vipac with information for reporting on mining plant, equipment and operations with correlating times and location. A full description of the Mine Operations and Activities are provided in **Appendix C** of this report.

6.3 DAY SURVEY

6.3.1 ATTENDED MEASUREMENT RESULTS – DAY SURVEY

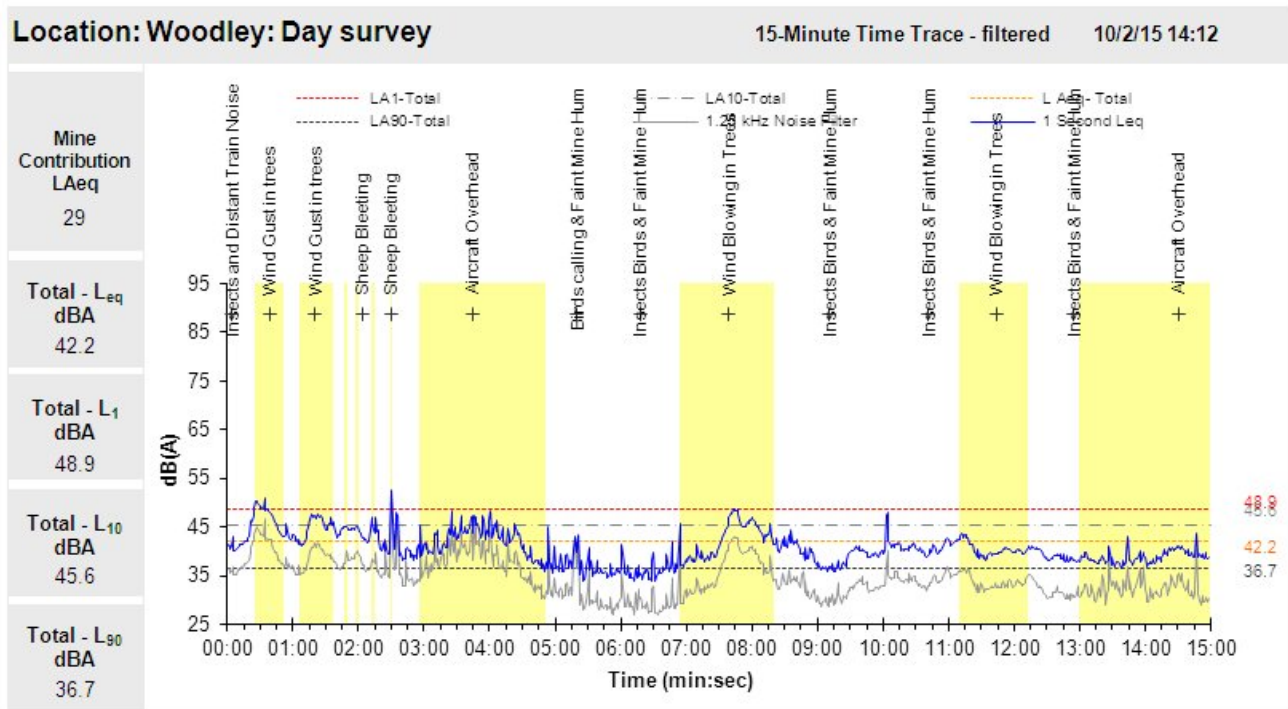


Figure 2: Day Survey, Woodley

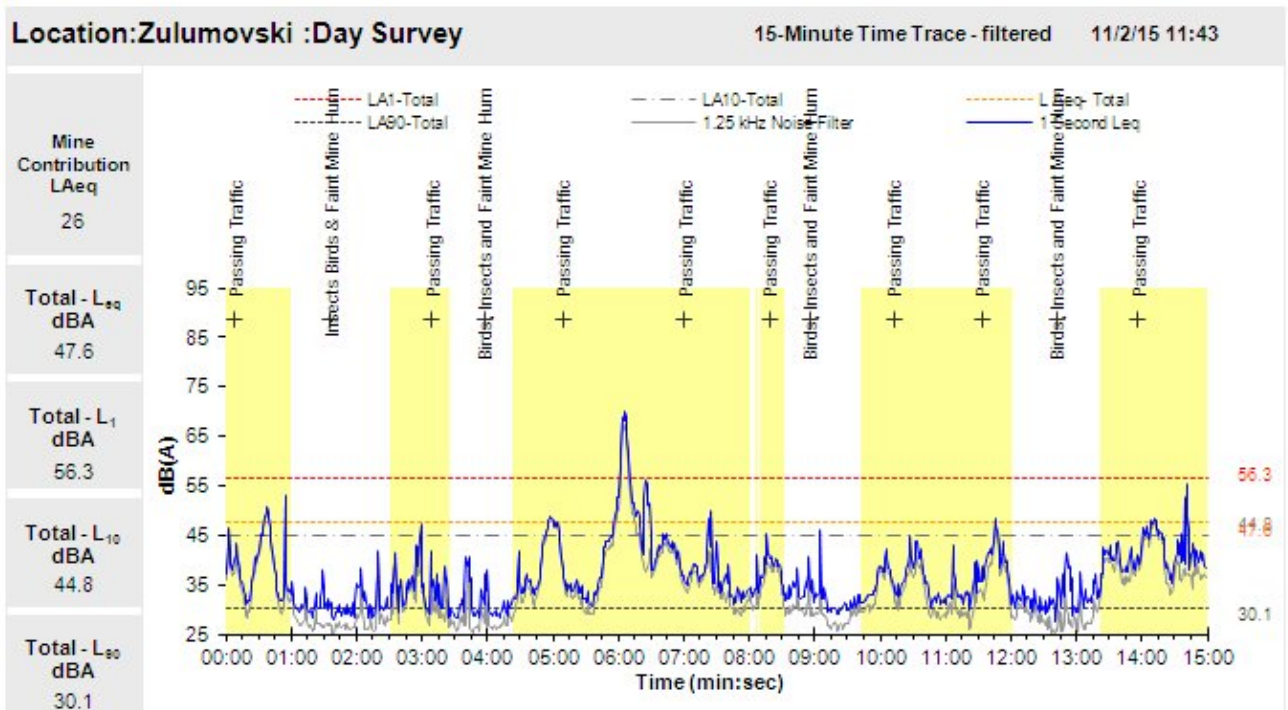


Figure 3: Day Survey, Zulumovski

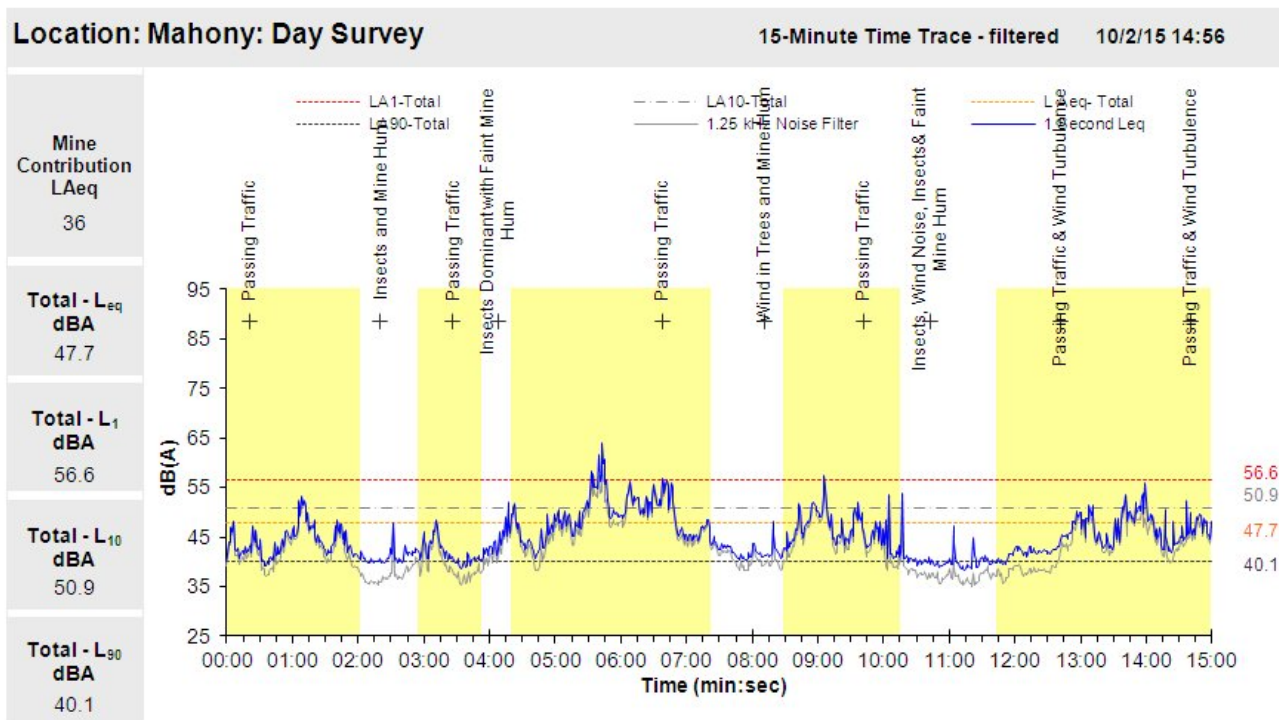


Figure 4: Day Survey, Mahony

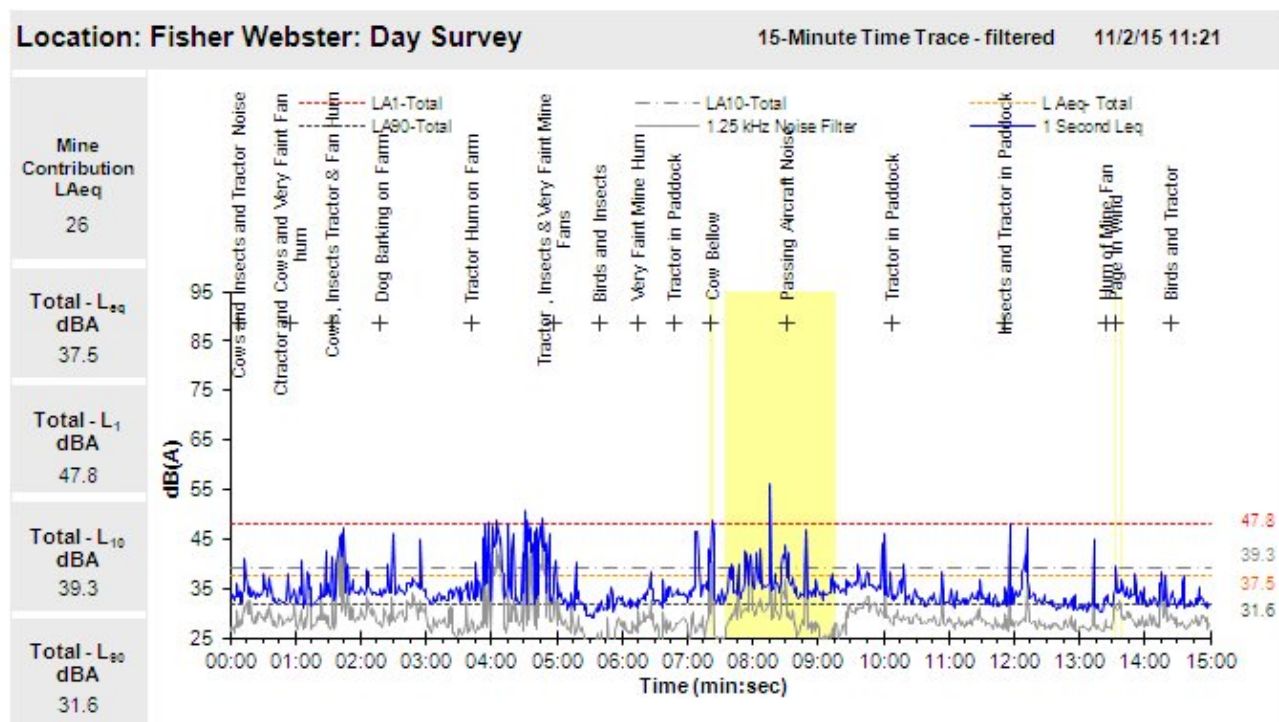


Figure 5: Day Survey, Fisher-Webster

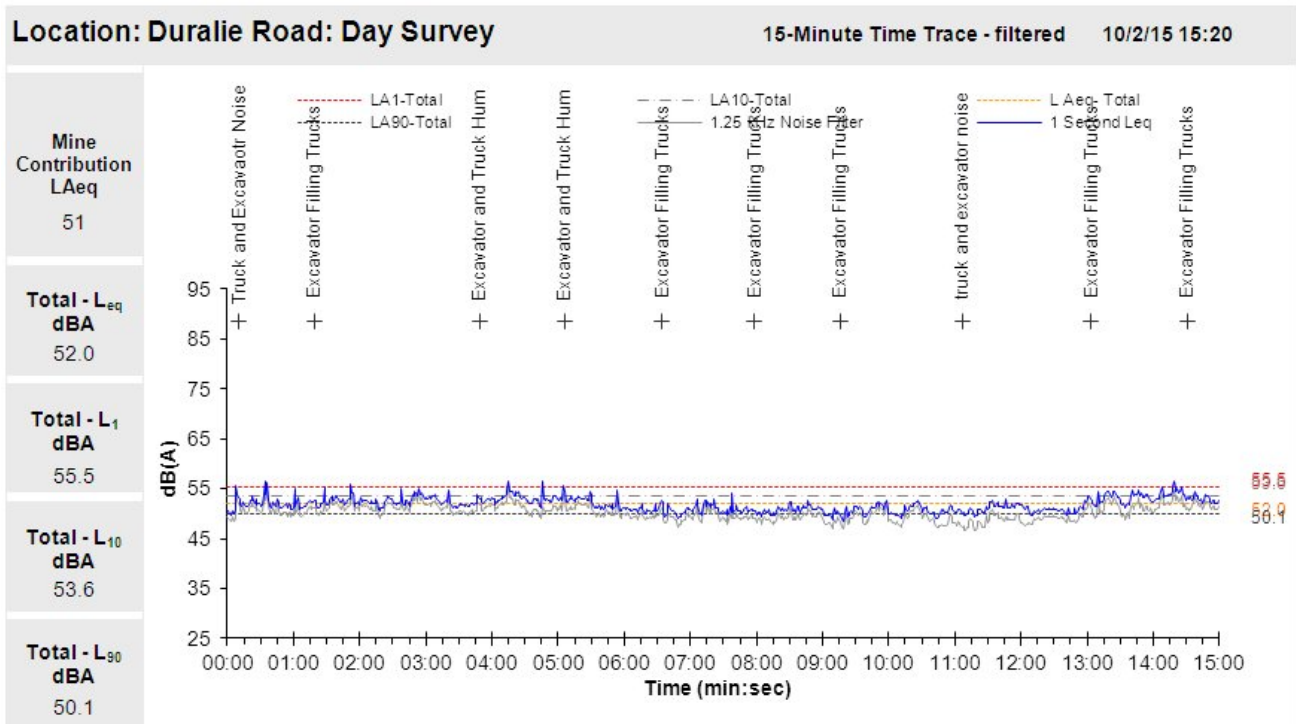


Figure 6: Day Survey, Duralie Road

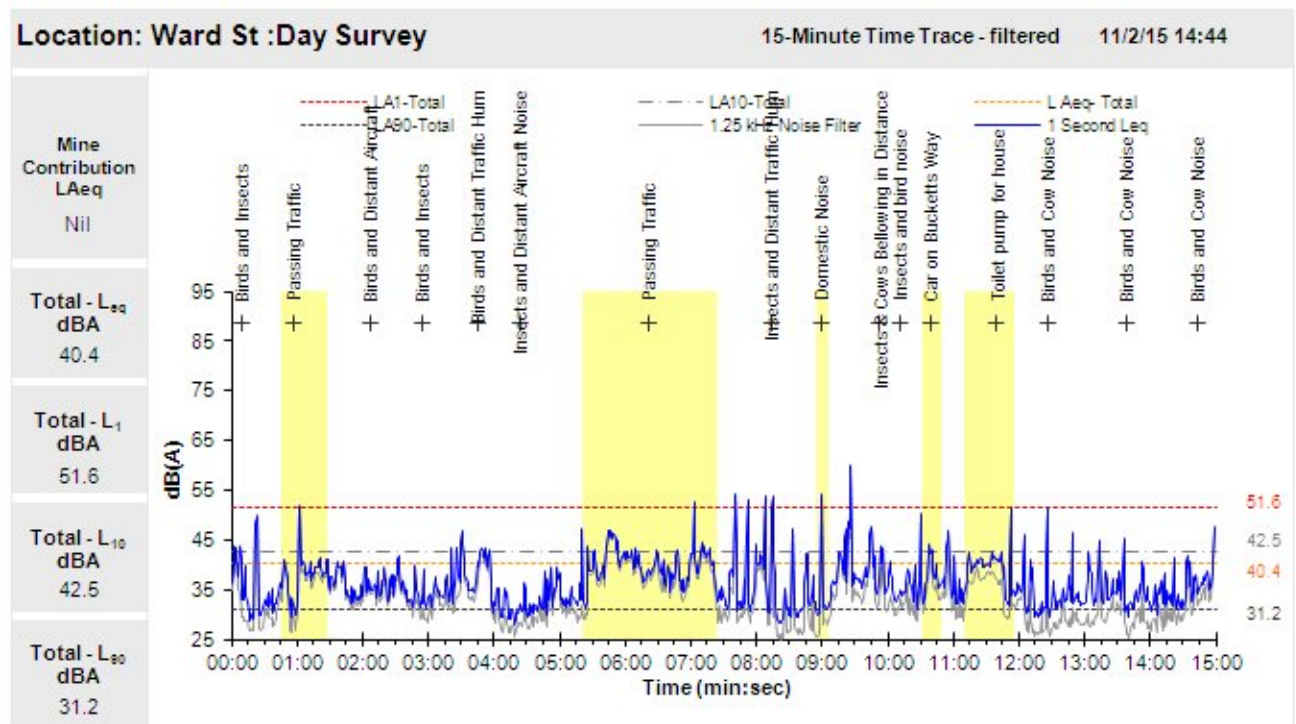


Figure 7: Day Survey, Wards River

6.3.2 ANALYSIS OF DAY ATTENDED SURVEY

Summary of Audible Noises during the Day Survey Period

The Mine noise emissions at the reference site (REF Duralie Road) measured 51dB L_{Aeq} during typical operations on the Mine lease. Audible noise sources that contributed to this result consisted of excavation activities such as excavator operations, haul truck movements and track dozers operating on excavation strips. Noise emissions measured at Duralie Road were representative of mine operations for this survey period.

