DONALDSON AND ABEL COAL MINES

Bi-Annual Noise Monitoring
Half-year Ending June 2022

Prepared for:

Donaldson Coal Pty Ltd
PO Box 675
Green Hills 2320

SLR Ref: 630.01053-R01
Version No: -v1.0
February 2023

PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
10 Kings Road
New Lambton NSW 2305 Australia

T: +61 2 4037 3200
E: newcastleau@slrconsulting.com www.slrconsulting.com

BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Donaldson Coal Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
Q84 630.01053-R01-v1.0	24 February 2023	Martin Davenport	Jonathan Caine	Martin Davenport

CONTENTS

CONTENTS

DOCUMENT REFERENCES

TABLES

FIGURES

APPENDICES

1 Introduction

1.1 Background

Donaldson Coal Pty Ltd has commissioned SLR Consulting Australia Pty Ltd (SLR) to conduct half-yearly noise monitoring surveys for the Donaldson Coal Mine and Abel Coal Mine during the June 2022 half in accordance with the *Donaldson Coal Mine and Abel Underground Coal Mine - Noise Management Plan Care and Maintenance* (the NMP) dated 3 June 2019.

1.2 Objectives of this Report

The objectives of the noise monitoring survey for this operating half-year were as follows:

- Measure the ambient noise levels at six focus receptor locations (potentially worst affected) surrounding Donaldson Coal Mine and Abel Coal Mine.
- Qualify all sources of noise within each of the attended surveys, including estimated contribution or maximum level of individual noise sources.
- Assess the noise emissions of Donaldson Coal Mine and Abel Coal Mine with respect to the limits contained in the Development Consent.

1.3 Acoustic Terminology

The following report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

2 Development Consent Project Approval

Development consent was obtained by Donaldson Coal Pty Ltd for the Donaldson Mine in October 1999 following a Commission of Inquiry. Development Consent number N97/00147 was issued by the Minister for Urban Affairs pursuant to Section 101 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

Project Approval (Application No. 05_0136) granted by the Minister of Planning was obtained by Donaldson Coal Pty Ltd for Abel Coal Mine in 2007.

2.1 Donaldson Coal Mine Development Consent Conditions

The Development Consent nominates hours of operation and mine noise emission goals in the Sections entitled "*Operation of Development, Condition No. 3(1) and 3(2)"*, and *"Noise and Vibrational Noise Limits: Condition No. 15*" as follows:

3.(1) Subject to (2) the approved hours of operation are as follows:

Works	*Period*	*Hours*
Construction, including construction of any bunds	*Monday to Friday* *Saturday*	*7 am to 6 pm* *8 am to 1 pm*
Mining operations, including mining, haulage of waste to dumps and coal processing	*Monday to Friday* *Saturday, Sunday*	*24 hours per day* *7 am to 6 pm*
Road Transportation and stockpiling of coal	*7 days per week*	*24 hours per day*
Rail loading of coal	*7 days per week*	*7 am to 10 pm*
Maintenance of mobile and fixed plant	*7 days per week*	*24 hours per day*
Blasting, not involving closure of John Renshaw Drive	*Monday to Saturday*	*7 am to 5 pm*
Blasting, involving closure of John Renshaw Drive	*Monday to Saturday*	*10 am to 2 pm*

Notes: Restrictions on Public Holidays are the same as Sundays

(2) The Applicant shall submit a report to the Director-General's satisfaction demonstrating the noise limits in Condition 15 can be met while rail loading of coal is occurring during the period from 6 pm to 10 pm. If that report does not demonstrate that the noise limits can be met to the Director-General's satisfaction, then the hours of operation for rail loading of coal shall be restricted to 7 am to 6 pm."

15. *Unless subject to a negotiated agreement in accordance with Condition 23, the Applicant shall ensure that the noise emission from construction or mining operations, when measured or computed at the boundary of any dwelling not owned by the applicant (or within 30 metres of the dwelling, if the boundary is more than 30 metres from the dwelling), shall not exceed the following noise limits:*

Location	$L_{A10(15minute)}$ Noise Limits (dBA)	
	Daytime	Night-time
Beresfield area (residential)	*45*	*35*
Steggles Poultry Farm	*50*	*40*
Ebenezer Park Area	*46*	*41*
Black Hill Area	*40*	*38*
Buchanan and Louth Park Area	*38*	*36*
Ashtonfield Area	*41*	*35*
Thornton Area	*48*	*40*

Note: Daytime is 7 am to 10 pm Monday-Saturday, and 8 am to 10 pm Sundays and Public Holidays. Night-time is 10 pm to 7 am Monday-Saturday, and 10 pm to 8 am Sundays and Public Holidays.

The noise limits apply for prevailing meteorological conditions (winds up to 3 m/s), except under conditions of temperature inversions."

Other Conditions of Consent relevant to noise are as follows:

18. *The applicant shall survey and investigate noise reduction measures from plant and equipment and set targets for noise reduction in each Annual Environmental Management Report (AEMR), taking into consideration valid noise complaints received in the previous year. The Report shall also include remedial measures.*

19. *The Applicant shall revise the Noise Management Plan as necessary and provide an updated Plan five years after commencement of mining to the Director-General, the independent noise expert (Condition 48), EPA, Councils and the Community Consultative Committee.*

2.2 Abel Coal Mine – Project Approval

Approved Operations

The following operations are approved under the Abel Coal Mine Project Approval:

- Extraction of up to 6.1 Mtpa of Run of Mine (ROM) coal from the Abel Underground Coal Mine.
- Transport coal to the existing Bloomfield Coal Handling and Preparation Plant by private haul roads, or by coal conveyor, or by a combination of both methods.
- Operate the Bloomfield Coal Handling Processing Plant (CHPP) to process coal extracted from the Abel Coal Mine and the Bloomfield and Donaldson Coal Mines.
- Transportation of product coal from the Bloomfield site by rail via the Bloomfield rail loading facility.

The Project Approval was modified in June 2010 (05_0136 MOD 1) allowing construction and operation of a downcast ventilation fan. In May 2011 the Project Approval was modified again (05_0136 MOD 2) to allow the construction and operation of an upcast ventilation fan (and associated facilities). In December 2013 the Project Approval was further modified (05_0136 MOD3) to account for the increase in coal extracted including the upgrade of the Bloomfield CHPP.

Consent Conditions

The relevant conditions relating to noise from the Abel Coal Mine approval are reproduced below.

Schedule 4

NOISE

Operational Noise Criteria

1. *The Proponent shall ensure that the noise generated by the Project does not exceed the criteria in Table 4 at any residence on privately-owned land.*

Table 4: Operational Noise Criteria dB(A)

Location	Receiver Area	Day	Evening	Night	
		$L_{Aeq(15minute)}$	$L_{Aeq(15minute)}$	$L_{Aeq(15minute)}$	$L_{A1(1minute)}$
Location I	Lord Howe Drive, Ashtonfield	*36*	*36*	*36*	*45*
Location K	Catholic Diocese Land	*37*	*37*	*37*	*45*
Location L	Kilshanny Avenue, Ashtonfield	*40*	*40*	*40*	*47*
All other Locations	All other privately owned Residences	*35*	*35*	*35*	*45*

Notes:

- *To interpret the locations referred to in Table 4, see plan in Appendix 3.*
- *Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 4 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.*

These noise criteria do not apply if the Proponent has an Agreement with the relevant landowner to generate higher noise levels, and the proponent has advised the Department in writing of the terms of this agreement.

Construction Noise Criteria

1. *The proponent shall ensure that the noise generated during the construction of the downcast ventilation shaft as described in EA (MOD3) does not exceed the criteria in Table 5.*

Table 5: Construction Noise Criteria dB(A)

Location	Receiver	Day
		$L_{Aeq(15minute)}$
Location R	*281 Lings Road, Buttai*	*50*
Location S	*189 Lings Road, Buttai*	*43*

Notes:

- *The criteria in Table 5 apply only whilst the downcast ventilation shaft is being constructed, and for a maximum of 12 weeks from the commencement of construction.*
- *To interpret the locations referred to in Table 5, see plan in Appendix 3* (attached to this report as **Appendix A**).
- *Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.*

However, these noise criteria do not apply if the Proponent has an Agreement with the relevant landowner to generate higher noise levels, and the proponent has advised the Department in writing of the terms of this agreement.

Rail Noise Criteria

1. *The proponent shall ensure that the noise from rail movements on the Bloomfield Rail Spur does not exceed the limits in Table 6 at any residence on privately owned land.*

Table 6: Rail Spur noise criteria dB (A)

Location	*Day*	*Evening*	*Night*
	$L_{Aeq(period)}$		
All privately-owned land	*55*	*45*	*40*

Cumulative Noise Criteria

1. *The proponent shall implement all reasonable and feasible measures to ensure that the noise generated by the project combined with noise generated by other mines does not exceed the criteria in Table 7 at any residence on privately-owned land.*

Table 7: Cumulative noise criteria dB (A)

Location	*Day*	*Evening*	*Night*
	$L_{Aeq(period)}$		
All privately-owned land	*55*	*45*	*40*

Notes: Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including meteorological conditions), of the NSW Industrial Noise Policy. Appendix 4 sets out the metrological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

Operating Conditions

1. *The proponent shall:*
    a. *Implement best management practise to minimise the construction, operational, road and rail noise of the project;*
    b. *Operate an on-site noise management system to ensure compliance with the relevant conditions of this approval;*
    c. *Minimise the noise impacts of the project during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 4);*
    d. *Only receive and/or dispatch locomotives and rolling stock either on or from the site that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL (No. 3142);*
    e. *Carry out regular monitoring to determine whether the project is complying with the noise criteria and other relevant conditions of approval, to the satisfaction of the Director-General.*

Noise Management Plan

2. *The proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must:*
    a. *Be prepared in consultation with the EPA, and be submitted to the Director-General for approval within 6 months of the date of approval of MOD 3;*
    b. *Describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this approval; Describe the proposed noise management system in detail; and*
    c. *Include a monitoring program that:*
        - *Uses attended monitoring to evaluate the compliance of the project against the noise criteria in this approval;*
        - *Evaluates and reports on:*
            - *The effectiveness of the on-site noise management system; and*
            - *Compliance against the noise operating conditions; and*

Defines what constitutes a noise incident, and includes protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents. Appendix 4

Noise Compliance Assessment

Applicable Meteorological Conditions

1. *The noise criteria in Tables 4 and 7 are to apply under all metrological conditions except the following:*
    a. *During periods of rain or hail.*
    b. *Average wind speed at microphone height exceeds 5 m/s;*
    c. *Wind speeds greater than 3 m/s measured at 10m above ground level; or*
    d. *Temperature inversion conditions greater than 3°C/100m.*

Determination of metrological conditions

2. *Except for wind speed at microphone height, the data to be used for determining metrological conditions shall be that recorded by the meteorological station located on the site.*

Compliance monitoring

3. *Attended monitoring is to be used to evaluate compliance with the relevant conditions of this approval.*
4. *Unless otherwise agreed with the director-general, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the NSW Industrial Noise Policy (as amended from time to time), in particular the requirements relating to:*
    a. *Monitoring locations for the collection of representative noise data;*
    b. *Metrological conditions during which collection of noise data is not appropriate;*
    c. *Equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and*
    d. *Modification to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.*

Appendix 5

Statement of Commitments

3. Noise

3.1 Construction Activities

The following noise control measures will be implemented prior to commencement of construction of the Abel Underground Mine or the upgrade of the Bloomfield CHPP.

1. *Maintain all machinery and equipment in working order;*
    a. *No construction activities at the Abel pit top will take place on Sundays or Public Holidays;*
    b. *Where possible locate noisy site equipment behind structures that act as barriers or at the greatest distance from noise sensitive areas; and*
    c. *Orientate equipment so that noise emissions are directed away from noise sensitive areas.*

3.2 Noise Control Measures

a. *The following noise control measures will be implemented prior to the mining of coal from the Abel underground Mine:*
    i. *Orientation of the ventilation fans away from residential receivers and angle the output parallel to the ground.*
    ii. *The sound power level of the front end loader to be used near the portal should not exceed 113 dBA and will be fitted with a noise sensitive reversing alarm.*
b. *The following noise control measures will be implemented prior to the Bloomfield CHPP receiving any ROM coal from Able Underground Mine;*

i. *Noise mitigation works including partial enclosure and noise screening of drives and conveyors of the Bloomfield CHPP to screen residences to the north of the site.*

3.2 Monitoring

The Company will implement a Noise Monitoring Program for the Abel Underground Mine and the Bloomfield CHPP, to the satisfaction of the Director-General. The Noise Monitoring Program shall include a combination of real-time and supplementary attended monitoring measures, and a noise monitoring protocol for evaluating compliance with the noise environmental assessment. This plan will be integrated with the monitoring plans for the Tasman, Donaldson and Bloomfield Mines to provide a single integrated Noise Monitoring Program for all 4 mines.

3.4 Continuous Improvement

The Company shall:

a. *Report on these investigations and implementation of any new noise mitigation measures on site in the AEMR, to the satisfaction of the Director General.*

The operator of the Bloomfield CHPP shall:

b. *Investigate ways to reduce the noise generated by the Bloomfield CHPP, including maximum noise levels which may result in sleep disturbance;*

c. *Implement all reasonable and feasible best practice noise mitigation measures on the site; and*

d. *Report on these investigations and the implementation of any new noise mitigation measures on site in the AEMR, to the satisfaction of the Director-General.*

3 Noise Monitoring Methodology

3.1 General Requirements

The operational noise monitoring program was conducted with reference to Development Consent N97/00147 (Donaldson Coal Mine), Project Approval 05_0136 (Abel Coal Mine), the NMP and AS 1055-2018 *Acoustics - Description and Measurement of Environmental Noise*.

All acoustic instrumentation employed throughout the monitoring program has been designed to comply with the requirements of AS IEC 61672.1 – 2019 *Electroacoustics—Sound level meters*, AS IEC 60942 2017 *Electroacoustics – Sound calibrators* and carried current NATA or manufacturer calibration certificates. Certificates for acoustic instrumentation used during the June 2022 half is provided in **Appendix B**.

Instrument calibration was conducted before and after each measurement, with the variation in calibrated levels not exceeding ±0.5 dBA.

3.2 Monitoring Locations

Baseline and preceding operational half-yearly surveys have been conducted at 11 locations surrounding the Donaldson Mine and Abel Coal Mine sites. With the experience of these previous surveys, it was decided to concentrate noise monitoring at six focus locations that represent the potentially most noise affected areas from Donaldson Mine and Abel Coal Mine. The details of the monitoring locations are contained within **Table 1**.

It is relevant to note that Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Furthermore, Abel mine was placed in Care & Maintenance on 28th April 2016 and there were no operations onsite during the June 2022 noise monitoring period.

Table 1 Monitoring Locations

Noise Monitoring Location	Description
D	Black Hill School, Black Hill
F	Lot 684 Black Hill Road, Black Hill
G	156 Buchannan Road, Buchannan
I	Magnetic Drive, Ashtonfield
J	Parish Drive, Thornton
L	65 Tipperary Dr, Ashtonfield

A map giving the approximate location of the noise monitoring sites is contained within **Appendix C**.

3.3 Unattended Continuous Noise Monitoring

An environmental noise logger was deployed for a minimum of a seven day period between Thursday 30 June 2022 to Tuesday 12 July 2022 at each of the six (6) nominated locations given in **Table 1**.

All unattended monitoring equipment was programmed to continuously record statistical noise level indices in 15 minute intervals including the L_{Amax}, L_{A1}, L_{A10}, L_{A90}, L_{A99}, L_{Amin} and L_{Aeq}. The statistical noise exceedance levels (L_{AN}) are the levels exceeded for N% of the 15 minute interval. The L_{A90} represents the level exceeded for 90% of the interval period and is referred to as the average minimum or background noise level. The L_{A10} is the level exceeded for 10% of the time and is usually referred to as the average maximum noise level. The L_{Aeq} is the equivalent continuous sound pressure level and represents the steady sound level which is equal in energy to the fluctuating level over the interval period. The L_{Amax} is the maximum noise level recorded over the interval.

3.4 Operator Attended Noise Monitoring

Operator attended surveys were conducted at each of the six monitoring locations during the daytime, evening and night-time periods, to verify the unattended logging results and to determine the character and contribution of ambient noise sources.

4 Operator Attended Noise Monitoring

4.1 Results of Operator Attended Noise Monitoring

Operator attended noise measurements were conducted commencing during the daytime period on 28 June 2022 and finished during the night-time period on 29 June 2022. Operator attended noise surveys were conducted using a Brüel & Kjær Type 2270 (serial number 2679354).

Ambient noise levels given in the tables include all noise sources such as traffic, insects, birds, and mine operations as well as any other industrial operations.

The tables provide the following information:

- Monitoring location.
- Date and start time.
- Wind velocity (m/s) and Temperature (ºC) at the measurement location.
- Typical maximum (L_{Amax}) and contributed noise levels.

Mine contributions listed in the tables are from the Abel Coal Mine and are stated only when a contribution could be quantified.

Table 2 Location D, Black Hill Public School, Black Hill

Period	Date/ Start time/Weather	Primary Noise Descriptor (dBA re 20 μPa)					Description of Noise Emission, Typical Maximum Noise Levels (LAmax – dBA)
		LAmax	LA1	LA10	LA90	LAeq	
Day	28/6/2022 17:53 11°C 0.3 m/s SSW	72	54	46	39	47	Insects 35-38 Wind in trees 35 Road traffic 39-72 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	28/6/2022 18:09 11°C 0.6 m/s S	78	69	51	40	56	Insects 37-41 Wind in trees 35 Road traffic 35-78 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					
Night	28/6/2022 22:53 9°C 0.4 m/s W	48	45	42	37	40	Insects 30-41 Road traffic 35-48 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					

Table 3 Location F, Lot 684 Black Hill Road, Black Hill

Period	Date/ Start time/Weather	Primary Noise Descriptor (dBA re 20 μPa)					Description of Noise Emission, Typical Maximum Noise Levels (LAmax – dBA)
		LAmax	LA1	LA10	LA90	LAeq	
Day	28/6/2022 14:56 13°C 0.6 m/s SSW	80	74	63	50	61	Road traffic 50-80 Birdsong 45-55 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	28/6/2022 18:32 11°C 0.4 m/s SSW	71	63	54	46	52	Insects 44-48 Road traffic 45-71 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					
Night	28/12/2021 23:17 9°C 0.4 m/s WNW	63	59	54	46	51	Road traffic 45-63 Insects 45-48 Other industry 35 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					