Noise from DCM operations was audible at all monitoring locations during the day survey period surveys conducted on the 10th & 11th Feb 2015 with the exception of the Ward St. Location located in Wards River, which had a nil contribution for this survey period.

Excluding extraneous noise sources (i.e. frequent road traffic movements, continuous sounds from birds, insects, dogs and occasional passing air & rail traffic) from the overall noise measurement resulted in the mine noise contribution determined at each monitoring location, which are summarised below. The audible noise sources at the monitoring locations consisted of passing road, rail and air traffic, insect and wildlife noise and general farm noise.

Prevailing weather conditions were characterised by cloudy skies with light winds blowing from a North-easterly direction on the 10th to the 11th February 2015 during the daytime survey period.

Summary of Measured Mine Noise

The DCM L_{Aeq} noise contributions for the day survey are as follows:

- 29dB L_{Aeq} 15-minute at NM1 Woodley
- 26dB L_{Aeq} 15-minute at NM2 Zulumovski
- 36dB L_{Aeq} 15-minute at NM3 Mahony
- 26dB L_{Aeq} 15-minute at NM4 Fisher Webster
- 51dB L_{Aeq} 15-minute at Ref. Duralie Road
- Nil at Wards River

6.4 EVENING SURVEY

6.4.1 ATTENDED MEASUREMENT RESULTS - EVENING SURVEY

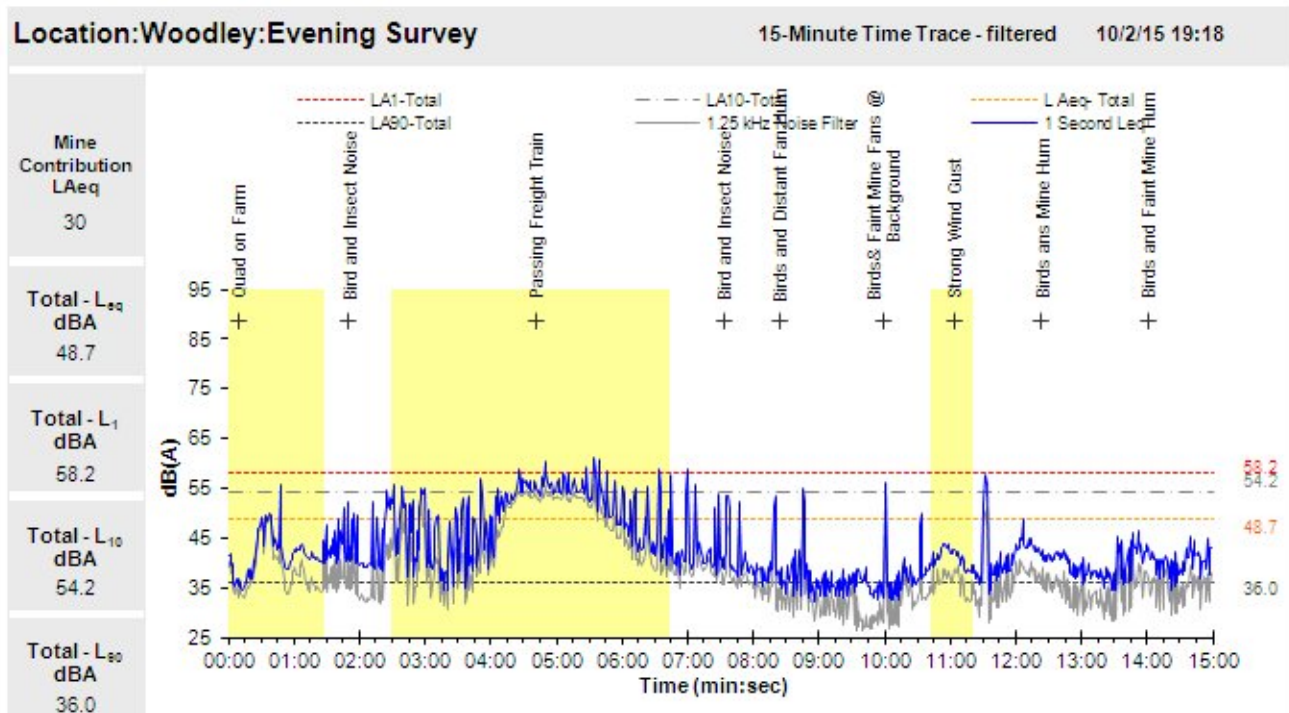


Figure 8: Evening Survey, Woodley

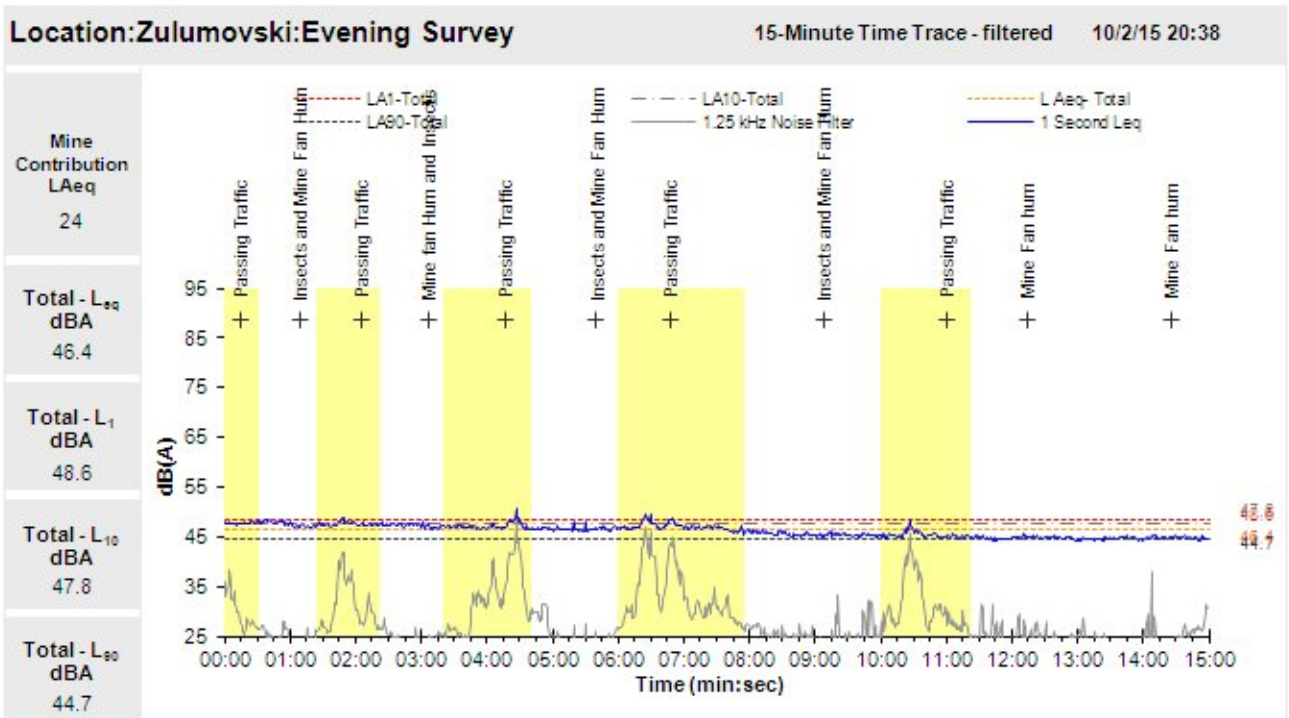


Figure 9: Evening Survey, Zulumovski

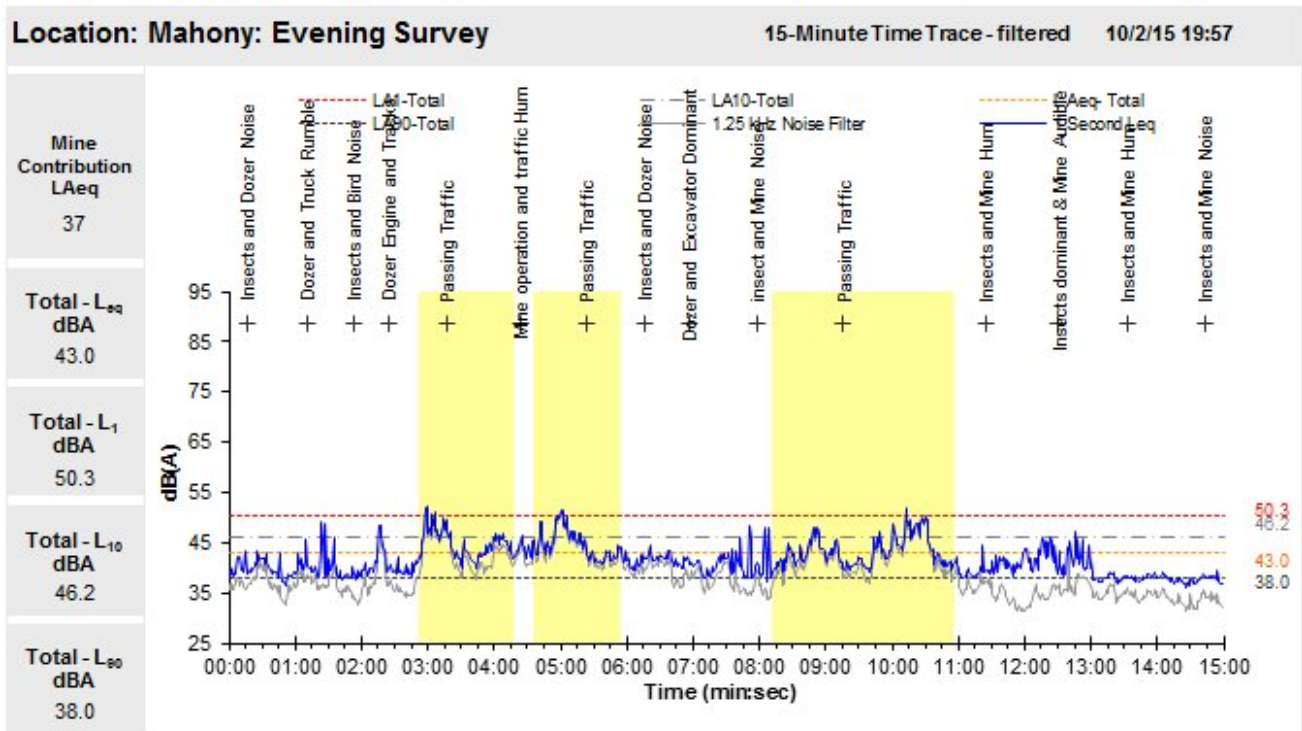


Figure 10: Evening Survey, Mahony

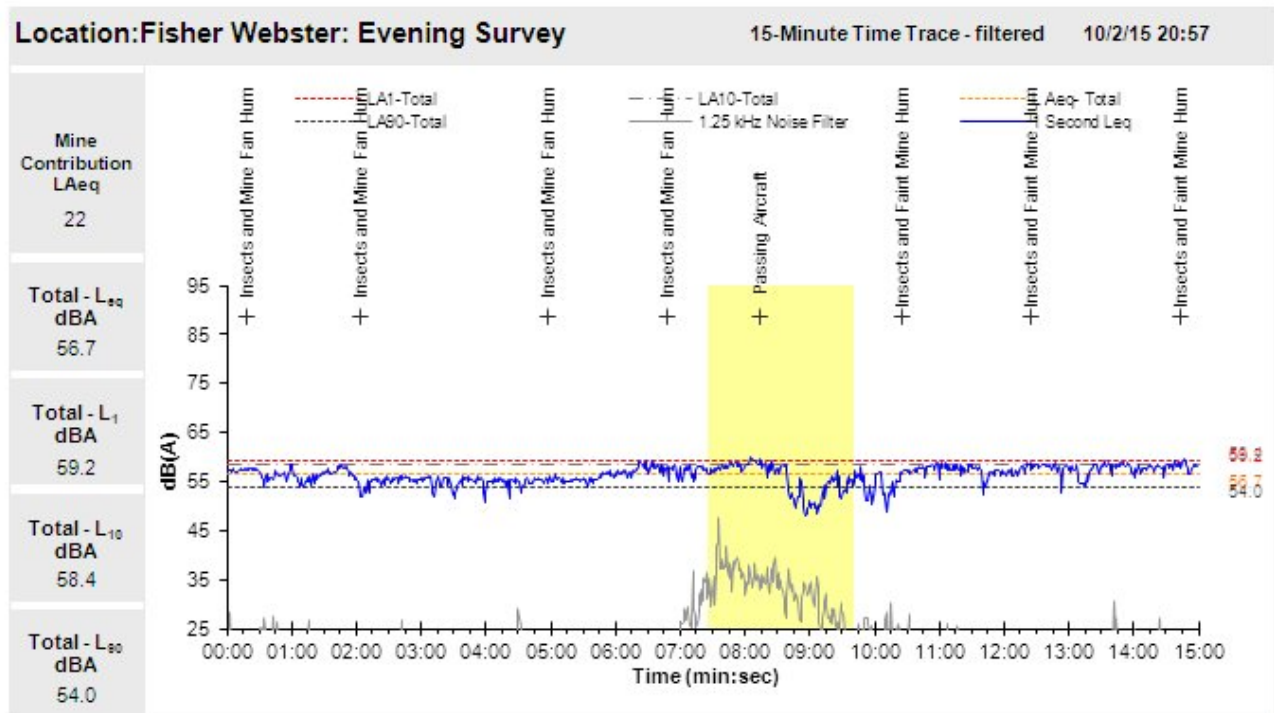


Figure 11: Evening Survey, Fisher-Webster

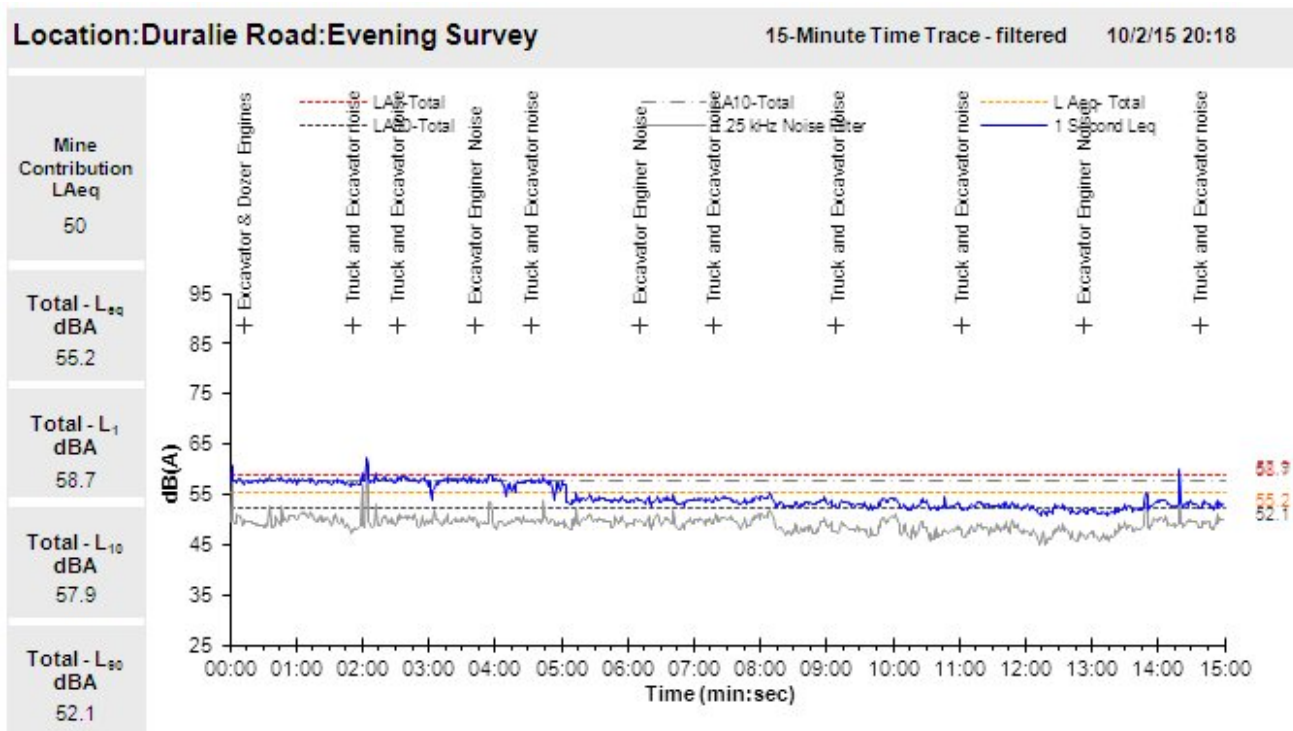


Figure 12: Evening Survey, Duralie Road

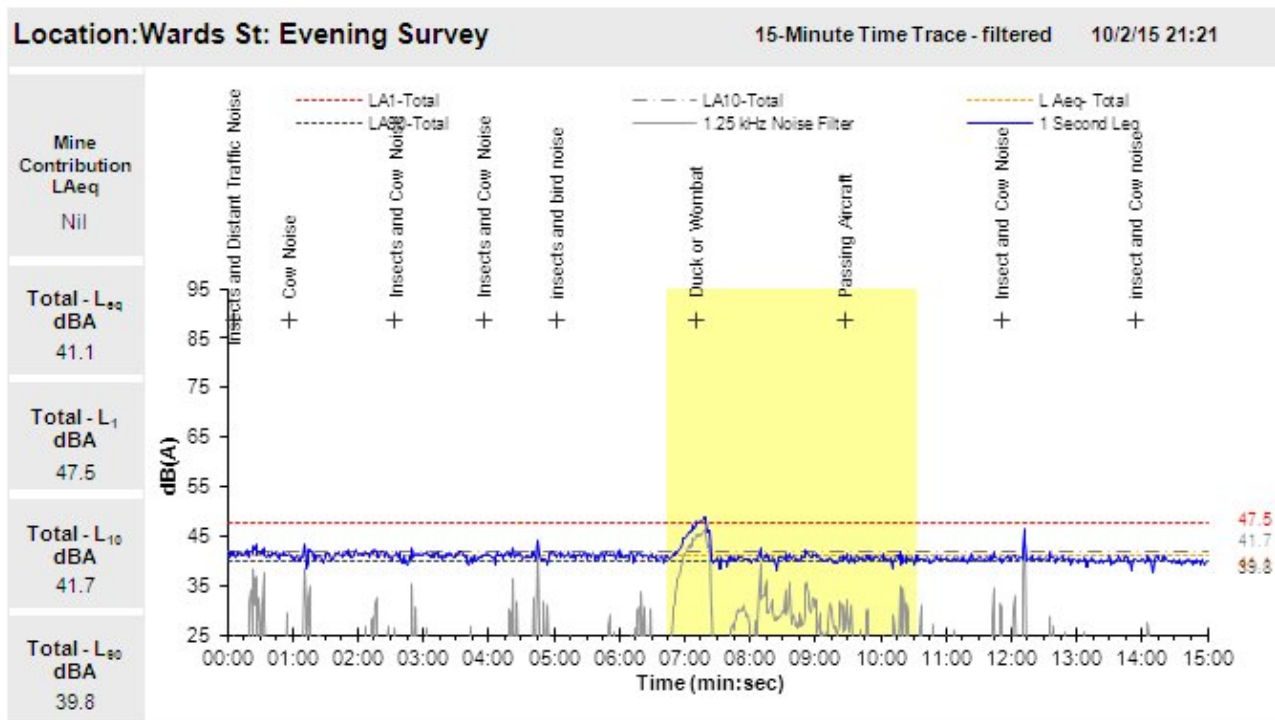


Figure 13: Evening Survey, Wards River

6.4.2 ANALYSIS OF EVENING ATTENDED SURVEY

Summary of Audible Noises during the Evening Survey Period

The Mine noise emissions at the reference site (REF Duralie Road) measured 50dB L_{Aeq} during typical operations on the Mine lease.