Table 4 Location G, Buchanan Road, Buchanan

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 μPa)					Description of Noise Emission, Typical Maximum Noise Levels (LAmax – dBA)
		LAmax	LA1	LA10	LA90	LAeq	
Day	28/6/2022 16:12 12°C 0.5 m/s SW	70	54	52	46	50	Road traffic 45-55 Birdsong 37-70 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	28/6/2022 19:47 10°C 0.2 m/s SW	57	50	48	40	45	Road traffic 38-57 Insects 35-40 Other industry 33-35 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					
Night	29/6/2022 00:22 9°C 0.7 m/s NW	49	46	40	28	36	Road traffic 30-49 Bird 45 Insects 25-38 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					

Table 5 Location I, Magnetic Drive, Ashtonfield

Period	Date/ Start time/Weather	Primary Noise Descriptor (dBA re 20 μPa)					Description of Noise Emission, Typical Maximum Noise Levels (LAmax – dBA)
		LAmax	LA1	LA10	LA90	LAeq	
Day	28/6/2022 17:01 11°C 0.3 m/s SSW	69	61	47	39	48	Road traffic 40-69 Birdsong 40-52 Dog barking 54-59 Insects/Frogs 33-36 **Abel Mine Audible** Bloomfield CHPP 32-34
		Estimated Abel Mine Noise Contribution 33 dBA LAeq(15minute)					
Evening	28/6/2022 21:06 10°C 0.2 m/s W	46	42	41	39	40	Traffic 40-46 Insects 32-38 **Abel Mine Audible** Bloomfield CHPP 32-35
		Estimated Abel Mine Noise Contribution 33 dBA LAeq(15minute)					
Night	28/6/2022 22:00 9°C 0.5 m/s WNW	48	43	40	35	38	Traffic 30-36 Insects/Frogs 35-45 Dog barking 48 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					

Table 6 Location J, Parish Drive, Thornton

Period	Date/ Start time/Weather	Primary Noise Descriptor (dBA re 20 μPa)					Description of Noise Emission, Typical Maximum Noise Levels (L_{Amax} – dBA)
		L_{Amax}	L_{A1}	L_{A10}	L_{A90}	L_{Aeq}	
Day	28/6/2022 17:25 11°C 0.4m/s SSW	56	48	43	39	42	Road traffic 39-56 Insects 38 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	28/6/2022 20:41 10°C 0.3 m/s SW	53	44	40	37	39	Insects 35 Train 38-43 Operator 53 Road traffic 37-42 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					
Night	28/6/2022 22:02 9°C 0.5 m/s WNW	43	39	37	35	36	Insects 38 Road traffic 35-43 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					

Table 7 Location L, 65 Tipperary Drive, Ashtonfield

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 μPa)					Description of Noise Emission, Typical Maximum Noise Levels (L_{Amax} – dBA)
		L_{Amax}	L_{A1}	L_{A10}	L_{A90}	L_{Aeq}	
Day	28/6/2022 16:54 11°C 0.3 m/s SSW	71	61	49	42	49	Road traffic 40-71 Residential noise / urban hum 45-56 Birdsong 42-52 **Abel Mine Audible** Bloomfield CHPP 38-41
		Estimated Abel Mine Noise Contribution 39 dBA $L_{Aeq(15minute)}$					
Evening	28/6/2022 21:35 9°C 0.2 m/s NW	71	57	41	33	45	Urban Hum 33-38 Traffic 40-71 Other industry 30-38 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					
Night	29/6/2022 00:51 9°C 0.3 m/s WSW	48	36	34	29	31	Operator 48 Road traffic 28-39 **Abel Mine Inaudible**
		Estimated Abel Mine Noise Contribution Inaudible					

4.2 Operator Attended Noise Monitoring Summary

4.2.1 Donaldson Mine

Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

4.2.2 Abel Coal Mine

Abel mine was placed in Care & Maintenance on 28th April 2016 and there were no operations onsite, excluding that from the Bloomfield CHPP which operates under the Abel Coal Mine project consent conditions.

The Bloomfield CHPP was audible at Location L and Location I during the daytime period and at Location I during the evening. Abel noise emission were inaudible during all other operator attended noise surveys. Noise generated by local and distant traffic was a significant contributor to ambient noise levels at all monitored locations as well as neighbourhood noise and 'natural' noises such as birds, insects and wind related noise.

4.3 Compliance Assessment and Discussion of Results

4.3.1 Operations

Results of the operational compliance assessment are given in **Table 8**.

Table 8 Compliance Noise Assessment - Operations

Location	Estimated Abel $L_{Aeq(15minute)}$ Contribution dBA			Consent Conditions			Compliance		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
D – Black Hill School, Black Hill	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
F – Black Hill Road, Black Hill	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
G – Buchanan Road, Buchanan	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
I – Magnetic Drive, Ashtonfield	35	36	Inaudible	36	36	36	Yes	Yes	Yes
J – Parish Drive, Thornton	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
L – 65 Tipperary Dr, Ashtonfield	39	Inaudible	Inaudible	40	40	40	Yes	Yes	Yes

Results presented in **Table 8** indicate that compliance with the relevant consent conditions was achieved at all noise monitoring locations during all periods.

4.3.2 Sleep Disturbance

Results of the sleep disturbance compliance assessment are given in **Table 9**.

Table 9 Compliance Noise Assessment – Sleep Disturbance

Location	Estimated Abel $L_{A1(1minute)}$ Contribution dBA	Consent Conditions $L_{A1(1minute)}$ dBA	Compliance
D – Black Hill School, Black Hill	Inaudible	45	Yes
F – Black Hill Road, Black Hill	Inaudible	45	Yes
G – Buchanan Road, Buchanan	Inaudible	45	Yes
I – Magnetic Drive, Ashtonfield	Inaudible	45	Yes
J – Parish Drive, Thornton	Inaudible	45	Yes
L – 65 Tipperary Dr, Ashtonfield	Inaudible	47	Yes

Results presented in **Table 9** indicate that compliance with the sleep disturbance consent conditions was achieved at all noise monitoring locations during the night-time noise surveys.

5 Unattended Continuous Noise Monitoring

5.1 Results of Unattended Continuous Noise Monitoring

Unattended continuous noise monitoring was conducted between Thursday 30 June 2022 to Tuesday 12 July 2022 at each of the six monitoring locations given in **Table 10**.

Table 10 Noise Logger and Noise Monitoring Locations

Location	Noise Logger Serial Number	Date of Logging
D – Black Hill School, Black Hill	SVAN 977 69757	30/06/2022 to 12/7/2022
F – Black Hill Road, Black Hill	ARL 316 16-203-529	Deployed 30/06/2022
G – Buchanan Road, Buchanan	SVAN 977 98070	30/06/2022 to 12/7/2022
I – Magnetic Drive, Ashtonfield	ARL EL316 16-306-042	30/06/2022 to 12/7/2022
L – 65 Tipperary Dr, Ashtonfield	SVAN 957 20665	30/06/2022 to 12/7/2022
J – Parish Drive, Thornton	ARL 316 16-203-526	30/06/2022 to 12/7/2022

The unattended ambient noise logger data from each monitoring location are presented graphically on a daily basis and are attached as **Appendix C**. A summary of the results of the unattended continuous noise monitoring is given in **Table 11**. Due to technical logger errors and vandalism no data is available for Location D, Location F and Location I.

The ambient noise level data quantifies the overall noise level at a given location independent of its source or character.

The measured ambient noise levels were divided into three periods representing day, evening and night as designated in the NSW Noise Policy for Industry (NPfI).

Precautions were taken to minimise influences from extraneous noise sources (eg optimum placement of the loggers away from creeks, trees, houses, etc), however, not all these sources or their effects can be eliminated. This is particularly the case during the warmer times of year when noise from insects, frogs, birds and other animals can become quite prevalent.

Weather data for the subject area during the noise monitoring period was provided by Bloomfield Colliery. Noise data during periods of any rainfall and/or wind speeds in excess of 5 m/s were discarded in accordance with NPfI weather affected data exclusion methodology.

Table 11 Unattended Continuous Noise Monitoring Ambient Noise Levels (dBA)

Location	Period	Primary Noise Descriptor (dBA re 20 µPA)			
		L_{A1}	L_{A10}	L_{A90}	L_{Aeq}
G 156 Buchanan Road, Buchanan	Day	54	51	43	51
	Evening	51	48	40	48
	Night	48	45	34	48
L 65 Tipperary Dr, Ashtonfield	Day	62	52	37	53
	Evening	57	41	34	48
	Night	45	37	31	45
J Parish Drive, Thornton	Day	54	48	40	50
	Evening	48	44	40	50
	Night	47	44	35	47

5.2 Long term Unattended Continuous Monitoring Summary for Donaldson Mine and Abel Coal Mine

5.2.1 Ambient LA90 Noise Levels

The long term ambient L_{A90} noise levels collected from each monitoring location are presented graphically in **Figure 1**, **Figure 2** and **Figure 3** for the daytime, evening and night-time periods respectively.

Figure 1 Long Term Daytime L_{A90} Noise Levels

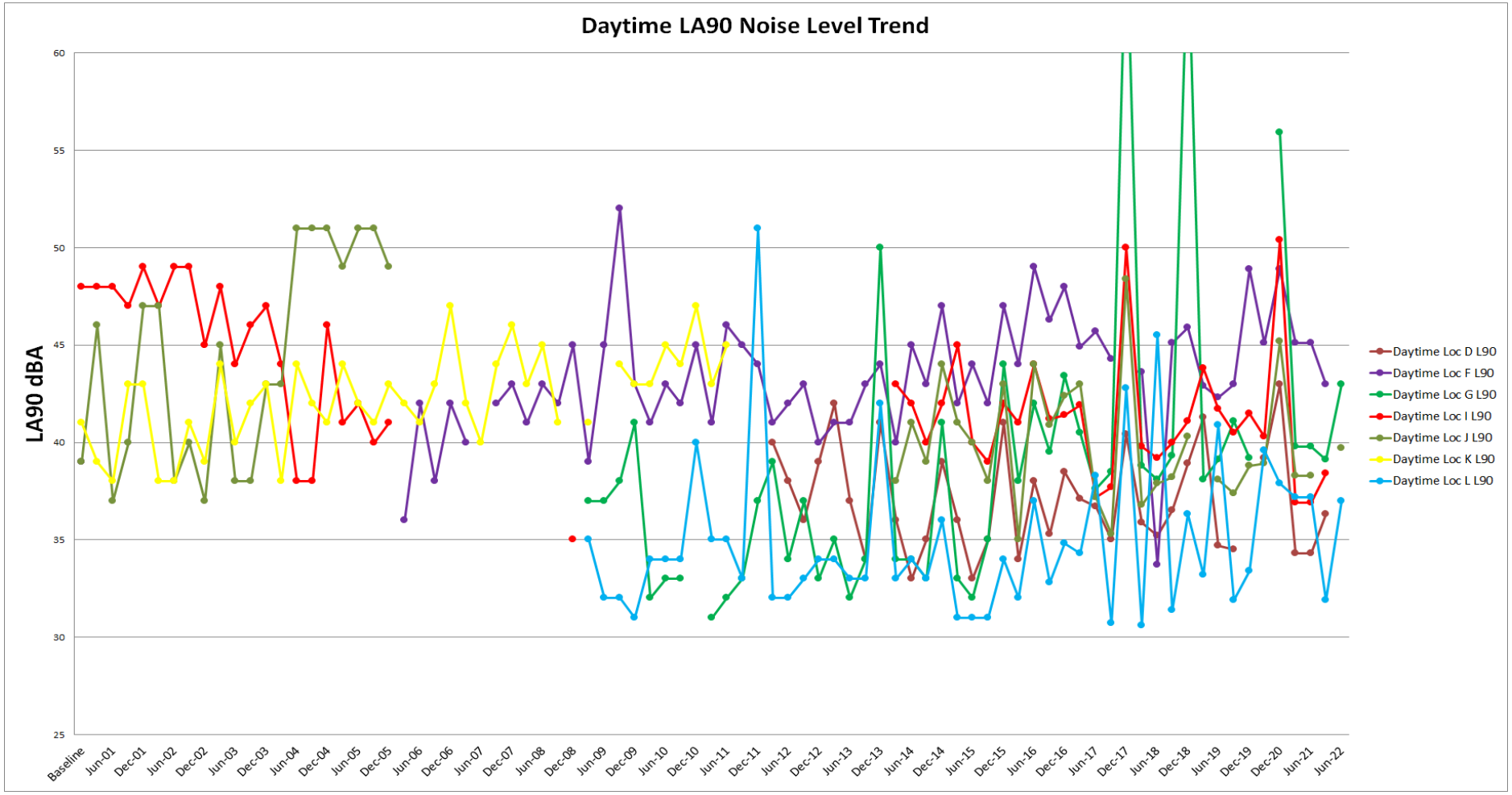


Figure 2 Long Term Evening L_{A90} Noise Levels

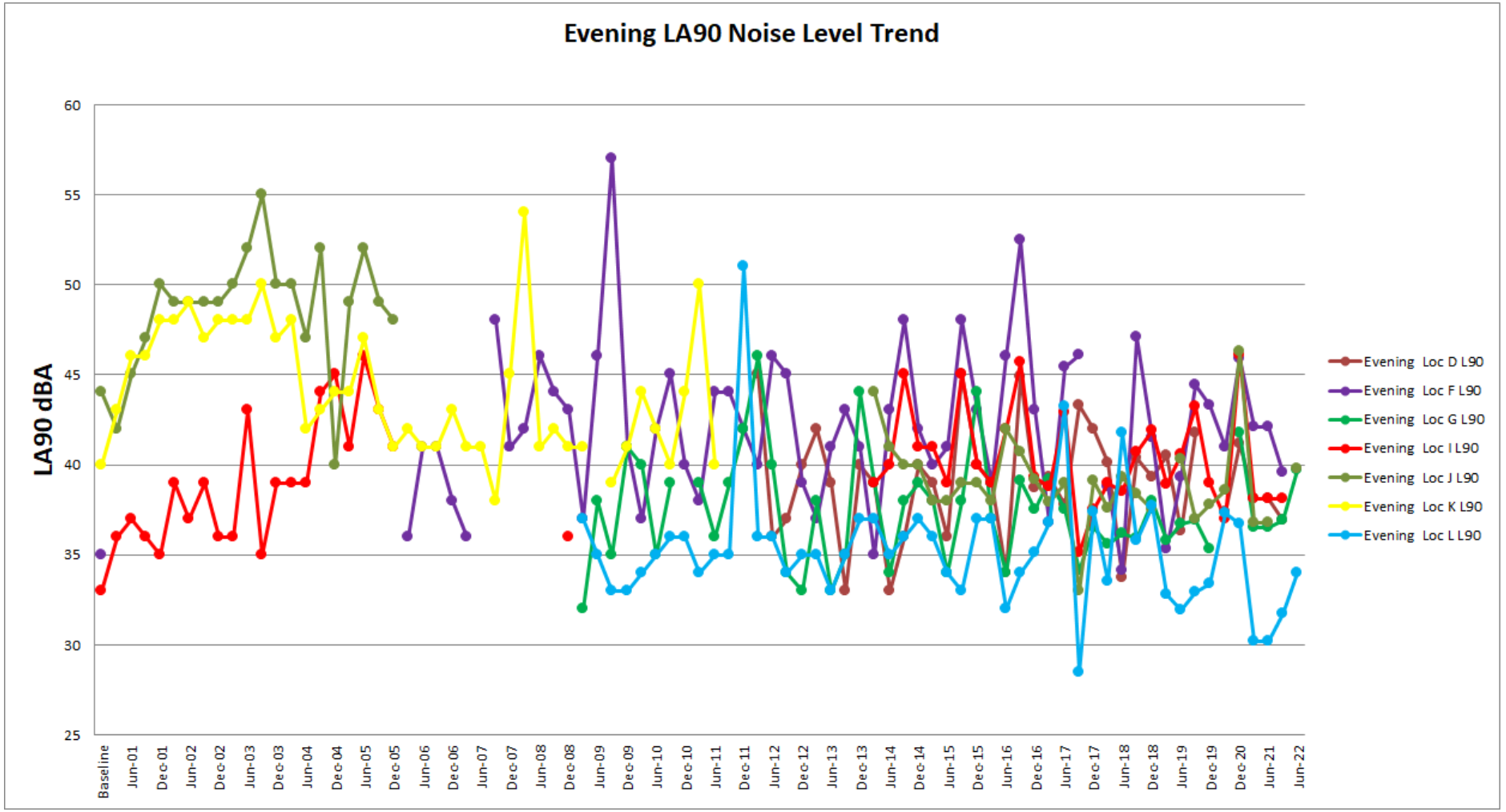
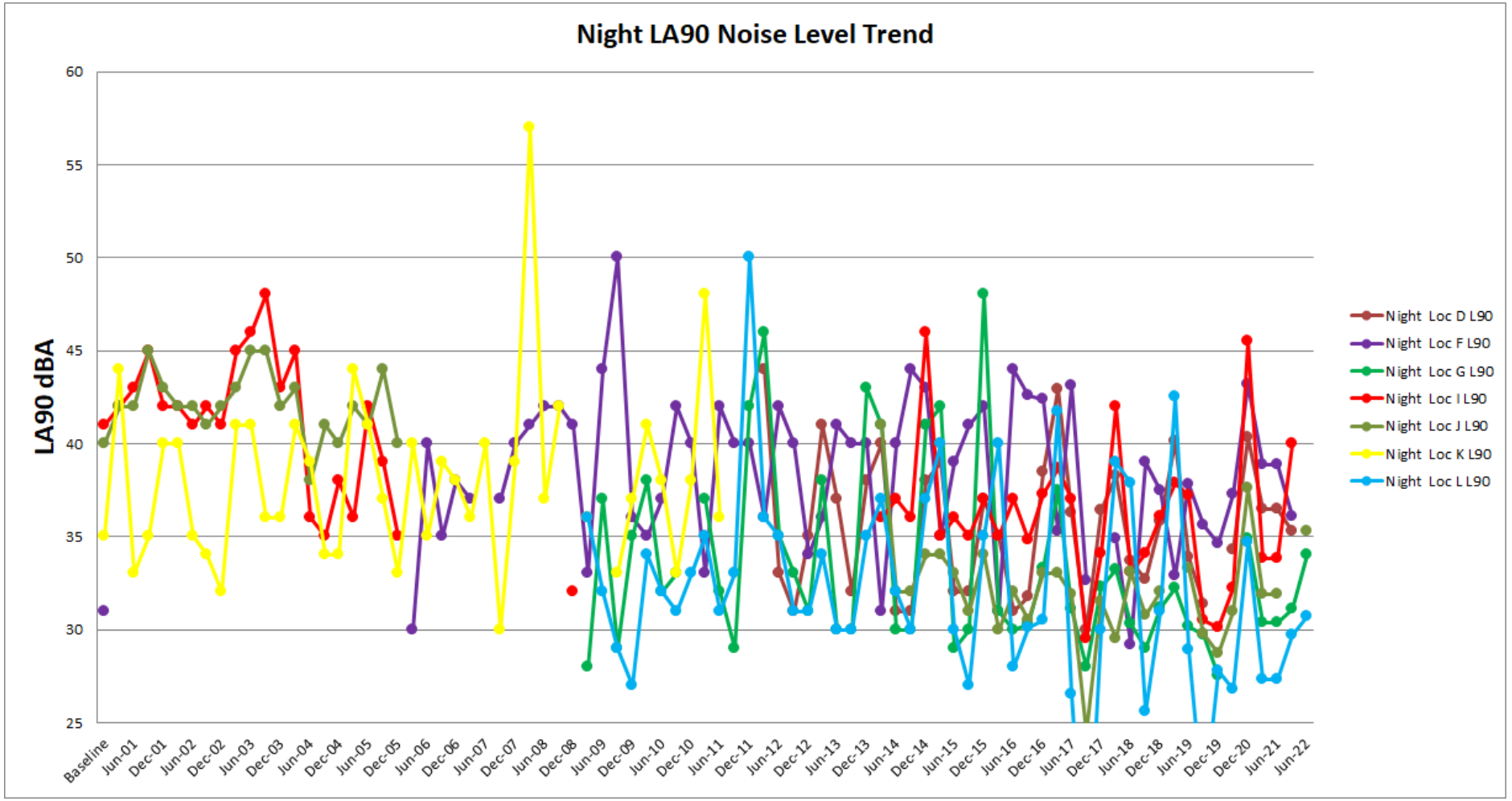