Audible noise sources that contributed to this result consisted of mining operations such as excavator operations and haul truck movements operating on excavation strips.

Noise emissions measured at Duralie Road were representative of mine operations for this survey period.

Noise from DCM operations was inaudible (nil contribution) at the Wards St, Wards River monitoring location during the evening survey conducted on 10th February 2015. Noise emissions from DCM operations were audible at the, Woodley, Zulumovski, Mahony and Fisher-Webster monitoring locations during the evening survey period. The audible mining operations at the noise sensitive receivers consisted of excavator, dozer and haul truck engine operations.

Excluding extraneous noise sources (i.e. frequent road traffic movements, continuous sounds from birds, insects, dogs and occasional passing rail traffic) from the overall noise measurement resulted in the mine noise contribution being determined at each monitoring location, which are summarised below.

Prevailing weather conditions at the time were characterised by clear skies with light wind conditions blowing from a Northern direction, combined with moderate temperature inversion conditions as calculated from the Duralie Inversion Tower Infrastructure throughout the evening survey period.

Summary of Measured Mine Noise

The DCM L_{Aeq} noise contributions for the evening survey period are as follows:

- 30dB L_{Aeq} 15-minute at NM1 Woodley
- 24dB L_{Aeq} 15-minute NM2 Zulumovski
- 37dB L_{Aeq} 15-minute at NM3 Mahony
- 22dB L_{Aeq} 15-minute at NM4 Fisher Webster
- 50dB L_{Aeq} 15-minute at Ref Duralie Road
- Nil at Wards River