Figure 3 Long Term Night-time L_{A90} Noise Levels



5.2.1.1 Baseline

The summary of results in **Table 12** shows the ambient L_{A90} noise levels recorded for the current monitoring period compared to the levels recorded during the baseline monitoring process (ie. prior to commencement of mining operation at Donaldson).

Table 12 L_{A90} Results Comparison - Baseline

Monitoring Location	Period[1]	Long term Night-time L_{A90} Noise Levels		Difference dB[3]
		Baseline	**June 2022**	
D Black Hill School, Black Hill	Day	N/A[2]	-[4]	N/A[2]
	Evening	N/A[2]	-[4]	N/A[2]
	Night	N/A[2]	-[4]	N/A[2]
F Lot 684 Black Hill Road, Black Hill	Day	39	-[4]	-[4]
	Evening	35	-[4]	-[4]
	Night	31	-[4]	-[4]
G 156 Buchanan Road, Buchanan	Day	N/A[2]	43	N/A[2]
	Evening	N/A[2]	40	N/A[2]
	Night	N/A[2]	34	N/A[2]
I 49 Magnetic Drive, Ashtonfield	Day	48	-[4]	-[4]
	Evening	33	-[4]	-[4]
	Night	41	-[4]	-[4]
L 65 Tipperary Drive, Ashtonfield	Day	N/A[2]	37	N/A[2]
	Evening	N/A[2]	34	N/A[2]
	Night	N/A[2]	31	N/A[2]
J 220 Parish Drive, Thornton	Day	39	40	1
	Evening	44	40	-4
	Night	40	35	-5

Note 1: Periods are as detailed the NPfI and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: No data was available during baseline measurements, no comparisons can be made.

Note 3: Rounded to the nearest whole dB.

Note 4: No data available or comparison can't be made.

5.2.1.2 Previous Half-year

Table 13 presents the ambient L_{A90} noise levels recorded for the current monitoring period compared to those measured during the previous monitoring period.

Table 13 L_{A90} Results Comparison – Previous Half-year

Monitoring Location	Period[1]	Long term Night-time L_{A10} Noise Levels		Difference dB[2]
		December 2021	**June 2022**	
D Black Hill School, Black Hill	Day	36	-[3]	-[3]
	Evening	37	-[3]	-[3]
	Night	35	-[3]	-[3]
F Lot 684 Black Hill Road, Black Hill	Day	43	-[3]	-[3]
	Evening	40	-[3]	-[3]
	Night	36	-[3]	-[3]
G 156 Buchanan Road, Buchanan	Day	39	43	4
	Evening	37	40	3
	Night	31	34	3
I 49 Magnetic Drive, Ashtonfield	Day	38	-[3]	-[3]
	Evening	38	-[3]	-[3]
	Night	40	-[3]	-[3]
L 65 Tipperary Drive, Ashtonfield	Day	32	37	5
	Evening	32	34	2
	Night	30	31	1
J 220 Parish Drive, Thornton	Day	-[3]	40	-[3]
	Evening	-[3]	40	-[3]
	Night	-[3]	35	-[3]

Note 1: 1. Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

Note 3: No data available or comparison cannot be made.

5.2.1.3 Coinciding Period last Year

Table 14 presents the ambient L_{A90} noise levels recorded for the current monitoring period compared to those measured during the coinciding monitoring period last year.

Table 14 L_{A90} Results Comparison – Coinciding Period Last Year

Monitoring Location	Period[1]	Long term Night-time L_{A90} Noise Levels		Difference dB[2]
		June 2021	**June 2022**	
D Black Hill School, Black Hill	Day	34	-[3]	-[3]
	Evening	38	-[3]	-[3]
	Night	37	-[3]	-[3]
F Lot 684 Black Hill Road, Black Hill	Day	45	-[3]	-[3]
	Evening	42	-[3]	-[3]
	Night	39	-[3]	-[3]
G 156 Buchanan Road, Buchanan	Day	40	43	3
	Evening	37	40	3
	Night	30	34	4
I 49 Magnetic Drive, Ashtonfield	Day	37	-[3]	-[3]
	Evening	38	-[3]	-[3]
	Night	34	-[3]	-[3]
L 65 Tipperary Drive, Ashtonfield	Day	37	37	0
	Evening	30	34	4
	Night	27	31	3
J 220 Parish Drive, Thornton	Day	38	40	1
	Evening	37	40	3
	Night	32	35	3

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

Note 3: No data available or comparison cannot be made.

5.2.2 Ambient L_{A10} Noise Comparison

The long term ambient L_{A10} noise levels collected from each monitoring location are presented graphically in **Figure 4**, **Figure 5** and **Figure 6** for the daytime, evening and night-time respectively.