6.5 NIGHT SURVEY 1

6.5.1 ATTENDED MEASUREMENT RESULTS - NIGHT SURVEY 1

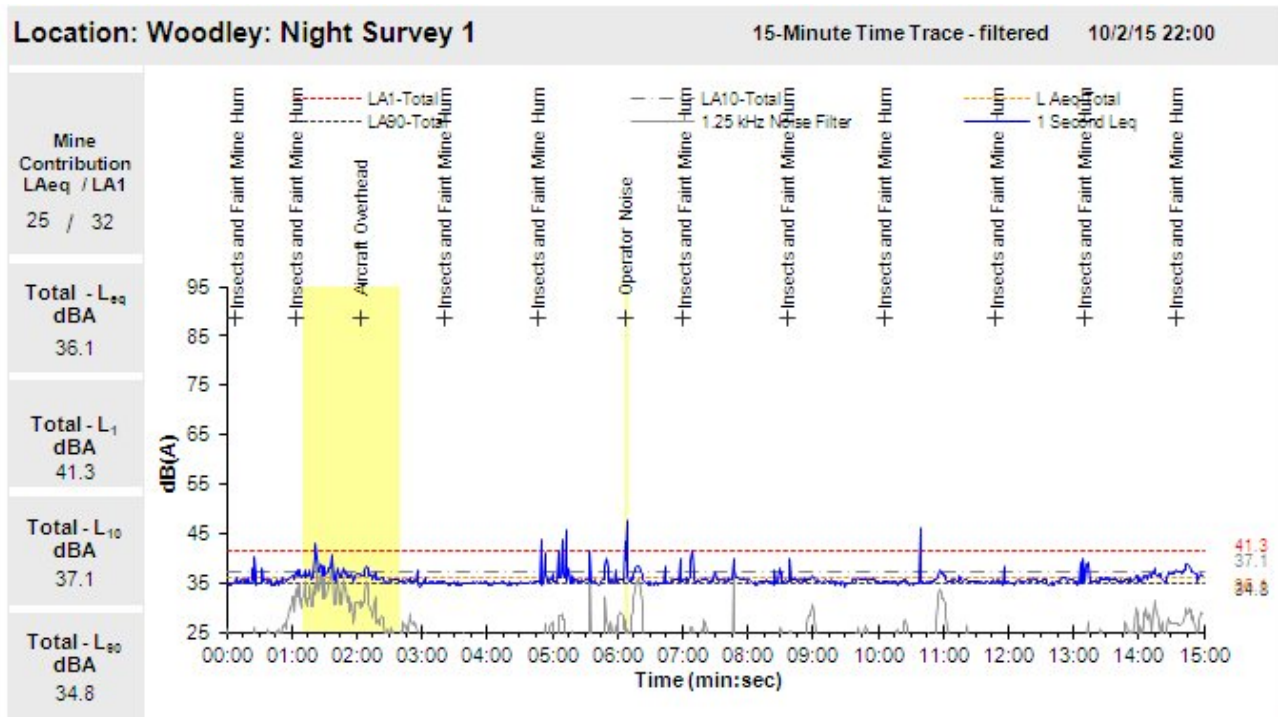


Figure 14: Night Survey 1, Woodley

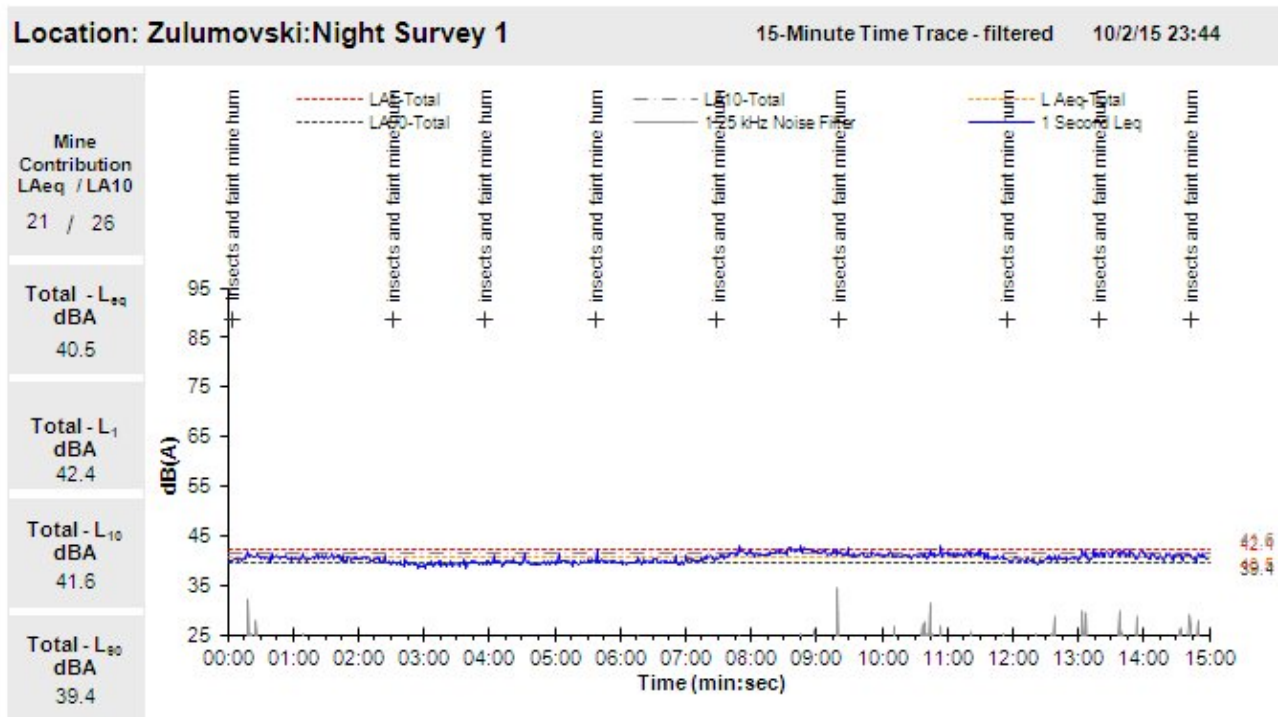


Figure 15: Night Survey 1, Zulumovski

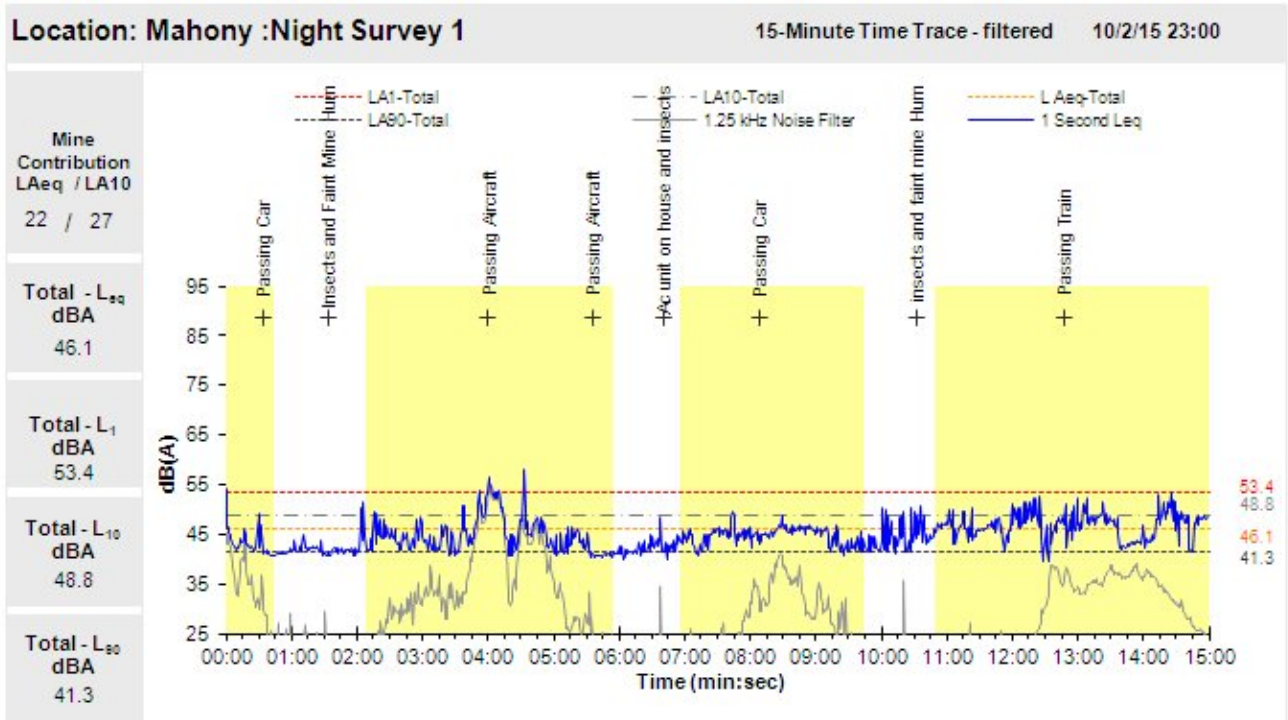


Figure 16: Night Survey 1, Mahony

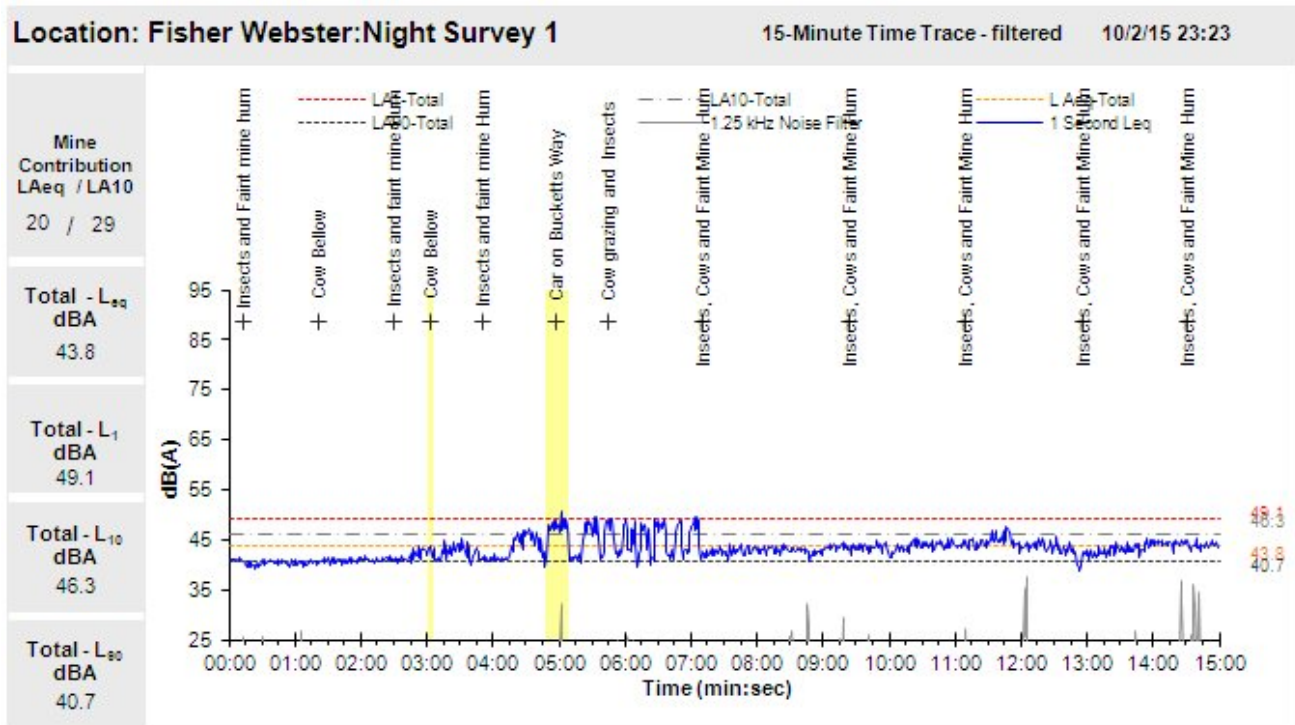


Figure 17: Night Survey 1, Fisher-Webster

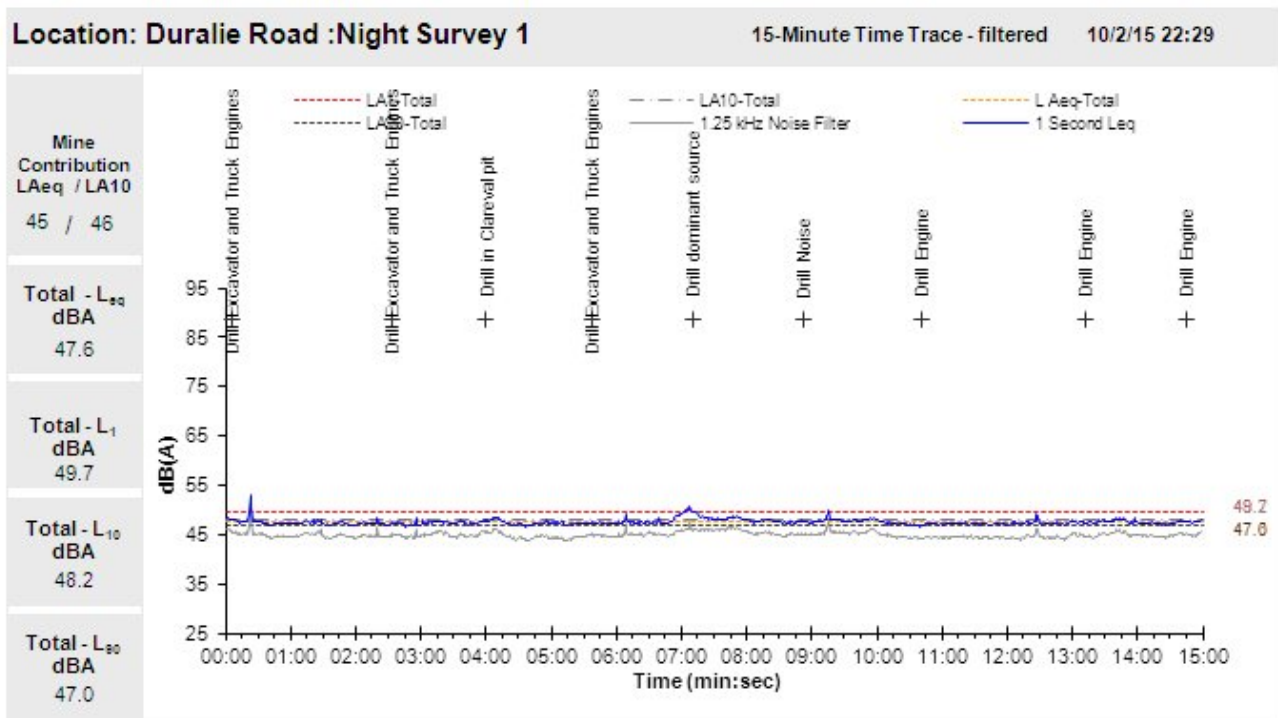


Figure 18: Night Survey 1, Duralie Road

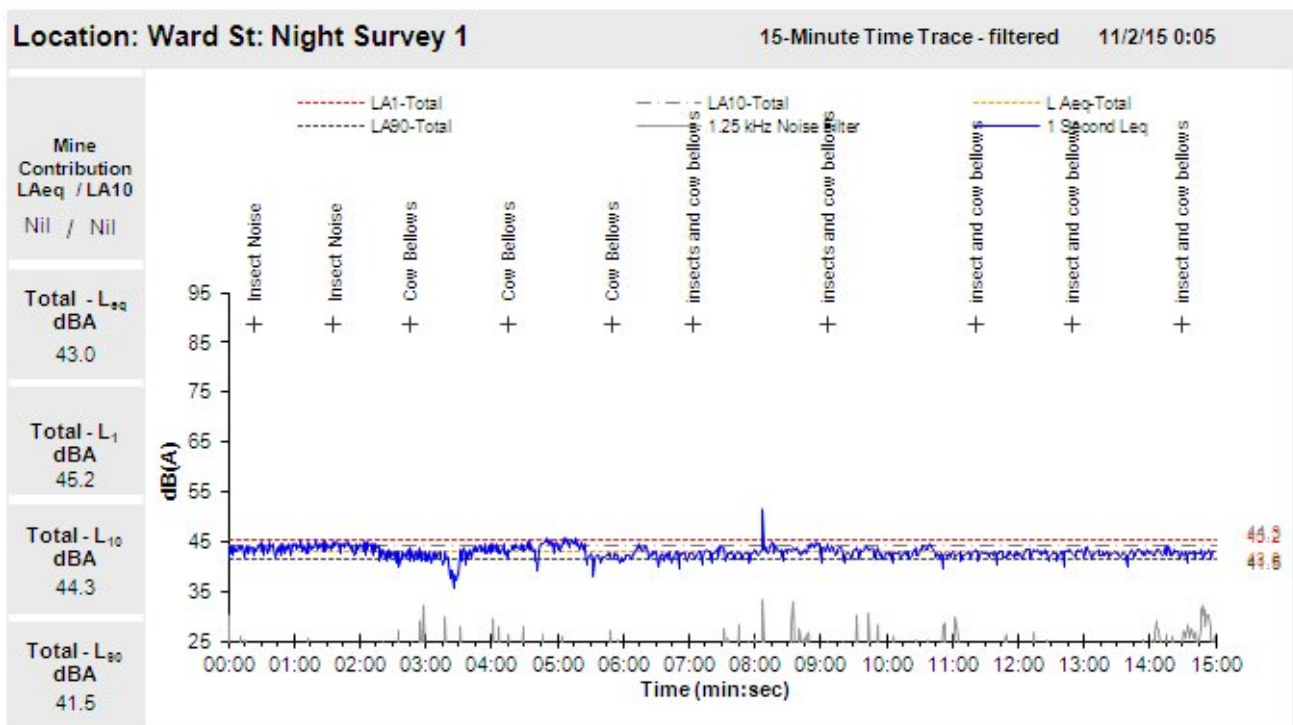


Figure 19: Night Survey 1, Wards River

6.5.2 ANALYSIS OF NIGHT ATTENDED SURVEY 1

Summary of Audible Noises during the Night Survey Period 1

The mine noise emissions at the reference site (REF Duralie Road) measured 45dB L_{Aeq} during typical operations on the Mine lease on the 10th February 2015. Audible noise sources that contributed to this result consisted of excavation activities such as excavator operations and haul truck movements operating on excavation strips. Noise emissions measured at Duralie Road were representative of mine operations for this survey period.

Noise from DCM operations was audible at all monitoring locations during the first night survey conducted on 10th February 2015. The audible mining operations at the noise sensitive receivers consisted of excavator operations, dozer operations including track slap and haul truck movements.

Excluding extraneous noise sources (i.e. road traffic movements, sounds from birds, insects, dogs and occasional passing rail traffic) from the overall noise measurement resulted in the mine noise contribution being determined at each monitoring location, which are summarised below.

Prevailing weather conditions were characterised by clear skies with moderate wind conditions blowing from a North-north-easterly direction, combined with temperature inversion conditions varying from moderate to strong inversion conditions throughout the survey periods on the Night Survey 1.

The DCM L_{Aeq} noise contributions for the first night survey period are as follows:

- 25dB L_{Aeq} 15-minute at NM1 Woodley
- 21dB L_{Aeq} 15-minute at NM2 Zulumovski
- 22dB L_{Aeq} 15-minute at NM3 Mahony
- 20dB L_{Aeq} 15-minute at NM4 Fisher Webster
- 45dB L_{Aeq} 15-minute at Ref Duralie Road
- Nil at Wards River

The DCM L_{A1} (1 minute) contributions for the first night survey period are as follows

- 32dB L_{A1} (1-minute) at NM1 Woodley
- 26dB L_{A1} (1-minute) at NM2 Zulumovski
- 27dB L_{A1} (1-minute) at NM3 Mahony
- 29dB L_{A1} (1-minute) at NM4 Fisher Webster
- 46dB L_{A1} (1-minute) at Ref Duralie Road
- Nil at Wards River

6.6 NIGHT SURVEY 2

6.6.1 ATTENDED MEASUREMENT RESULTS - NIGHT SURVEY 2

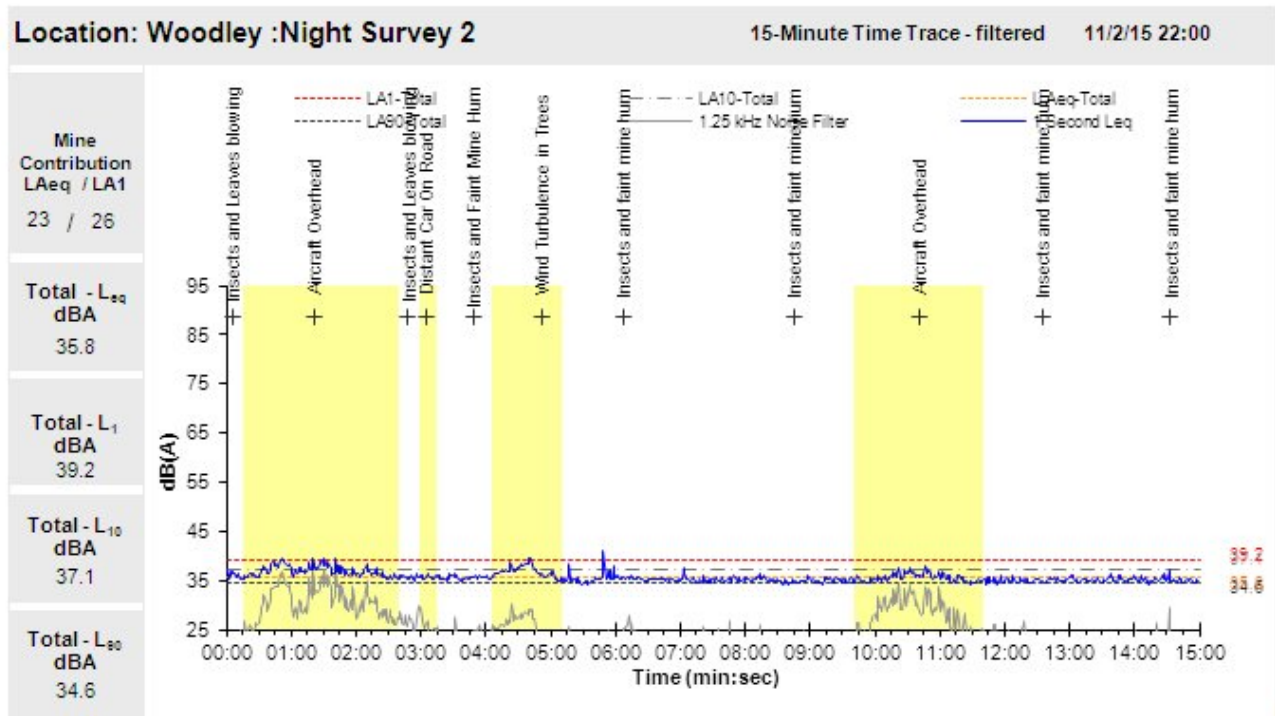


Figure 20: Night Survey 2, Woodley

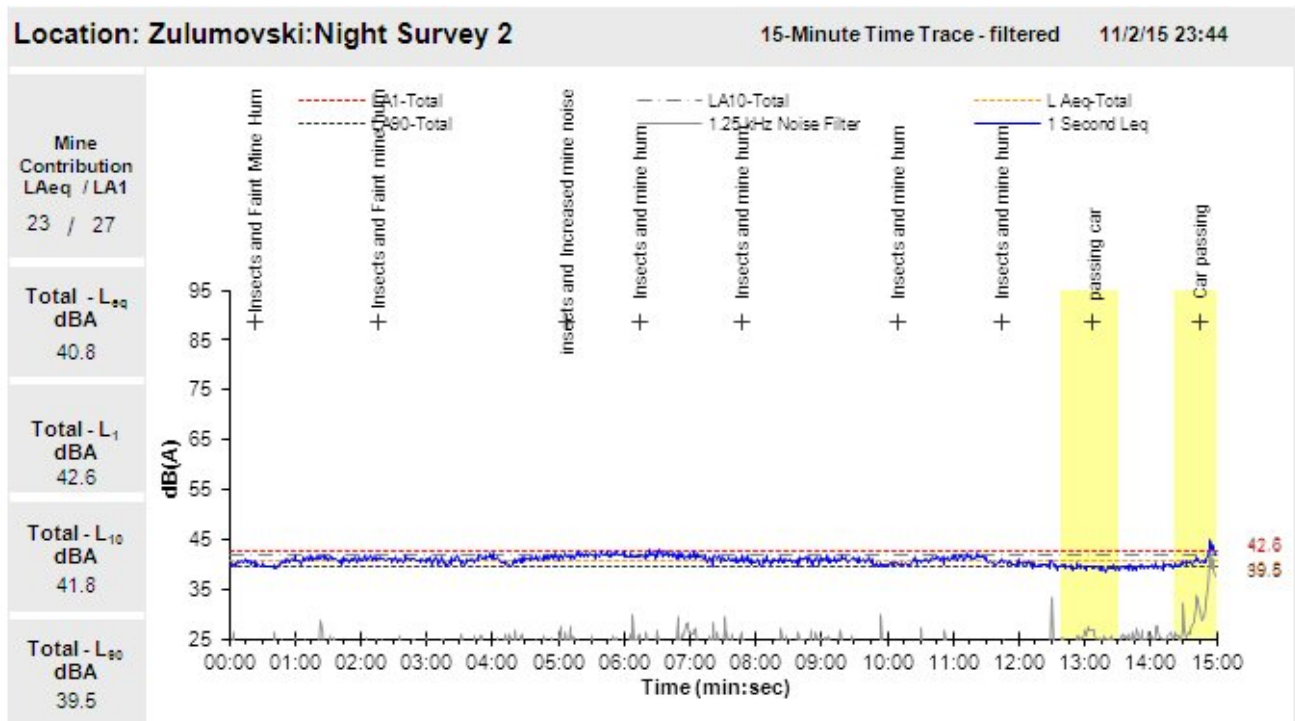


Figure 21: Night Survey 2, Zulumovski

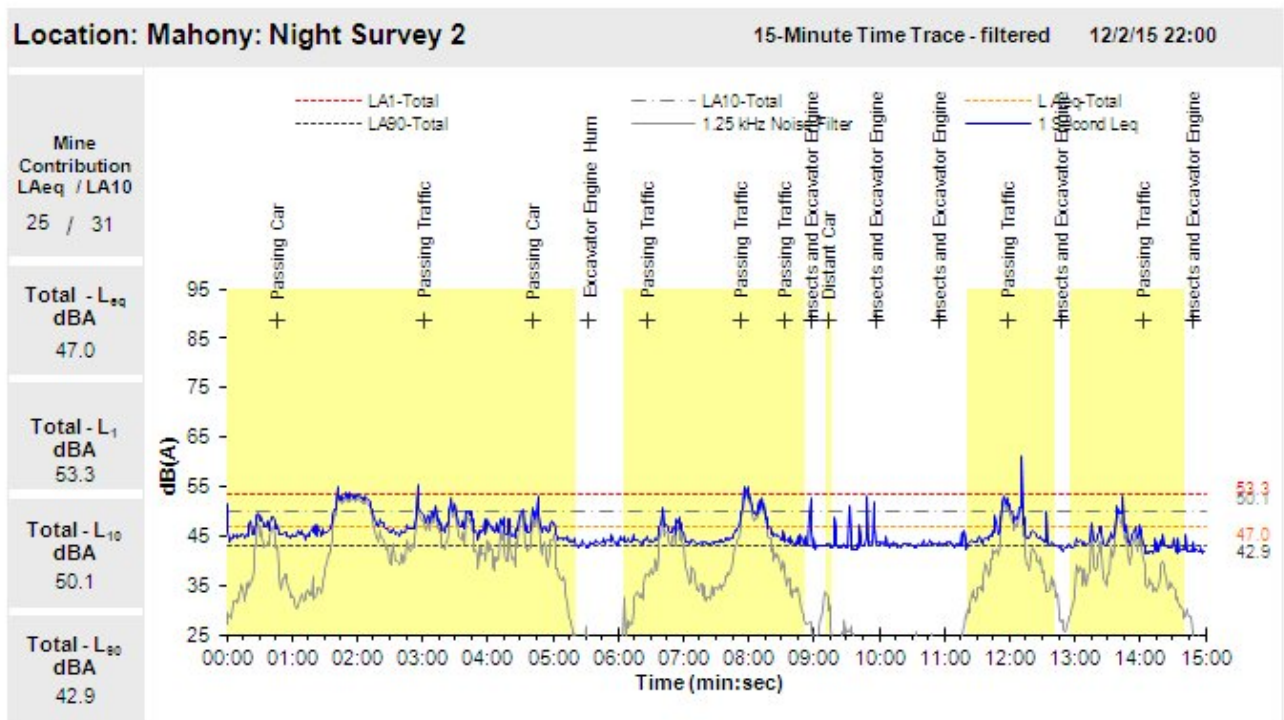


Figure 22: Night Survey 2, Mahony

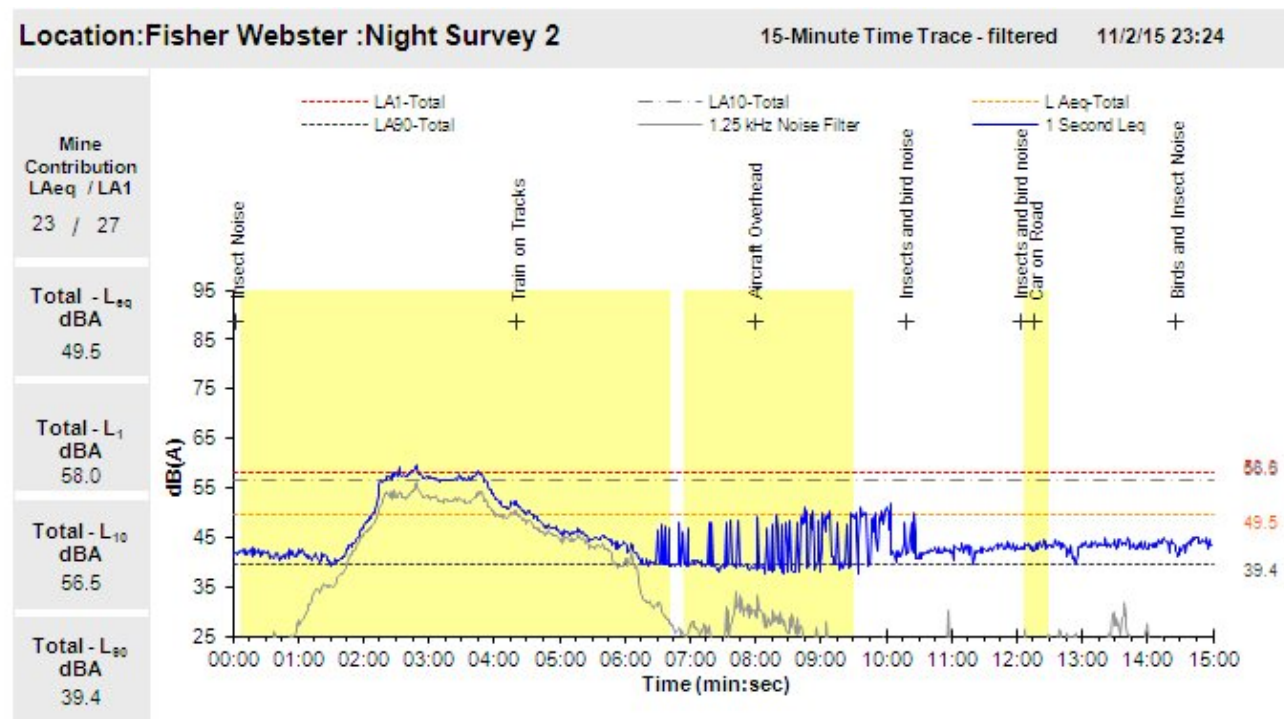


Figure 23: Night Survey 2, Fisher Webster

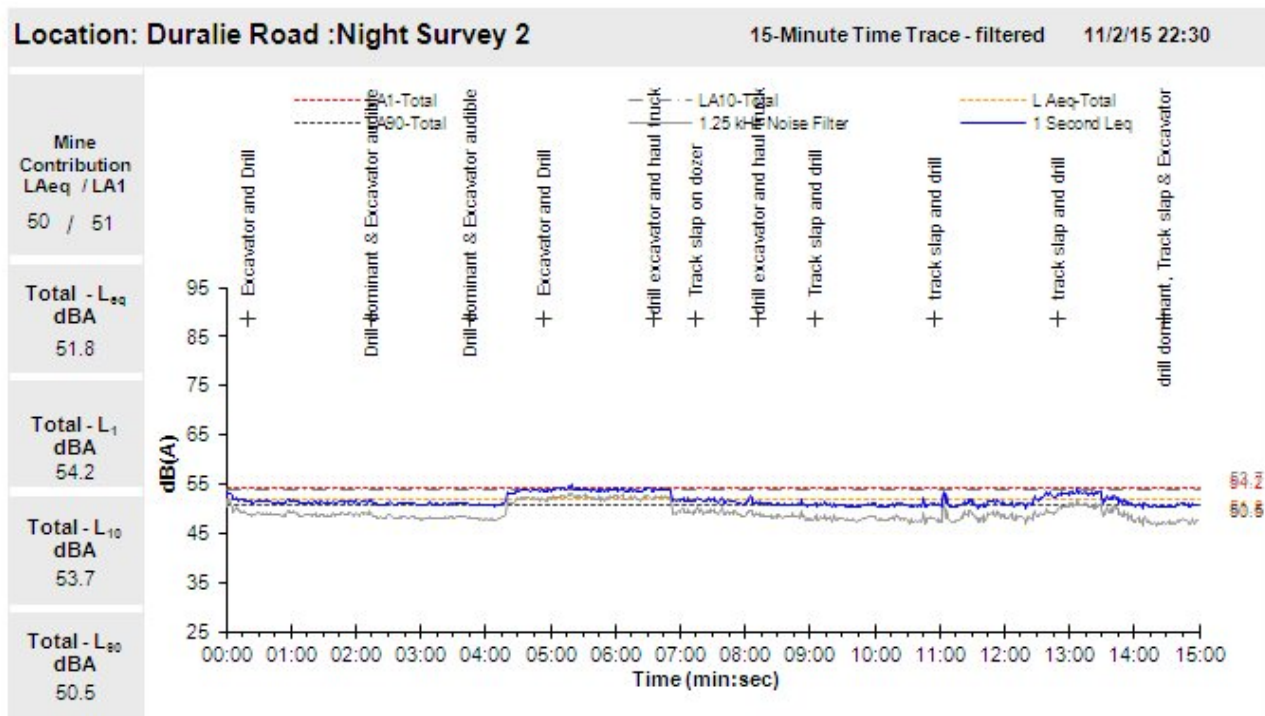


Figure 24: Night Survey 2, Duralie Road

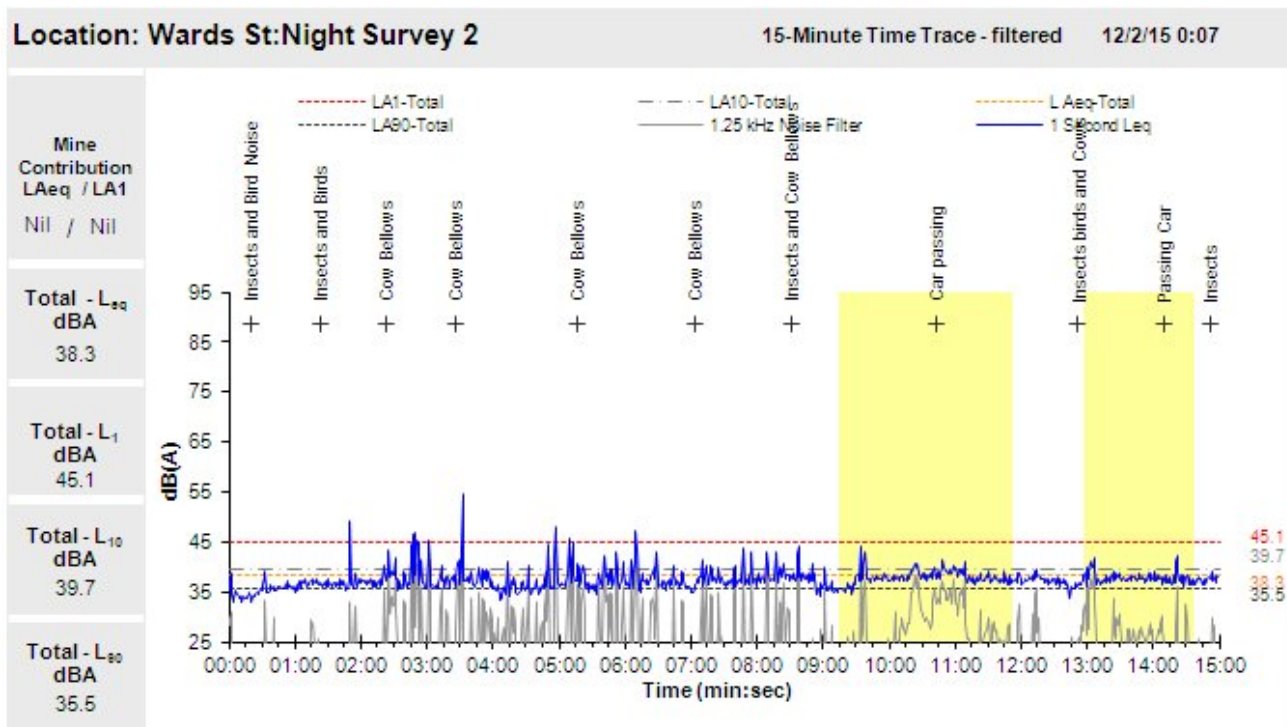


Figure 25: Night Survey 2, Wards River

6.6.2 ANALYSIS OF NIGHT ATTENDED SURVEY 2

Summary of Audible Noises during the Night Survey Period 2

The Mine noise emissions at the reference site (REF Duralie Road) measured 50dB L_{Aeq} during typical operations on the Mine lease. Audible noise sources that contributed to this result consisted of excavation activities such as excavator operations; haul truck movements and track dozers operating on excavation strips. Noise emissions measured at Duralie Road were representative of mine operations for this survey period.

Noise from DCM operations was not audible at the Wards River monitoring locations during the night survey 2, conducted on 11th & 12th February 2015. The mine operations were audible at the Woodley, Zulumovski, Mahony and Fisher Webster monitoring locations. The audible mining operations at the noise sensitive receivers consisted of haul truck movements and excavator operations and hum from the DCM fixed plant operation.

Excluding extraneous noise sources (i.e. road traffic movements, sounds from birds, insects, dogs and occasional passing rail traffic) from the overall noise measurement resulted in the mine noise contribution determined at each monitoring location, which are summarised below.

Prevailing weather conditions were characterised by clear sky conditions during the night with still conditions combined with strong temperature inversion conditions throughout the second night survey period.

Summary of Measured Mine Noise

The DCM L_{Aeq} noise contributions for the second night survey period are as follows:

- 23dB L_{Aeq} 15-minute at NM1 Woodley
- 23dB L_{Aeq} 15-minute at NM2 Zulumovski
- 25dB L_{Aeq} 15-minute at NM3 Mahony
- 23dB L_{Aeq} 15-minute at NM4 Fisher Webster
- 50dB L_{Aeq} 15-minute at Ref Duralie Road
- Nil at Wards River

The DCM L_{A1} (1 minute) contributions for the second night survey period are as follows:

- 26dB L_{A1} (1-minute) at NM1 Woodley
- 27dB L_{A1} (1-minute) at NM2 Zulumovski
- 31dB L_{A1} (1-minute) at NM3 Mahony
- 27dB L_{A1} (1-minute) at NM4 Fisher Webster
- 51dB L_{A1} (1-minute) at Ref Duralie Road
- Nil at Wards River

7 RAIL NOISE RESULTS

Table 7 presents the results of the attended Duralie Shuttle pass-by assessment. These measurements were conducted at locations TN1 (Wards River) and TN2 (Craven) as shown in **Appendix B** and are assessed against the criteria set out in **Section 4.3** of this report. Measurements were conducted in accordance with AS 2377: 2002 *Acoustics – Methods for the measurement of rail bound vehicle noise*.

Table 7: Attended Rail Monitoring Results

Monitoring Site	Time, Date	Distance to track	L _{Amax} dB Train Horn	L _{Amax} dB Train Horn Excluded	L _{Aeq} Train Pass-by dB	L _{Aeq} Train Pass-by dB Train Horn Excluded
TN1 - Wards River	12:11 11/2/15	65m	93	81	68	62
TN2 - Craven	14:27 11/2/15	34m	85	77	68	64

Table 8 presents the results of the unattended measurements at the Wards River Monitoring location TN1, at the estimated time of the Duralie Shuttle pass-by. These measurements were conducted approximately 15m from the centre of the rail track and may be influenced by extraneous noise sources such as vehicles on the Bucketts Way, wildlife in the vicinity of the microphone and other passing rail traffic.

Table 8: Unattended Rail Monitoring Results at TN1 (Wards River)

Date & Time	TN1 – South of Village		TN1 – North of Village		Departed From
	L _{Aeq} (15-minute) dB(A)	L _{Amax} dB(A)	L _{Aeq} (15-minute) dB(A)	L _{Amax} dB(A)	
11/2/2015 12:15	59	78	63	94	Duralie
11/2/2015 14:25	63	86	63	83	Stratford
11/2/2015 16:15	62	83	61	82	Duralie
11/2/2015 18:45	60	84	60	85	Stratford
11/2/2015 20:30	58	81	63	86	Duralie
11/2/2015 22:30	55	82	58	81	Stratford
12/2/2015 07:30	60	77	64	91	Duralie
12/2/2015 09:30	60	83	61	80	Stratford

Table 9 presents the results of the unattended measurements at the Craven Monitoring location TN2, at the estimated time of the Duralie train pass-by. These measurements were conducted approximately 30m from the centre of the rail track and may be influenced by rail horn utilised for the crossing and other extraneous noise sources such as the level-crossing bells, wildlife and other passing rail traffic and idling locomotives on the siding.

Table 9: Unattended Rail Monitoring Results at TN2 (Craven)

Date & Time	L _{Aeq} (15-minute) dB(A)	L _{Amax} dB(A)	Departed from
11/2/2015 12:15	72	105	Duralie
11/2/2015 14:25	68	90	Stratford
11/2/2015 16:15	57	95	Duralie
11/2/2015 18:45	64	91	Stratford
11/2/2015 20:30	65	90	Duralie
11/2/2015 22:30	67	89	Stratford
12/2/2015 07:30	72	104	Duralie
12/2/2015 09:30	65	86	Stratford

Table 10 presents the L_{Aeq}-daytime and the L_{Amax}-daytime noise levels for the four days the 3 loggers (TN1 South, TN1North and TN2 Craven) were located onsite.

The L_{Aeq} results presented in **Table 10** for the 10/2/2015 and 13/2/2015 are not for a full 15-hour period, rather the daytime period the loggers were deployed (i.e. 8.5 hours on 10/2/2015 and 3.5 hours on 13/2/2015). The L_{Aeq} results presented in **Table 10** for the 28/10/14 and 29/10/14 however are for the full 15-hour period.

It should be noted that the results presented in **Table 10** are for data from unattended noise loggers. Based on Vipac's experience in undertaking noise surveys in the area it should also be noted that noise levels recorded during the logging surveys may also be influenced by additional noise sources such as birds and other wildlife in the vicinity of the noise logging equipment, passing traffic on the Buckets Way and other rail traffic utilising the train line and not just noise emissions associated with the Duralie shuttle alone. Therefore, the results presented in **Table 10** should not be taken as the basis for the assessment of noise emissions from the Shuttle train as such.

Table 10: Unattended Rail Monitoring Results at TN1 (North & South) & TN2

Date	Wards River – TM1South		Wards River – TM1North		Craven – TM2	
	L _{Aeq} – daytime period dB	L _{Amax} - daytime period dB	L _{Aeq} – daytime period dB	L _{Amax} - day time period dB	L _{Aeq} – daytime period dB	L _{Amax} - day time period dB
10/2/2015	62*	94*	72*	97*	59*	98*
11/2/2015	60	87	60	98	62	105
12/2/2015	60	84	62	104	70	116
13/2/2015	60**	85**	60**	84**	64**	88**

* Measurement conducted for an 8.5 hour period.

** Measurement conducted for a 3.5 hour period.

7.1 COMPLIANCE ASSESSMENT

This section presents the compliance assessment for the measured DCM noise emissions for each of the survey periods as well as an assessment of the rail noise monitoring with NMP noise target goals.

7.1.1 COMPLIANCE ASSESSMENT SUMMARY – DAY SURVEY PERIOD

DCM operational L_{Aeq 15-minute} noise emissions during the day attended monitoring period under the prevailing weather conditions are summarised in **Table 11**. The results indicate noise levels at all monitoring locations were within criterion limits during the daytime survey.

Table 11: Received Noise Level (L_{Aeq (15-minute)}) at Monitoring Locations under prevailing weather conditions – Daytime

Monitoring Locations	Sound Pressure Level dB L _{Aeq (15-minute)}	Noise Criteria dB L _{Aeq (15-minute)}	Excursion dB(A)
NM1 Woodley	29	35	0
NM2 Zulumovski North	26	35	0
NM3 Mahony	36	N/A	0
NM4 Fisher-Webster	26	35	0
REF1 Duralie Road	51	N/A	0
Additional Monitoring Location Wards River	Nil	35	0

7.1.2 COMPLIANCE ASSESSMENT SUMMARY – EVENING SURVEY PERIOD

DCM operational L_{Aeq 15-minute} noise emissions during the evening attended monitoring period under the prevailing weather conditions are summarised in **Table 12**. The results indicate noise levels at all monitoring locations complied with the criterion during this evening survey period.

Table 12: Received Noise Level (L_{Aeq (15-minute)}) at Monitoring Locations under prevailing weather conditions – Evening

Monitoring Locations	Sound Pressure Level dB L _{Aeq (15-minute)}	Noise Criteria dB L _{Aeq (15-minute)}	Excursion dB(A)
NM1 Woodley	30	35	0
NM2 Zulumovski North	24	35	0
NM3 Mahony	37	N/A	0
NM4 Fisher-Webster	22	35	0
REF1 Duralie Road	50	N/A	0
Additional Monitoring Location Wards River	Nil	35	0

7.1.3 COMPLIANCE ASSESSMENT SUMMARY – NIGHT SURVEY PERIOD

DCM operational L_{Aeq} 15-minute and L_{A1} (1-minute) noise emissions during the first and second night attended monitoring survey periods under the prevailing weather conditions are summarised respectively in **Table 13** and **Table 14**. The results indicate noise levels at all monitoring locations were within criterion limits during the night-time surveys. The results presented in **Table 14** indicate that the L_{A1} (1-minute) noise levels at all monitoring locations were within criterion limits during the night-time survey periods.

Table 13: Received Noise Level (L_{Aeq} (15-minute)) at Monitoring Locations under prevailing weather conditions – Night-time

Monitoring Locations	Sound Pressure Level dB L_{Aeq} (15-minute)		Noise Criteria dB L_{Aeq} (15-minute)	Excursion dB(A)	
	Night 1	Night 2		Night 1	Night 2
NM1 Woodley	25	23	35	0	0
NM2 Zulumovski North	21	23	35	0	0
NM3 Mahony	22	25	N/A	0	0
NM4 Fisher-Webster	20	23	37	0	0
REF1 Duralie Road	45	50	N/A	0	0
Additional Monitoring Location Wards River	Nil	Nil	35	0	0

Table 14: Received Noise Levels (L_{A1} (1-minute)) at Monitoring Locations under prevailing weather conditions – Night-time

Monitoring Locations	Sound Pressure Level dB L_{A1} (1-minute)		Noise Criteria dB L_{A1} (1-minute)	Excursion dB(A)	
	Night 1	Night 2		Night 1	Night 2
NM1 Woodley	32	26	45	0	0
NM2 Zulumovski North	26	27	45	0	0
NM3 Mahony	27	31	N/A	0	0
NM4 Fisher-Webster	29	27	45	0	0
REF1 Duralie Road	46	51	N/A	0	0
Additional Monitoring Location Wards River	Nil	Nil	45	0	0

7.2 RAIL NOISE MONITORING ASSESSMENT SUMMARY

Vipac has conducted rail noise measurements at two attended monitoring locations TN1 North (Wards River) and TN2 (Craven) along the rail line between the Duralie and Stratford Coal Mines. No attended rail monitoring was conducted at TN1 South (Wards River) due to the low number of train pass-bys during the monitoring period. However as an additional location has been added in Wards River a single attended measurement within the village is all that is required for the rail assessment. **Table 15** below presents the measured sound pressure levels at the property boundary at the two locations without the rail horn being excluded from the measurement.

Table 15: Sound Pressure Levels at the property boundary with Rail Horn Noise

Date Time	Sound Pressure Level at Receiver		Noise Goal		Excursion	
	dB L_{Amax} train horn included	dB L_{Aeq} Pass-by train horn included	dB L_{Amax}	dB L_{Aeq}	dB	dB
TN1 North - Wards River						
11/2/2015 12:11	93	68	85	65	8	3
TN2 - Craven						
11/2/2015 14:27	85	68	85	65	0	3

It is evident from the results presented in **Table 15** that the noise emanating from the Duralie shuttle failed to comply with the L_{Aeq} pass-by noise goals at both the TN1- North (Wards River North) and TN2 (Craven) and L_{Amax} noise goal at TN1 Wards River monitoring location due to the operation of the shuttle rail horn.

It is noted that the rail horn operation is a compulsory requirement as set out in DSN60/14 issued by Pacific National on the 22nd September 2014. As all Pacific National trains are required to sound their horn as a safety measure prior to crossing, Vipac has excluded the noise of the rail horn and assess the noise generated by the diesel locomotives and the wagons. These noise levels for the shuttles operation with the rail horn excluded are presented below in **Table 16**.

Table 16: Sound Pressure Levels at the property boundary with Rail Horn Noise Excluded

Date Time	Sound Pressure Level at Receiver		Noise Goal		Excursion	
	dB L _{Amax} (train horn excluded)	dB L _{Aeq} Pass-by train horn excluded	dB L _{Amax}	dB L _{Aeq}	dB	dB
TN1 North - Wards River						
11/2/2015 12:11	81	62	85	65	0	0
TN2 - Craven						
11/2/2015 14:27	77	64	85	65	0	0

It is evident from **Table 16** that the noise emanating from the Duralie shuttle complied with the L_{Aeq} pass-by and the L_{Amax} noise goals at TN1 North (Wards River) & TN2 (Craven) monitoring locations, with the exclusion of the noise from the sounding of the rail horn. On this basis Vipac finds the Shuttle compliant with the noise goal set out in the DCM Noise management plan.

8 NOISE MODEL PREDICTION

The mine contributed noise emissions from mining and process operations for each monitoring location were calculated using a noise model with the operational data provided by Duralie Coal Mine. The model inputs incorporated the following:

- Current sound power levels of mobile plant and fixed machinery associated with the mine;
- Prevailing meteorological conditions over the attended noise monitoring period;
- Operator attended noise-monitoring results.

The current mine production, operations and weather data were supplied by Duralie Coal Mine, as detailed in **Appendix A** and **Appendix C**.

Calculated day, evening and night contributed noise emissions from Duralie Coal Mine at each owner/tenant location are presented in **Table 17**.