Figure 4 Long Term Daytime L_{A10} Noise Levels

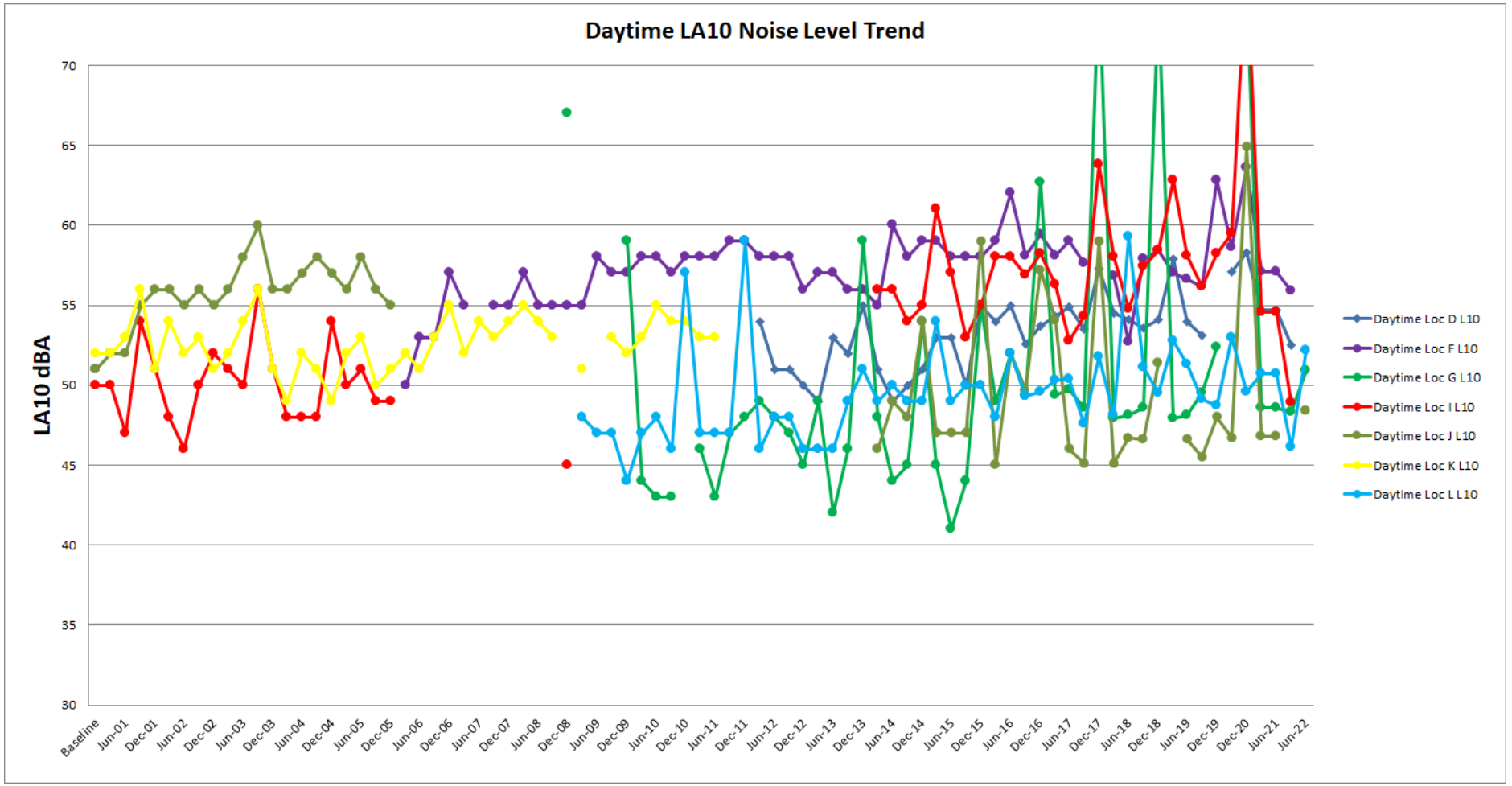


Figure 5 Long term Evening L_{A10} Noise Levels

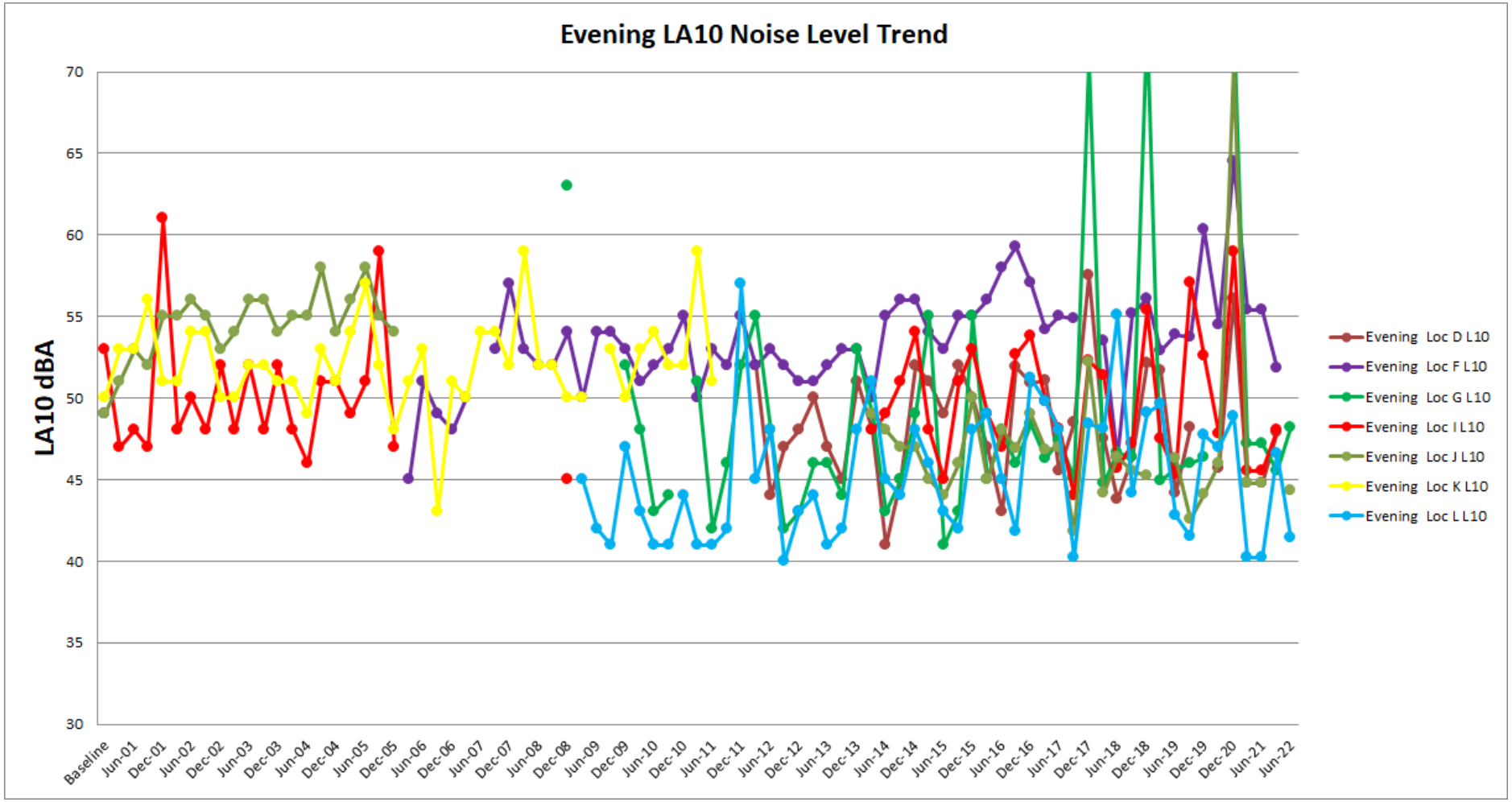
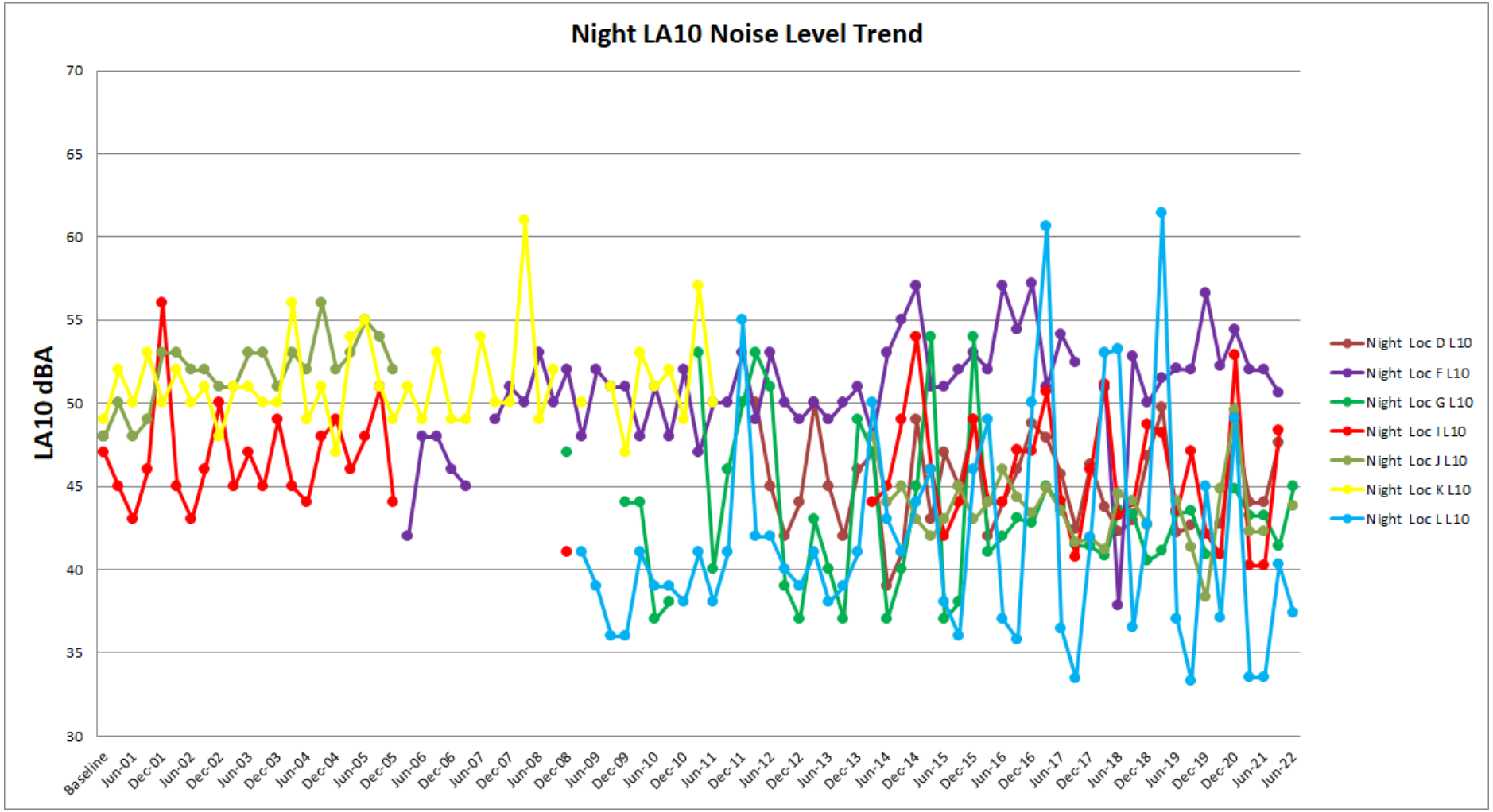


Figure 6 Long term Night L_{A10} Noise Levels



5.2.2.1 Baseline

Table 15 presents the ambient L_{A10} noise levels recorded for the current monitoring period compared to the levels recorded during the baseline monitoring period.