A comparison of the model predictions and actual operator attended noise level measurements is also presented in **Table 17**. Contributed mine noise emissions at most locations generally agree with the modelled noise level prediction and the operator attended measured L_{Aeq} noise levels conducted between the 10th & 12th February at all landowners and tenants that currently surround the coal-mining lease.

Some variances are experienced at the Mahony, Wards River, Woodley and Zulumovski monitoring locations. The variances at the Mahony residence appear to be due to the depth of the pit and positioning of mobile plant in the region of Blocks 4-6. The variance in the measurements at Wards River & Woodley during the evening survey may be attributed to the weather conditions; in particular the wind conditions which were varying in strength during the measurements and may have propagated the noise further than would normally be experienced. The variance at the Zulumovski residence during the second night period is due to the masking effect of the noise of leaves rustling in the wind and insects locally at the monitoring location.

Additionally the exact location of mobile plant and operation of the Duralie Shuttle would affect the outcomes of the model predictions. Some excursion from the noise criteria has been predicted for this survey, February 2015 particularly at the Zulumovski residence.

Noise criteria for this survey are applicable for all attended noise measurements not withstanding meteorological conditions during the course of the survey.

Table 17: Environmental Noise Levels – February 2015

Owner/ Tenant	Monitored - Predicted DCPL Noise Levels ¹							Noise Criteria		
	dB(A) _{L_{Aeq}(15 minute)}							dB(A) _{L_{Aeq} (15 Minute)}		
	Day	Evening	Night 1	Night 2	Day	Evening	Night	Day	Evening	Night
Bailey ²	0	28	25	29	35	35	35	35	35	35
Bragg	19	20	20	8	35	35	35	35	35	35
Fisher-Webster	26 21	22 21	20 21	23 25	35	35	37	35	35	37
Gillard	0	Nil	3	4	35	35	35	35	35	35
Hamann-Pixalu PL	21	21	21	24	35	35	39	35	35	39
Hare-Scott ²	28	27	27	29	35	35	35	35	35	35
Hattam ²	36	37	37	35	35	35	35	35	35	35
Holloway	16	15	15	19	35	35	35	35	35	35
Holmes ²	29	26	23	27	35	35	35	35	35	35
James	18	13	13	21	35	35	35	35	35	35
Lyll	29	24	30	30	35	39	40	35	39	40
Mahony ²	36 24	37 28	22 23	25 26	35	35	35	35	35	35
Morgan	5	5	7	15	35	35	35	35	35	35
Oleksiuk & Carmody	22	16	17	24	35	35	35	35	35	35
Relton ²	21	17	17	22	35	35	35	35	35	35
Richards	19	21	21	22	35	35	35	35	35	35
Schultz	18	15	16	15	35	35	35	35	35	35
Wards River Village	Nil 12	Nil 5	Nil 5	Nil 3	35	35	35	35	35	35
Weismantel	19	15	14	22	35	35	35	35	35	35
Wielgosinski	25	29	29	11	35	35	35	35	35	35
Woodley	29 17	30 22	25 25	23 25	35	35	35	35	35	35
Zulumovski(North) ²	26 31	24 27	21 24	23 30	35	35	35	35	35	35

Note ¹ Nil Denotes an unmeasurable noise contribution from the mine

² Owned by Duralie Coal Pty Ltd(DCPL) or private agreement in place between DCPL and the residence

9 DISCUSSION & CONCLUSION

9.1 ENVIRONMENTAL NOISE SURVEY

An Environmental Compliance Noise Monitoring Survey has been carried out in the rural environment surrounding the Duralie Coal Mine (DCM) Site, Stroud Road, NSW. The survey was requested by Duralie Coal Pty Ltd to ascertain the degree of compliance of noise emissions generated from the operation of Duralie Coal Mine with licence and project approval conditions.

Direct temperature inversion measurements were conducted during the entire survey utilising the Duralie Coal Inversion Tower Infrastructure. These measurements were used to ascertain temperature lapse rates and atmospheric stability classes during the survey period, the results of which are presented in **Appendix A** of this report.

The mine operating noise emissions were within the noise criteria of $35\text{dBL}_{\text{Aeq}}$ at all monitoring locations for the Day, Evening and Night 1 & 2 survey periods during the February 2015 compliance survey.

Noise levels measured at the Mahony residence during the day and evening period were above $35\text{dBL}_{\text{Aeq}}$ limit that is applicable to private properties. The noise level monitored at the Mahony residence during the daytime survey was $36\text{dBL}_{\text{Aeq}}$ and the noise level monitored at the residence during the evening survey was $37\text{dBL}_{\text{Aeq}}$. However, the Mahony property is currently under private agreement with DCM and noise limits are not applicable to this property.

It is Vipac's professional opinion that the noise emissions produced by Duralie Coal Mine during the February 2015 DCM Environmental Quarterly Survey complied with the noise criteria set out in **Section 4** of this report.

9.2 RAIL NOISE SURVEY

As outlined in **Section 4** of this report, all of the train-monitoring results presented in this assessment are to be used for general information purposes only and are not DCM compliance requirements.

Vipac conducted Duralie Shuttle Rail Pass-by monitoring at TN1 (Craven) and has augmented the monitoring program conducted at TN2 (Wards River) by splitting the monitoring location into two separate locations TN2-South (southern end of Wards River village) and TN2-North (northern end of Wards River village) to better assess the rail noise from the Duralie shuttle within Wards River. This is the first quarterly rail monitoring survey that has been conducted in such a manner. In order to meet the requirements set out in Section 4 of this report, attended monitoring has to be conducted at only one location in Wards River (i.e. TN2-South or TN2-North), however where possible measurements will be conducted at both sites.

An unattended noise logger was located at all three locations TN1, TN2-North and TN2-South. Attended Measurements were conducted at TN1 and TN2-North as part of this survey. No additional attended measurement was conducted at TN2-South due to a low number of train pass-bys during the period the survey was conducted.

The attended noise levels measured at TN1 Craven and TN2-North have been assessed against the L_{Amax} and $L_{\text{Aeq15-hour}}$ noise goals as set out in **Section 4.1** of this report.

The noise emanating from the Duralie shuttle was predicted to comply with the L_{Amax} noise goal at residential receivers from monitoring conducted at the TN1 Craven and TN2-North (North Wards River Village) for this the February 2015 noise compliance assessment.



Appendix A: WEATHER DATA

Date	Time	Ave Air Temp (deg C)	Ave Wind Dir (deg)	Ave Sigma (deg)	Ave Wind Spd (m/s)	Total Rain (mm)	Predicted Lapse Rate (deg/100m)	Inversion Tower Lapse Rate (deg/100m)
10/02/2015	8:00	19.9	15.17	38.7	0.2	0	-1.9	4.3
10/02/2015	8:15	20.3	36.67	23.8	0.3	0	-1.9	4.4
10/02/2015	8:30	21.1	359.09	40.0	0.2	0	-1.9	3.9
10/02/2015	8:45	22.0	181.9	68.9	0.4	0	-1.9	4.1
10/02/2015	9:00	22.9	92.62	84.9	0.3	0	-1.9	4.2
10/02/2015	9:15	23.9	355.97	46.2	0.5	0	-1.9	3.8
10/02/2015	9:30	24.7	332.19	29.4	0.7	0	-1.9	2.9
10/02/2015	9:45	25.5	353.49	49.1	0.8	0	-1.9	2.7
10/02/2015	10:00	26.1	18.42	38.5	1.5	0	-1.9	3.2
10/02/2015	10:15	26.0	18.79	32.4	1.7	0	-1.9	3.3
10/02/2015	10:30	26.0	21.44	24.1	1.9	0	-1.9	2.9
10/02/2015	10:45	26.8	23.26	32.9	1.4	0	-1.9	2.6
10/02/2015	11:00	26.7	56.26	35.8	1.0	0	-1.9	3.1
10/02/2015	11:15	26.7	42.57	37.9	1.3	0	-1.9	4.4
10/02/2015	11:30	27.2	78.1	72.5	1.1	0	-1.9	4.6
10/02/2015	11:45	28.0	69.12	41.5	1.7	0	-1.9	4.3
10/02/2015	12:00	26.2	19.15	16.8	3.5	0	-1.5	3.2
10/02/2015	12:15	26.3	19.95	20.3	2.3	0	-1.7	2.4
10/02/2015	12:30	27.0	67.95	29.0	2.2	0	-1.9	2.9
10/02/2015	12:45	27.9	55.72	28.6	2.8	0	-1.9	0.9
10/02/2015	13:00	24.9	96.6	13.4	4.3	1.8	-1.5	0.2
10/02/2015	13:15	23.2	134.07	19.2	2.0	0.4	-1.7	2.9
10/02/2015	13:30	24.8	133.71	19.9	2.1	0.2	-1.7	3.8
10/02/2015	13:45	25.8	116.03	17.5	3.1	0	-1.7	3.1
10/02/2015	14:00	25.8	97.43	11.0	4.9	0	-0.5	3.3
10/02/2015	14:15	23.8	101.48	12.0	3.9	0	-0.5	3.4
10/02/2015	14:30	25.6	99.96	16.7	4.1	0	-1.5	4.4
10/02/2015	14:45	25.7	88.47	12.1	4.7	0	-0.5	5.2
10/02/2015	15:00	19.0	19	10.7	4.2	0	-0.5	5.3
10/02/2015	15:15	27.1	85.94	11.7	4.2	0	-0.5	4.7
10/02/2015	15:30	27.5	80.89	14.5	3.7	0	-1.5	4.6
10/02/2015	15:45	27.7	91.66	14.7	3.2	0	-1.5	4.9
10/02/2015	16:00	27.6	110.41	10.9	4.2	0	-0.5	5.2
10/02/2015	16:15	27.5	101.37	14.9	4.6	0	-1.5	5.3
10/02/2015	16:30	27.8	99.88	13.4	4.3	0	-1.5	5.2
10/02/2015	16:45	27.6	102.33	15.7	4.4	0	-1.5	5.0
10/02/2015	17:00	27.6	102.64	11.0	4.6	0	-0.5	4.4
10/02/2015	17:15	27.4	88.33	7.5	5.6	0	-0.5	2.1
10/02/2015	17:30	27.2	90.17	16.8	3.6	0	-0.5	0.7
10/02/2015	17:45	27.0	77.45	13.1	4.5	0	-0.5	1.0
10/02/2015	18:00	26.6	69.38	11.8	3.9	0	-0.5	0.1
10/02/2015	18:15	26.2	58.28	14.0	4.7	0	-0.5	0.0
10/02/2015	18:30	25.3	51.67	11.8	4.4	0	-0.5	1.4
10/02/2015	18:45	25.4	81.51	11.0	5.1	0	-0.5	0.9
10/02/2015	19:00	25.2	80.79	14.5	3.0	0	-0.5	0.7
10/02/2015	19:15	25.0	77.2	11.8	3.0	0	-0.5	0.8
10/02/2015	19:30	24.6	81.36	11.6	3.3	0	-0.5	1.2
10/02/2015	19:45	24.1	76.68	12.3	2.5	0	-0.5	1.5
10/02/2015	20:00	24.1	76.57	16.9	3.2	0	-0.5	1.2
10/02/2015	20:15	23.7	64.2	10.4	1.7	0	-0.5	1.6
10/02/2015	20:30	23.3	71.43	14.7	1.4	0	1.5	1.5
10/02/2015	20:45	23.2	62.13	11.9	1.1	0	-0.5	2.9
10/02/2015	21:00	23.2	44.75	18.3	1.3	0	4	2.5
10/02/2015	21:15	23.0	33.47	14.7	1.7	0	1.5	2.5
10/02/2015	21:30	22.8	37.44	18.8	1.8	0	4	1.8
10/02/2015	21:45	22.8	42.53	17.9	2.2	0	4	1.4
10/02/2015	22:00	22.7	45.16	15.1	2.2	0	1.5	2.4
10/02/2015	22:15	22.6	47.31	11.8	2.1	0	-0.5	3.6

10 April 2015



Date	Time	Ave Air Temp (deg C)	Ave Wind Dir (deg)	Ave Sigma (deg)	Ave Wind Spd (m/s)	Total Rain (mm)	Predicted Lapse Rate (deg/100m)	Inversion Tower Lapse Rate (deg/100m)
10/02/2015	22:30	22.3	37.43	10.6	1.5	0	-0.5	4.6
10/02/2015	22:45	22.2	34.7	11.3	1.9	0	-0.5	4.2
10/02/2015	23:00	22.1	38.37	15.9	1.6	0	1.5	3.1
10/02/2015	23:15	22.2	29.58	12.8	2.0	0	1.5	2.7
10/02/2015	23:30	22.2	24.54	12.6	1.9	0	1.5	3.1
10/02/2015	23:45	21.8	33.76	13.9	1.6	0	1.5	4.6
11/02/2015	0:00	21.5	20.27	12.9	1.6	0	1.5	4.7
11/02/2015	0:15	21.1	358.96	15.0	1.6	0	1.5	4.6
11/02/2015	0:30	20.7	338.14	13.2	1.2	0	1.5	4.9
11/02/2015	0:45	20.5	333.23	23.2	0.5	0	4	4.6
11/02/2015	1:00	20.3	329.88	22.6	0.3	0	4	3.5
11/02/2015	1:15	20.2	295.23	13.0	0.5	0	1.5	3.5
11/02/2015	1:30	20.0	325.63	11.8	0.4	0	-0.5	3.8
11/02/2015	1:45	19.9	329.39	12.6	0.2	0	1.5	4.7
11/02/2015	2:00	19.9	287.29	11.8	0.3	0	-0.5	4.6
11/02/2015	2:15	19.9	290.39	27.4	0.1	0	4	4.7
11/02/2015	2:30	19.4	119.2	86.5	0.0	0	4	4.2
11/02/2015	2:45	19.2	310.03	71.2	0.0	0	4	4.9
11/02/2015	3:00	19.0	286.23	59.2	0.0	0	4	5.0
11/02/2015	3:15	19.0	270.39	18.8	0.3	0	4	4.4
11/02/2015	3:30	19.0	313.83	8.8	0.4	0	-0.5	4.9
11/02/2015	3:45	19.0	349.74	75.8	0.1	0	4	4.7
11/02/2015	4:00	18.7	103.81	87.8	0.0	0	4	4.7
11/02/2015	4:15	18.3	110.15	16.8	0.5	0	1.5	4.8
11/02/2015	4:30	18.2	47.55	55.1	0.0	0	4	4.4
11/02/2015	4:45	18.2	84.87	37.8	0.1	0	4	4.7
11/02/2015	5:00	18.1	279.54	23.4	0.0	0	4	4.1
11/02/2015	5:15	18.1	41.15	75.6	0.1	0	4	3.8
11/02/2015	5:30	18.0	71.87	17.8	0.1	0	-0.5	3.8
11/02/2015	5:45	17.8	16.31	15.6	0.2	0	-0.5	3.7
11/02/2015	6:00	17.8	338.08	16.0	0.3	0	-0.5	3.5
11/02/2015	6:15	17.6	348.44	39.0	0.2	0	-0.5	3.4
11/02/2015	6:30	17.4	86.78	64.7	0.1	0	-1.9	2.7
11/02/2015	6:45	17.1	100.7	9.0	0.2	0	-0.5	2.2
11/02/2015	7:00	17.4	139.55	50.3	0.0	0	-1.9	3.0
11/02/2015	7:15	18.2	359.58	24.2	0.0	0	-1.9	3.4
11/02/2015	7:30	18.3	343.36	15.5	0.1	0	-1.5	4.3
11/02/2015	7:45	18.7	33.48	44.0	0.2	0	-1.9	4.1
11/02/2015	8:00	19.0	88.76	17.5	0.3	0	-1.7	3.8
11/02/2015	8:15	18.9	54.94	26.7	0.2	0	-1.9	4.0
11/02/2015	8:30	19.4	59.96	34.1	0.3	0	-1.9	4.6
11/02/2015	8:45	20.7	354.99	17.8	1.0	0	-1.7	4.4
11/02/2015	9:00	21.8	354.42	18.1	0.7	0	-1.7	3.8
11/02/2015	9:15	23.2	49.29	69.1	0.3	0	-1.9	4.6
11/02/2015	9:30	23.9	7.42	71.1	0.4	0	-1.9	4.6
11/02/2015	9:45	24.5	18.34	50.2	0.6	0	-1.9	4.1
11/02/2015	10:00	24.2	359.28	22.2	0.6	0	-1.7	2.9
11/02/2015	10:15	24.7	342.98	38.1	0.4	0	-1.9	3.5
11/02/2015	10:30	25.2	55.81	69.9	0.4	0	-1.9	2.9
11/02/2015	10:45	25.0	59.29	31.1	1.1	0	-1.9	3.5
11/02/2015	11:00	25.8	32.58	46.6	0.9	0	-1.9	3.7
11/02/2015	11:15	25.8	31.54	49.2	1.9	0	-1.9	4.1
11/02/2015	11:30	26.3	50.21	22.5	2.3	0	-1.7	3.8
11/02/2015	11:45	26.7	30.77	26.5	2.0	0	-1.9	3.7
11/02/2015	12:00	26.7	69.79	32.6	3.2	0	-1.9	3.3
11/02/2015	12:15	26.9	76.43	21.9	2.1	0	-1.7	3.5
11/02/2015	12:30	27.3	76.78	55.4	1.4	0	-1.9	3.6
11/02/2015	12:45	26.8	83.99	19.7	2.1	0	-1.7	3.6
11/02/2015	13:00	26.3	35.66	29.4	2.4	0	-1.9	3.5
11/02/2015	13:15	25.8	47.75	21.7	4.4	0	-1.7	3.5