Table 15 L_{A10} Results Comparison – Baseline

Monitoring Location	Period[1]	Long term Night-time L_{A10} Noise Levels		Difference dB[3]
		Baseline	**June 2022**	
D Black Hill School, Black Hill	Day	N/A[2]	-[4]	N/A
	Evening	N/A[2]	-[4]	N/A
	Night	N/A[2]	-[4]	N/A
F Lot 684 Black Hill Road, Black Hill	Day	51	-[4]	-[4]
	Evening	49	-[4]	-[4]
	Night	48	-[4]	-[4]
G 156 Buchanan Road, Buchanan	Day	N/A[2]	51	N/A
	Evening	N/A[2]	48	N/A
	Night	N/A[2]	45	N/A
I 49 Magnetic Drive, Ashtonfield	Day	50	-[4]	-[4]
	Evening	53	-[4]	-[4]
	Night	47	-[4]	-[4]
L 65 Tipperary Drive, Ashtonfield	Day	N/A[2]	52	N/A
	Evening	N/A[2]	41	N/A
	Night	N/A[2]	37	N/A
J 220 Parish Drive, Thornton	Day	51	48	-3
	Evening	49	44	-5
	Night	48	44	-4

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: No data was available during baseline measurements, no comparisons can be made.

Note 3: Difference rounded to the nearest whole dB.

Note 4: No data available or a comparison cannot be made.

5.2.2.2 Previous Half-year

Table 16 presents the ambient L_{A10} noise levels recorded for the current monitoring period compared to those measured during the previous monitoring period.

Table 16 L_{A10} Results Comparison – Previous Half-year

Monitoring Location	Period[1]	Long term Night-time L_{A10} Noise Levels		Difference dB[2]
		December 2021	**June 2022**	
D Black Hill School, Black Hill	Day	53	-[4]	-[3]
	Evening	48	-[4]	-[3]
	Night	48	-[4]	-[3]
F Lot 684 Black Hill Road, Black Hill	Day	56	-[4]	-[3]
	Evening	52	-[4]	-[3]
	Night	51	-[4]	-[3]
G 156 Buchanan Road, Buchanan	Day	48	51	3
	Evening	46	48	3
	Night	41	45	4
I 49 Magnetic Drive, Ashtonfield	Day	49	-[4]	-[3]
	Evening	48	-[4]	-[3]
	Night	48	-[4]	-[3]
L 65 Tipperary Drive, Ashtonfield	Day	46	52	6
	Evening	47	41	-5
	Night	40	37	-3
J 220 Parish Drive, Thornton	Day	-[3]	48	-[3]
	Evening	-[3]	44	-[3]
	Night	-[3]	44	-[3]

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Difference Rounded to the nearest whole dB.

Note 3: No data available or a comparison cannot be made.

5.2.2.3 Coinciding Period Last Year

Table 17 presents the ambient L_{A10} noise levels recorded for the current monitoring period compared to those measured during the coinciding monitoring period last year.

Table 17 L_{A10} Result Comparison – Coinciding Period Last Year

Monitoring Location	Period[1]	Long term Night-time L_{A10} Noise Levels		Difference dB[2]
		June 2021	**June 2022**	
D Black Hill School, Black Hill	Day	55	-[4]	-[3]
	Evening	45	-[4]	-[3]
	Night	44	-[4]	-[3]
F Lot 684 Black Hill Road, Black Hill	Day	57	-[4]	-[3]
	Evening	55	-[4]	-[3]
	Night	52	-[4]	-[3]
G 156 Buchanan Road, Buchanan	Day	49	51	2
	Evening	47	48	1
	Night	43	45	2
I 49 Magnetic Drive, Ashtonfield	Day	55	-[4]	-[3]
	Evening	46	-[4]	-[3]
	Night	40	-[4]	-[3]
L 65 Tipperary Dr, Ashtonfield	Day	51	52	1
	Evening	40	41	1
	Night	34	37	4
J 220 Parish Drive, Thornton	Day	47	48	2
	Evening	45	44	-1
	Night	42	44	2

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

Note 3: No data available or a comparison cannot be made.

5.3 Rail Noise Monitoring

In order to determine compliance with the rail noise criteria, a noise logger was positioned at Location J. The train loading times during the noise monitoring period are presented in **Table 18**.

Table 18 Coal Train Loading Operations Log

Date	Coal Train Loading Time	Period
11/07/2022	07:35-14:15	Day
12/07/2022	07:40-11:20	Day

The measured $L_{Aeq(period)}$ noise level for each period from rail traffic at Location J are presented in **Table 19.**

Table 19 Rail Noise Impact Monitoring Results

Location	Date	Period	Measured $L_{Aeq(period)}$	Criteria $L_{Aeq(period)}$	Compliance
	11/7/2022	Day	37	55	Yes
	12/7/2022	Day	38	55	Yes

Results presented in **Table 19** indicate that rail noise levels from the Bloomfield Rail Spur were in compliance with the Abel Mine Project Approval during the noise monitoring period.

6 Conclusion

SLR was engaged by Donaldson Coal Pty Ltd to conduct half-yearly noise monitoring surveys for Donaldson Coal Mine and Abel Coal Mine in accordance with the NMP, dated 3 June 2019.

Abel mine was placed in Care & Maintenance on 28th April 2016 and there were no operations onsite, excluding that from the Bloomfield CHPP which operates under the Abel Coal Mine project consent conditions.

Operator-attended and unattended noise measurements were conducted for the June 2022 half at six focus locations surrounding the mine.

Results of the attended noise monitoring have indicated that compliance with the Abel Mine *Project Approval* was achieved at all locations.

A comparison of ambient L_{A10} and L_{A90} noise levels recorded during the current monitoring period (June 2022), the baseline monitoring period, the last monitoring period (December 2021), and the coinciding monitoring period from last year (June 2021) has been conducted.

Rail noise levels from the Bloomfield Rail Spur were considered to be in compliance with the Abel Mine Project Approval during the noise monitoring period.

APPENDIX A

Acoustic Terminology

1. Sound Level or Noise Level

The terms 'sound' and 'noise' are almost interchangeable, except that 'noise' often refers to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure. The human ear responds to changes in sound pressure over a very wide range with the loudest sound pressure to which the human ear can respond being ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2 x 10^{-5} Pa.

2. 'A' Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an 'A-weighting' filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4,000 Hz), and less sensitive at lower and higher frequencies. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dB or 2 dB in the level of a sound is difficult for most people to detect, whilst a 3 dB to 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels.

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	
80	Kerbside of busy street	Loud
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	Recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as 'linear', and the units are expressed as dB(lin) or dB.

3. Sound Power Level

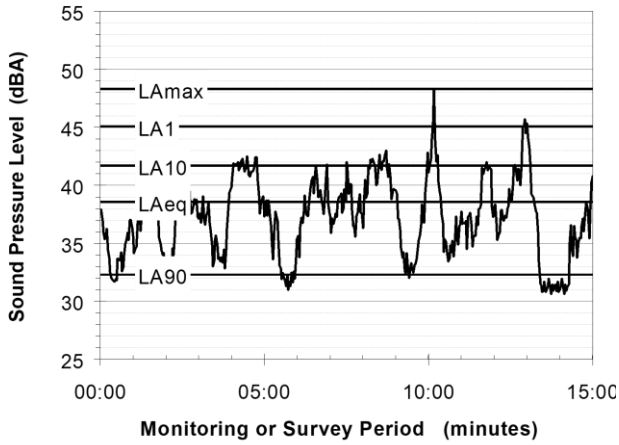
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 10^{-12} W.

The relationship between Sound Power and Sound Pressure is similar to the effect of an electric radiator, which is characterised by a power rating but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4. Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LAN, where LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the LA1 is the noise level exceeded for 1% of the time, LA10 the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

LA1 The noise level exceeded for 1% of the 15 minute interval.

LA10 The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.

LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.

LAeq The A-weighted equivalent noise level (basically, the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

5. Frequency Analysis

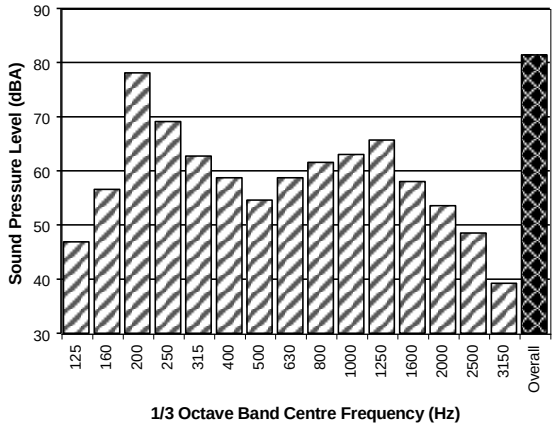
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (three bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



6. Annoying Noise (Special Audible Characteristics)

A louder noise will generally be more annoying to nearby receivers than a quieter one. However, noise is often also found to be more annoying and result in larger impacts where the following characteristics are apparent:

- **Tonality** - tonal noise contains one or more prominent tones (ie differences in distinct frequency components between adjoining octave or 1/3 octave bands), and is normally regarded as more annoying than 'broad band' noise.
- **Impulsiveness** - an impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.
- **Intermittency** - intermittent noise varies in level with the change in level being clearly audible. An example would include mechanical plant cycling on and off.
- **Low Frequency Noise** - low frequency noise contains significant energy in the lower frequency bands, which are typically taken to be in the 10 to 160 Hz region.

7. Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of 'peak' velocity or 'rms' velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as 'peak particle velocity', or PPV. The latter incorporates 'root mean squared' averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements (ie vertical, longitudinal and transverse).

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V, expressed in mm/s can be converted to decibels by the formula 20 log (V/Vo), where Vo is the reference level (10^{-9} m/s). Care is required in this regard, as other reference levels may be used.