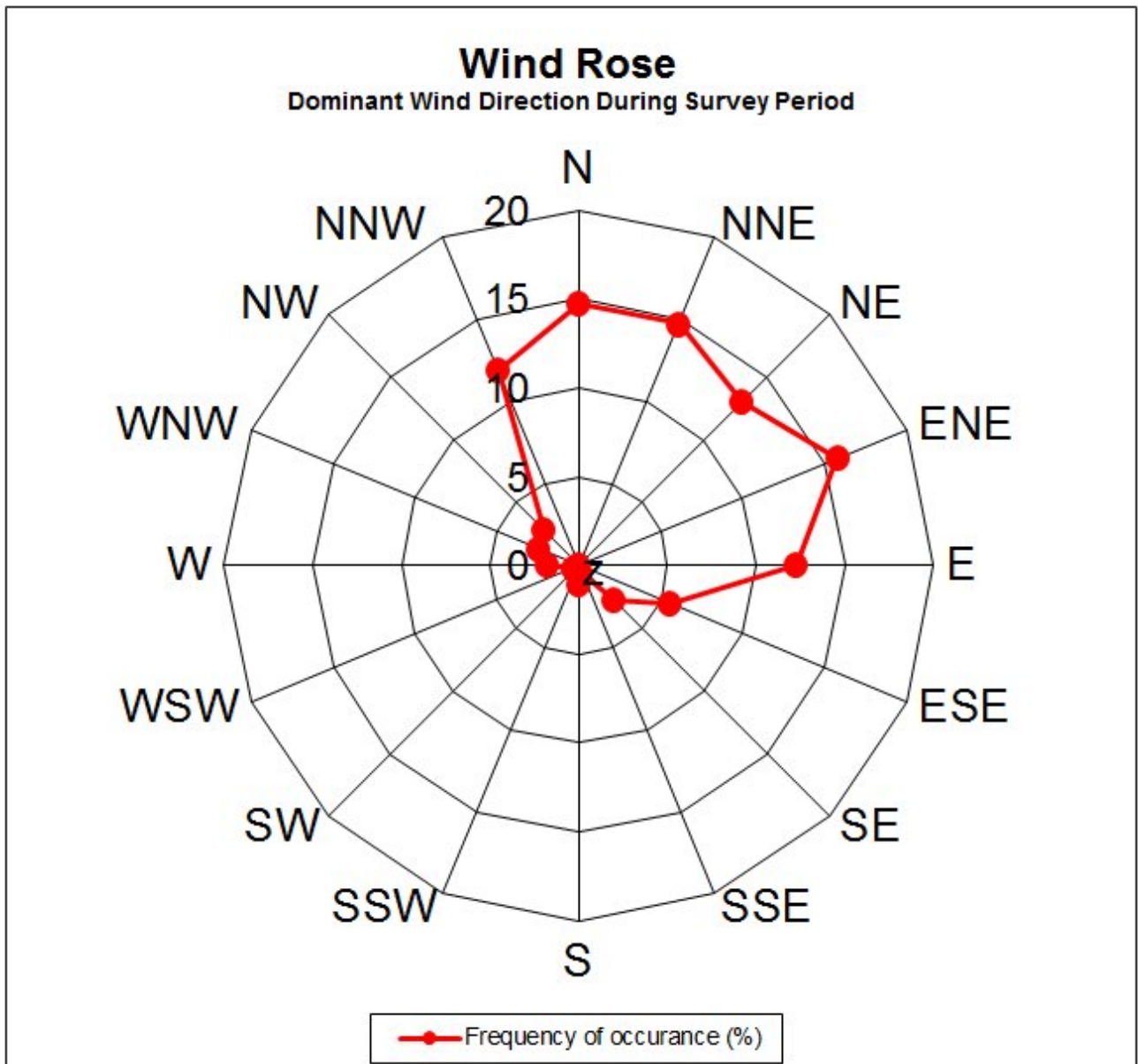
Date	Time	Ave Air Temp (deg C)	Ave Wind Dir (deg)	Ave Sigma (deg)	Ave Wind Spd (m/s)	Total Rain (mm)	Predicted Lapse Rate (deg/100m)	Inversion Tower Lapse Rate (deg/100m)
11/02/2015	13:30	26.3	44.38	15.6	4.6	0	-1.5	3.7
11/02/2015	13:45	25.8	22.43	13.1	4.1	0	-1.5	3.2
11/02/2015	14:00	26.6	8.98	22.9	2.7	0	-1.9	3.0
11/02/2015	14:15	26.8	10.76	22.0	3.1	0	-1.7	3.9
11/02/2015	14:30	25.1	58.34	37.8	2.3	1.8	-1.9	3.5
11/02/2015	14:45	24.4	72.27	12.2	2.4	0.2	-0.5	4.4
11/02/2015	15:00	25.6	82.32	15.9	2.4	0	-1.5	3.4
11/02/2015	15:15	26.2	77.83	13.4	2.7	0	-1.5	2.4
11/02/2015	15:30	27.1	62.86	35.4	2.2	0	-1.9	2.0
11/02/2015	15:45	27.6	64.29	17.7	2.9	0	-1.7	1.4
11/02/2015	16:00	27.8	7.11	18.7	4.1	0	-1.7	0.7
11/02/2015	16:15	27.9	48	24.6	3.2	0	-1.9	1.0
11/02/2015	16:30	28.0	32.36	22.4	3.5	0	-1.7	1.1
11/02/2015	16:45	27.8	45.45	22.4	4.3	0	-1.7	0.8
11/02/2015	17:00	27.7	31.86	19.8	3.8	0	-1.7	1.2
11/02/2015	17:15	27.5	35.39	24.9	3.3	0	-0.5	1.1
11/02/2015	17:30	27.1	56.83	19.6	3.7	0	-0.5	1.2
11/02/2015	17:45	27.1	73.65	12.1	3.7	0	-0.5	0.8
11/02/2015	18:00	27.0	51.68	16.6	3.7	0	-0.5	1.1
11/02/2015	18:15	26.2	60.86	17.0	3.4	0	-0.5	1.0
11/02/2015	18:30	26.2	56.94	13.2	3.0	0	-0.5	1.3
11/02/2015	18:45	25.7	60.68	14.0	4.0	0	-0.5	1.1
11/02/2015	19:00	25.3	63.64	13.3	4.0	0	-0.5	1.0
11/02/2015	19:15	25.0	67.34	15.0	3.4	0	-0.5	1.0
11/02/2015	19:30	24.6	73.86	9.5	3.4	0	-0.5	1.3
11/02/2015	19:45	24.1	68.66	12.4	2.7	0	-0.5	1.1
11/02/2015	20:00	23.7	71.5	16.1	3.8	0	-0.5	1.3
11/02/2015	20:15	23.5	68.56	13.9	3.7	0	-0.5	1.3
11/02/2015	20:30	23.4	55.81	13.4	3.7	0	-0.5	2.1
11/02/2015	20:45	23.2	52.42	16.2	3.0	0	-0.5	1.8
11/02/2015	21:00	23.0	39.53	17.8	3.4	0	-0.5	2.5
11/02/2015	21:15	22.9	28.1	16.4	3.8	0	-0.5	2.5
11/02/2015	21:30	22.7	37.53	19.8	3.2	0	-0.5	2.4
11/02/2015	21:45	22.5	43.83	13.8	3.7	0	-0.5	3.9
11/02/2015	22:00	22.3	25.06	15.5	2.6	0	-0.5	3.9
11/02/2015	22:15	22.3	26.09	17.4	3.3	0	-0.5	4.1
11/02/2015	22:30	22.2	9.07	20.8	2.4	0	4	3.5
11/02/2015	22:45	21.7	350.91	18.6	1.6	0	4	3.1
11/02/2015	23:00	21.4	344.58	17.7	1.2	0	4	3.9
11/02/2015	23:15	21.0	334.56	7.7	1.9	0	-0.5	5.0
11/02/2015	23:30	20.8	341.01	7.6	2.3	0	-0.5	4.2
11/02/2015	23:45	20.8	347.99	9.1	2.0	0	-0.5	3.8
12/02/2015	0:00	20.6	345.79	6.9	1.4	0	10	3.2
12/02/2015	0:15	20.4	335.64	10.4	1.2	0	-0.5	1.8
12/02/2015	0:30	20.1	323.19	10.4	1.5	0	-0.5	1.4
12/02/2015	0:45	20.0	334.96	9.2	2.1	0	-0.5	3.5
12/02/2015	1:00	20.1	350.73	11.6	1.9	0	-0.5	4.4
12/02/2015	1:15	19.9	357.72	11.0	2.1	0	-0.5	3.0
12/02/2015	1:30	19.7	348.06	7.8	1.9	0	-0.5	4.4
12/02/2015	1:45	19.7	334.11	10.4	1.8	0	-0.5	4.1
12/02/2015	2:00	19.6	325.78	12.0	1.9	0	-0.5	2.3
12/02/2015	2:15	19.4	338.39	12.9	1.4	0	1.5	3.2
12/02/2015	2:30	19.0	341.29	7.0	1.4	0	10	4.8
12/02/2015	2:45	19.0	336.08	7.2	2.0	0	4	3.7
12/02/2015	3:00	18.9	344.01	6.3	1.8	0	10	4.4
12/02/2015	3:15	18.8	357.53	7.2	1.6	0	10	5.1
12/02/2015	3:30	18.6	355.81	9.9	1.9	0	-0.5	3.7
12/02/2015	3:45	18.5	1.06	8.8	1.6	0	-0.5	4.4
12/02/2015	4:00	18.3	353.04	8.9	1.7	0	-0.5	3.8
12/02/2015	4:15	18.3	12.94	10.2	1.8	0	-0.5	2.0

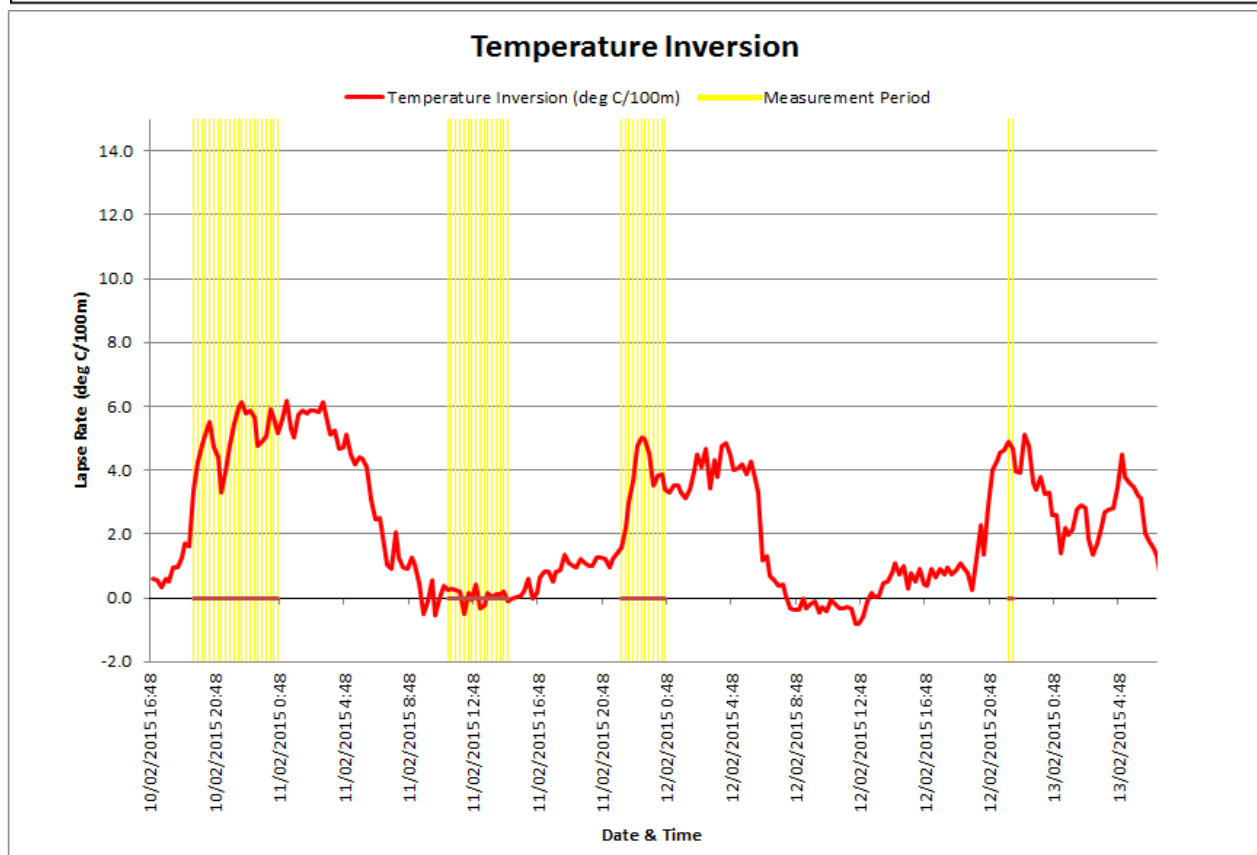
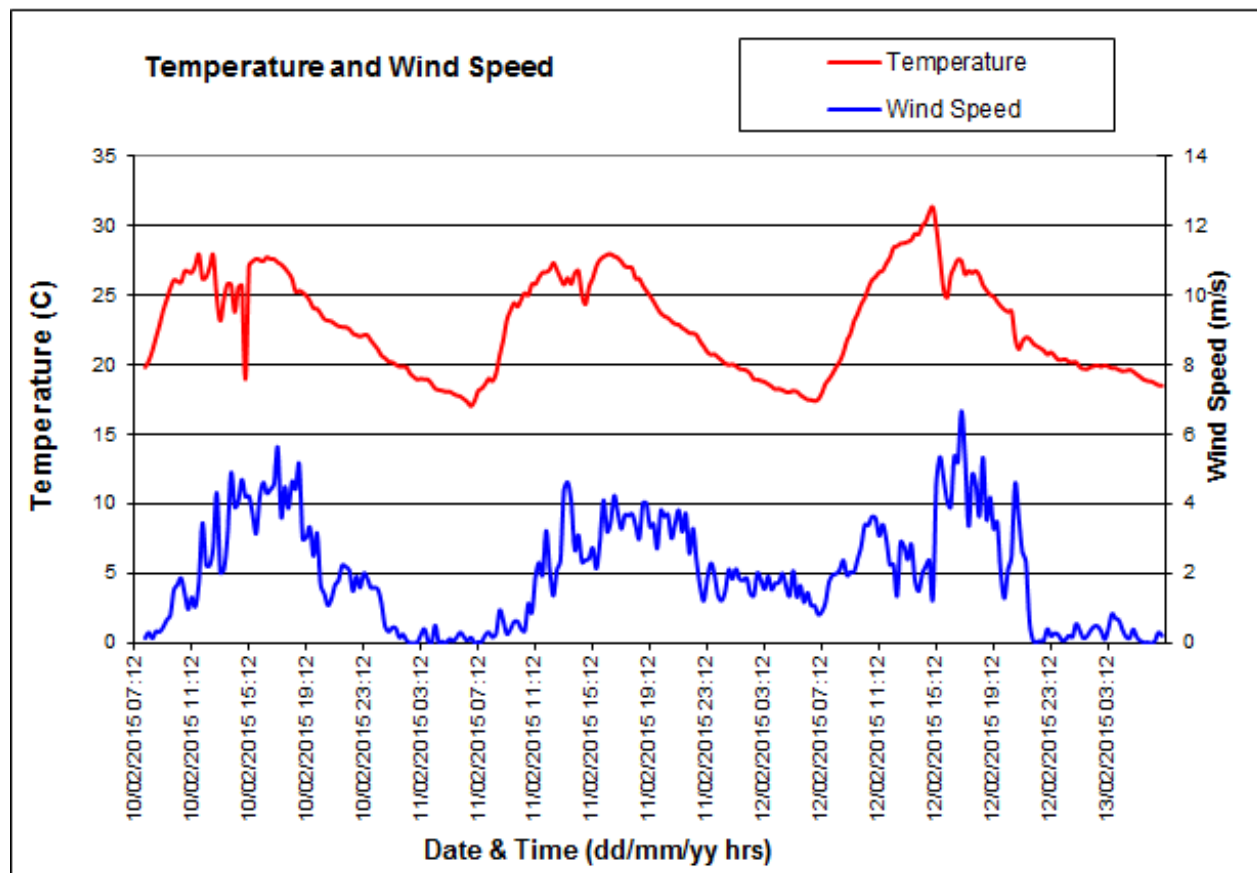


Date	Time	Ave Air Temp (deg C)	Ave Wind Dir (deg)	Ave Sigma (deg)	Ave Wind Spd (m/s)	Total Rain (mm)	Predicted Lapse Rate (deg/100m)	Inversion Tower Lapse Rate (deg/100m)
12/02/2015	4:30	18.2	9.77	10.4	2.0	0	-0.5	2.9
12/02/2015	4:45	18.1	12.06	9.9	1.6	0	-0.5	4.6
12/02/2015	5:00	18.1	20.27	10.2	1.4	0	-0.5	4.6
12/02/2015	5:15	18.2	8.64	10.3	2.1	0	-0.5	5.7
12/02/2015	5:30	18.1	359.74	12.2	1.3	0	-0.5	4.4
12/02/2015	5:45	17.9	353.68	9.0	1.7	0	-0.5	4.1
12/02/2015	6:00	17.7	18.38	14.4	1.2	0	-0.5	3.5
12/02/2015	6:15	17.5	1.94	9.1	1.5	0	-0.5	2.6
12/02/2015	6:30	17.5	7.03	12.9	1.1	0	-1.5	3.5
12/02/2015	6:45	17.4	358.08	13.0	1.1	0	-1.5	3.8
12/02/2015	7:00	17.5	3.6	32.2	0.8	0	-1.9	4.4
12/02/2015	7:15	18.0	12.8	24.2	0.9	0	-1.9	4.1
12/02/2015	7:30	18.7	9.52	17.8	1.2	0	-1.7	5.2
12/02/2015	7:45	19.0	350.28	17.4	1.8	0	-1.5	6.1
12/02/2015	8:00	19.4	350.43	10.4	2.0	0	-0.5	5.6
12/02/2015	8:15	19.9	357.64	13.8	2.0	0	-1.5	5.5
12/02/2015	8:30	20.3	12.58	16.0	2.1	0	-1.5	5.1
12/02/2015	8:45	20.9	6.65	14.1	2.4	0	-1.5	5.6
12/02/2015	9:00	21.8	11.31	16.2	2.0	0	-1.5	6.3
12/02/2015	9:15	22.3	1.45	14.9	2.1	0	-1.5	5.5
12/02/2015	9:30	23.2	18.65	18.4	2.1	0	-1.7	5.2
12/02/2015	9:45	23.7	19.36	22.5	2.4	0	-1.7	6.3
12/02/2015	10:00	24.4	15.13	18.8	2.8	0	-1.7	6.5
12/02/2015	10:15	24.8	356.54	18.9	3.4	0	-1.7	6.1
12/02/2015	10:30	25.6	349.34	18.3	3.4	0	-1.7	6.4
12/02/2015	10:45	26.1	345.47	17.7	3.6	0	-1.7	6.0
12/02/2015	11:00	26.3	339.17	15.0	3.6	0	-1.5	5.7
12/02/2015	11:15	26.7	343.39	20.3	3.1	0	-1.7	6.3
12/02/2015	11:30	26.8	326.81	16.2	3.4	0	-1.5	6.2
12/02/2015	11:45	27.3	355.99	22.2	3.0	0	-1.7	5.9
12/02/2015	12:00	27.7	1.27	27.3	2.3	0	-1.9	6.3
12/02/2015	12:15	28.4	342.56	22.5	2.3	0	-1.7	5.3
12/02/2015	12:30	28.6	344.39	49.8	1.4	0	-1.9	5.4
12/02/2015	12:45	28.7	359.5	25.5	2.9	0	-1.9	6.2
12/02/2015	13:00	28.8	70.91	34.1	2.8	0	-1.9	5.8
12/02/2015	13:15	28.9	28.65	29.2	2.4	0	-1.9	5.0
12/02/2015	13:30	29.0	32.53	25.0	2.9	0	-1.9	5.5
12/02/2015	13:45	29.5	50.45	35.8	1.8	0	-1.9	5.7
12/02/2015	14:00	29.4	26.64	48.6	1.5	0	-1.9	4.4
12/02/2015	14:15	30.0	13.39	29.5	2.0	0	-1.9	4.1
12/02/2015	14:30	30.3	48.11	41.8	2.2	0	-1.9	3.8
12/02/2015	14:45	31.0	10.99	32.0	2.4	0	-1.9	4.9
12/02/2015	15:00	31.3	61.11	41.4	1.3	0	-1.9	4.9
12/02/2015	15:15	29.9	109.99	21.4	4.6	0	-1.7	5.1
12/02/2015	15:30	27.7	88.49	8.2	5.4	0	-0.5	6.2
12/02/2015	15:45	25.5	107.37	17.5	4.8	1.8	-1.5	4.8
12/02/2015	16:00	24.9	121.16	12.0	4.1	0	-0.5	4.1
12/02/2015	16:15	26.4	111.05	11.0	3.9	0	-0.5	3.6
12/02/2015	16:30	27.1	107.1	8.9	5.4	0	-0.5	1.5
12/02/2015	16:45	27.6	97.67	14.4	5.2	0	-1.5	2.4
12/02/2015	17:00	27.5	94.83	10.0	6.7	0	-0.5	2.8
12/02/2015	17:15	26.5	83.65	9.1	5.4	0	-0.5	2.4
12/02/2015	17:30	26.8	75.22	11.7	3.4	0	-0.5	3.8
12/02/2015	17:45	26.6	88.16	14.5	4.8	0	-0.5	3.5
12/02/2015	18:00	26.8	87.14	15.3	4.6	0	-0.5	3.5
12/02/2015	18:15	26.5	89.1	12.6	3.7	0	-0.5	2.7
12/02/2015	18:30	25.8	92.21	11.6	5.3	0	-0.5	1.9
12/02/2015	18:45	25.4	89.38	11.0	3.6	0	-0.5	0.9
12/02/2015	19:00	25.1	94.09	12.7	4.2	0	-0.5	1.0
12/02/2015	19:15	24.9	76.69	11.3	3.3	0	-0.5	1.0



Date	Time	Ave Air Temp (deg C)	Ave Wind Dir (deg)	Ave Sigma (deg)	Ave Wind Spd (m/s)	Total Rain (mm)	Predicted Lapse Rate (deg/100m)	Inversion Tower Lapse Rate (deg/100m)
12/02/2015	19:30	24.6	88.63	10.9	3.5	0	-0.5	1.0
12/02/2015	19:45	24.2	99.46	14.4	2.0	0	1.5	1.3
12/02/2015	20:00	24.0	72.09	22.0	1.3	0	4	1.1
12/02/2015	20:15	23.9	51.5	15.2	2.1	0	1.5	1.6
12/02/2015	20:30	23.9	63.21	27.5	2.5	0	4	1.5
12/02/2015	20:45	21.9	75.06	16.2	4.6	0.6	-0.5	2.4
12/02/2015	21:00	21.2	68.87	17.0	3.6	0	-0.5	3.0
12/02/2015	21:15	21.7	54.96	16.8	2.6	0	-0.5	2.9
12/02/2015	21:30	22.0	24.3	17.4	2.4	0	1.5	2.9
12/02/2015	21:45	21.9	23.57	50.0	0.6	0	4	4.4
12/02/2015	22:00	21.6	128.73	31.6	0.1	0	4	3.4
12/02/2015	22:15	21.4	96.66	86.9	0.0	0	4	4.9
12/02/2015	22:30	21.2	340.4	54.7	0.1	0	4	4.4
12/02/2015	22:45	21.1	109.61	33.6	0.1	0	4	4.9
12/02/2015	23:00	20.8	298.35	16.0	0.4	0	1.5	5.1
12/02/2015	23:15	20.9	326.11	47.5	0.2	0	4	4.9
12/02/2015	23:30	20.7	128.82	22.1	0.3	0	4	4.3
12/02/2015	23:45	20.4	153.49	21.3	0.3	0	4	5.2
13/02/2015	0:00	20.4	209.35	22.9	0.1	0	4	4.6
13/02/2015	0:15	20.4	242.17	53.2	0.1	0	4	2.5
13/02/2015	0:30	20.2	301.09	37.1	0.2	0	4	4.0
13/02/2015	0:45	20.2	81.2	23.5	0.2	0	4	2.6
13/02/2015	1:00	20.2	320.63	17.2	0.6	0	1.5	2.8
13/02/2015	1:15	19.9	77.67	27.5	0.4	0	4	3.9
13/02/2015	1:30	19.7	50.95	26.5	0.2	0	4	2.5
13/02/2015	1:45	19.7	143.95	88.7	0.2	0.4	4	1.5
13/02/2015	2:00	19.9	177.97	48.3	0.4	0.2	4	1.2
13/02/2015	2:15	19.9	335.23	66.6	0.5	0	4	4.4
13/02/2015	2:30	20.0	272.59	32.5	0.5	0	4	3.9
13/02/2015	2:45	19.9	11.35	27.7	0.4	0	4	3.8
13/02/2015	3:00	20.0	26.67	72.0	0.1	0	4	3.6
13/02/2015	3:15	19.9	298.46	43.0	0.4	0	4	4.7
13/02/2015	3:30	19.8	320.99	15.2	0.9	0	1.5	4.5
13/02/2015	3:45	19.8	337.58	6.9	0.7	0	10	3.2
13/02/2015	4:00	19.7	342.69	8.7	0.7	0	-0.5	4.2
13/02/2015	4:15	19.6	326.84	16.1	0.4	0	1.5	5.2
13/02/2015	4:30	19.6	262.48	41.8	0.2	0	4	5.1
13/02/2015	4:45	19.7	277.42	23.6	0.2	0	4	5.0
13/02/2015	5:00	19.5	182.3	59.0	0.4	0	4	4.9
13/02/2015	5:15	19.3	128.4	22.4	0.2	0	4	4.8
13/02/2015	5:30	19.2	143.63	22.4	0.1	0	-0.5	2.7
13/02/2015	5:45	19.0	95.14	22.2	0.0	0	-0.5	2.7
13/02/2015	6:00	18.9	354.5	21.3	0.0	0	-0.5	2.1
13/02/2015	6:15	18.8	119.74	54.3	0.0	0	-0.5	1.5
13/02/2015	6:30	18.7	72.8	11.6	0.1	0	-0.5	1.8
13/02/2015	6:45	18.6	36.14	11.4	0.3	0	-0.5	2.7

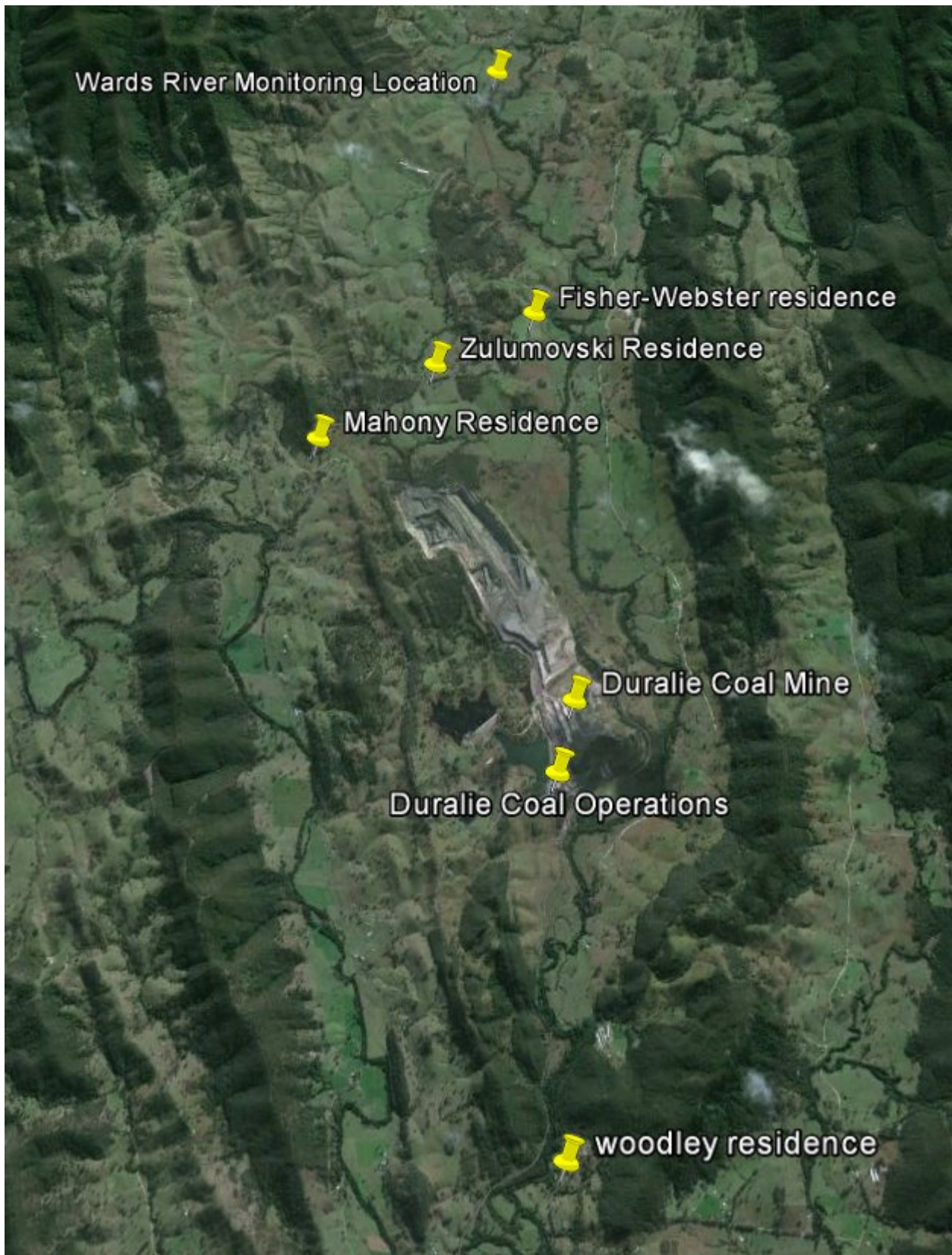




Appendix B: LOCALITY MAP & SURVEY LOCATIONS



The monitoring locations at the Woodley and Wards River properties are located further from the Mine Site. An additional Locality Map illustrating those monitoring locations is provided below.





10 April 2015

Page 44 of 48

Commercial-In-Confidence

Appendix C: DURALIE COAL MINE OPERATIONAL DATA

Duralie Mine				
<u>Trains & Plant In Operation During Noise Survey</u>				
Tuesday 10/02/2015 to Friday 13/02/2015				
Duralie Shuttle				
Tuesday	10/02/2015			
	Arrive time	Start load/unload	Finish load/unload	Depart
Duralie	no trains			
Wednesday	11/02/2015			
	Arrive time	Start load/unload	Finish load/unload	Depart
Duralie			10:30	11:15 12:10
Stratford	12:35		12:55	14:10 14:25
Duralie	14:45		15:00	15:48 16:15
Stratford	16:45		16:50	18:00 18:45
Duralie	19:05		19:40	20:20 20:30
Stratford	21:00		21:05	22:20 22:30
Duralie	22:55			
Thursday	12/02/2015			
	Arrive time	Start load/unload	Finish load/unload	Depart
Duralie			6:20	7:05 7:25
Stratford	8:00		8:05	9:15 9:30
Duralie				
Friday	13/02/2015			
	Arrive time	Start load/unload	Finish load/unload	Depart
	no trains			

Duralie Operations				
Tuesday Day Shift (6.30 am to 5.00 pm)			Crib break 12:30 - 13:15	
10/02/2015				
Plant		Activity	Operating Hours	Trucks
Excavator	EX 5028	-		0
	EX 5029	B6 Waste	8.5	3-5 trucks
	EX 6105	B7 PAF waste	8.9	3-5 trucks
	EX 6119	B2 Waste & Coal	7.7	3-5 trucks
D10 dozer	DZ 45	Waste Dump	29.7	Total
	DZ 21	Bench Prep		
	DZ 37	Block 7 & 2		
	DZ 15	PAF Dump		
	DZ22	-		
16M graders	MG6049	Roads, Dumps, Pit Floor	16	total
	MG6052	Roads, Dumps, Pit Floor		
Loader	LWX4076	ROM	3.5	
Water Cart	WC3011	Haul Roads, dig face	16	total
	WTX2192	Haul Roads, dig face		
Drill	DR14	B6	6.5	
	DR216	B6	8.7	
	DR215		7.3	

Tuesday Night Shift (5.00pm to 3.30am)			Crib break 22:00 - 22:45	
10/02/2015				
Plant		Activity	Operating Hours	Trucks
Excavator	EX 5028	-		0
	EX 5029	B6 Waste	8.7	3-5 trucks
	EX 6105	B7 Waste	8.5	3-5 trucks
	EX 6119	B2 Waste & Coal	8.4	3-5 trucks
D10 dozer	DZ 45	Waste Dump	30	Total
	DZ 21	Bench Prep		
	DZ 37	Block 7		
	DZ 15	PAF Dump		
	DZ52	-		
16M graders	MG6049	Roads, Dumps, Pit Floor	14.2	total
	MG6052	Roads, Dumps, Pit Floor		
Loader	LWX4076		0	
Water Cart	WC3011	Haul Roads, dig face	3.7	Total
	WTX2192	Haul Roads, dig face	0	
Drill	DR14	B6	8.9	
	DR216	B6	0	
	DR215	B6	9	

Wednesday Day Shift (6.30 am to 5.00 pm)			Crib break 12:30 - 13:15	
11/02/2015				
Plant		Activity	Operating Hours	Trucks
Excavator	EX 5028	-		0
	EX 5029	B7 Waste	8.3	3-5 trucks
	EX 6105	B7 PAF waste	9.1	3-5 trucks
	EX 6119	B2 Waste & Coal	8.9	3-5 trucks
D10 dozer	DZ 45	Waste Dump	37.8	Total
	DZ 21	Bench Prep		
	DZ 37	Block 7		
	DZ 15	PAF Dump		
	DZ22	-		
16M graders	MG6049	Roads, Dumps, Pit Floor	16	total
	MG6052	Roads, Dumps, Pit Floor		
Loader	LWX4076	ROM		0
Water Cart	WC3011	Haul Roads, dig face	16	total
	WTX2192	Haul Roads, dig face		
Drill	DR14	B6	8.6	
	DR216	B6	7.9	
	DR215		8.3	

Wednesday Night Shift (5.00pm to 3.30am)			Crib break 22:00 - 22:45	
11/02/2015				
Plant		Activity	Operating Hours	Trucks
Excavator	EX 5028			0
	EX 5029	B7 Waste	8.8	3-5 trucks
	EX 6105	B7 Waste	8.9	3-5 trucks
	EX 6119	B2 Waste & Coal	8.7	3-5 trucks
D10 dozer	DZ 45	Waste Dump	30	Total
	DZ 21	Bench Prep		
	DZ 37	Block 7		
	DZ 15	PAF Dump		
	DZ52	-		
16M graders	MG6049	Roads, Dumps, Pit Floor	14.9	total
	MG6052	Roads, Dumps, Pit Floor		
Loader	LWX4076			0
Water Cart	WC3011	Haul Roads, dig face	10	Total
	WTX2192	Haul Roads, dig face		0
Drill	DR14	B6	8.6	
	DR216	B6		0
	DR215	B6	8.7	

Thursday Day Shift (6.30 am to 5.00 pm)			Crib break 12:30 - 13:15	
12/02/2015				
Plant		Activity	Operating Hours	Trucks
Excavator	EX 5028	-		0
	EX 5029	B7 Waste	8.8	3-5 trucks
	EX 6105	B7 Waste, to RL114 dump	8.9	3-5 trucks
	EX 6119	B2 Waste & Coal, to RL 114 dump	8.4	3-5 trucks
D10 dozer	DZ 45	PAF Dump	40.7 Total	
	DZ 21	Block 7		
	DZ 37	Block 2		
	DZ 15	RL114 and B6		
	DZ22	-		
16M graders	MG6049	Roads, Dumps, Pit Floor	12 total	
	MG6052	Roads, Dumps, Pit Floor		
Loader	LWX4076	ROM		5
Water Cart	WC3011	Haul Roads, dig face	16 total	
	WTX2192	Haul Roads, dig face		
Drill	DR14	B6		7.3
	DR216	B6		7.5
	DR215	B6		9.3

Thursday Night Shift (5.00pm to 3.30am)			Crib break 22:00 - 22:45	
12/02/2015				
Plant		Activity	Operating Hours	Trucks
Excavator	EX 5028	-		0
	EX 5029	B7 Waste	8.7	3-5 trucks
	EX 6105	B7 Waste	9.3	3-5 trucks
	EX 6119	B2 Waste & Coal	8.9	3-5 trucks
D10 dozer	DZ 45	PAFDump	30 Total	
	DZ 21	Bench Prep		
	DZ 37	Block 2		
	DZ 15	Dumps		
	DZ22	-		
16M graders	MG6049	Roads, Dumps, Pit Floor	15.3 total	
	MG6052	Roads, Dumps, Pit Floor		
Loader	LWX4076			0
Water Cart	WC3011	Haul Roads, dig face	7.1 Total	
	WTX2192	Haul Roads, dig face		0
Drill	DR14	B6		6.7
	DR216	B6		0
	DR215	B6		7.7