8. Human Perception of Vibration

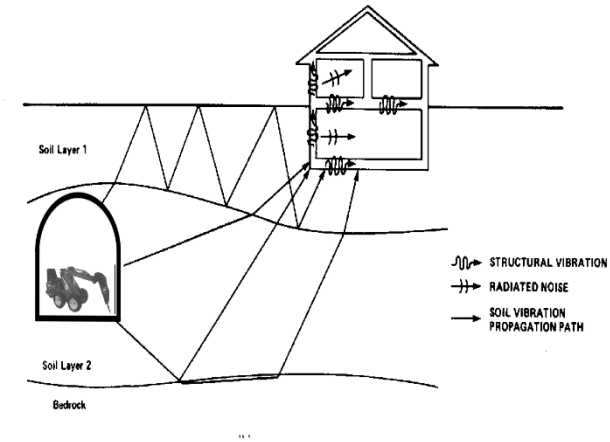
People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as 'normal' in a car, bus or train is considerably higher than what is perceived as 'normal' in a shop, office or dwelling.

9. Ground-borne Noise, Structure-borne Noise and Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed 'structure-borne noise', 'ground-borne noise' or 'regenerated noise'. This noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of ground-borne or structure-borne noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

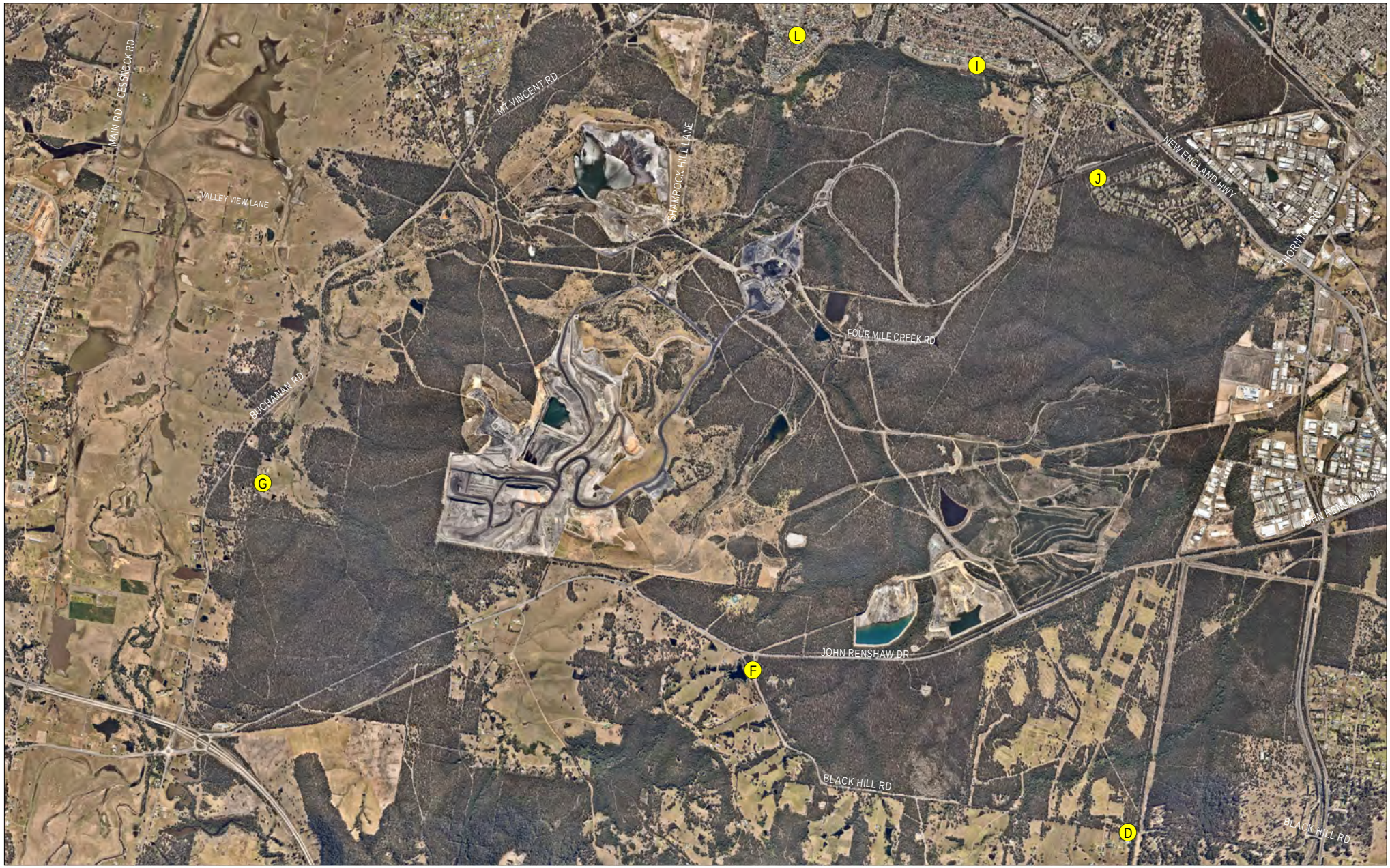
The following figure presents an example of the various paths by which vibration and ground-borne noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



The term 'regenerated noise' is also used in other instances where energy is converted to noise away from the primary source. One example would be a fan blowing air through a discharge grill. The fan is the energy source and primary noise source. Additional noise may be created by the aerodynamic effect of the discharge grill in the airstream. This secondary noise is referred to as regenerated noise.

APPENDIX B

Noise Monitoring Locations



D:\Quick Jobs\Martin Davenport\Donaldson\SLR630010530 1200_AB_Monitoringlocations_01.mxd

10 KINGS ROAD
NEW LAMBTON
NEW SOUTH WALES 2305
AUSTRALIA
T: 61 2 4037 3200
F: 61 2 4037 3201
www.slrconsulting.com

Project No.:	630.01053.01200
Date:	11/01/2018
Drawn by:	NT
Scale:	1:45,000
Sheet Size:	A4
Projection:	GDA 1994 MGA Zone 56

LEGEND

Noise Monitoring Locations

N
W E
S

0 500 1,000 1,500 2,000 m

Donaldson Coal

Noise Monitoring

Noise Monitoring Locations

APPENDIX B

APPENDIX C

Calibration Certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM32604

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	Svantek		
Type No:	SVAN-977C	**Serial No:**	98070
Mic. Type:	MK255	**Serial No:**	21096
Pre-Amp. Type:	SV12L	**Serial No:**	118240
Filter Type:	1/3 Octave	**Test No:**	F032610

Owner: SLR Consulting Australia Pty Ltd
120 High Street
North Sydney, NSW 2060

Tests Performed: IEC 61672-3:2013 & IEC 61260-3:2016

Comments: All Test passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1003	hPa ±1 hPa	**Date of Receipt :**	17/05/2022
Temperature	24	°C ±1° C	**Date of Calibration :**	17/05/2022
Relative Humidity	51	% ±5%	**Date of Issue :**	18/05/2022

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: KB **AUTHORISED SIGNATURE:** Bruce Meldrum

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab No. 9262
Acoustic and Vibration Measurements

Acu-Vib Electronics
CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave, Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

The performance characteristics listed below were tested. The tests are based on the relevant clauses of IEC 61672-3:2013

Tests Performed:	*Clause*	*Result*
Absolute Calibration	10	Pass
Acoustical Frequency Weighting	12	Pass
Self-Generated Noise	11.1	Observed
Electrical Noise	11.2	Observed
Long Term Stability	15	Pass
Electrical Frequency Weightings	13	Pass
Frequency and Time Weightings	14	Pass
Reference Level Linearity	16	Pass
Range Level Linearity	17	Pass
Toneburst	18	Pass
Peak C Sound Level	19	Pass
Overload Indicator	20	Pass
High Level Stability	21	Pass

Statement of Compliance: The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:-2013, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:-2013 because evidence was not publically available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:-2013 and because the periodic tests of IEC 61672-3:-2013 cover only a limited subset of the specifications in IEC 61672-1:-2013.

This Sound Level Meter included an Octave Filter Set. Tests were based on IEC 61260-3:2016 and were conducted to test the following performance characteristics:

Tests performed	*Clause*	*Result*
Test of relative attenuation at filter midband frequency	10	Pass
Linear operating range including range control if fitted	11	Pass
Test of lower limit of linear operating range	12	Pass
Measurement of relative attenuation (filter shape)	13	Pass

The filter submitted for testing successfully completed the tests listed above for the environmental conditions under which the tests were performed. If the filter type has successfully completed the pattern-evaluation tests of IEC 61260-2 then it can be stated that the filter set continues to conform to the specifications of IEC 61260-1.

A full technical report is available on request.

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM32386

EQUIPMENT TESTED: Sound & Vibration Analyser

Manufacturer:	Svantek		
Type No:	SVAN-977A	**Serial No:**	69757
Mic. Type:	7052E	**Serial No:**	71198
Pre-Amp. Type:	SV12L	**Serial No:**	73688
Filter Type:	1/3 Octave	**Test No:**	F032387

Owner: SLR Consulting Australia Pty Ltd
120 High Street
North Sydney, NSW 2060

Tests Performed: IEC 61672-3:2013 & IEC 61260-3:2016

Comments: All Test passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1004	hPa ±1 hPa	**Date of Receipt :**	11/04/2022
Temperature	23	°C ±1° C	**Date of Calibration :**	27/04/2022
Relative Humidity	63	% ±5%	**Date of Issue :**	27/04/2022

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: ... **AUTHORISED SIGNATURE:** .....

Bruce Meldrum

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab No. 9262
Acoustic and Vibration Measurements

Acu-Vib Electronics
CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

The performance characteristics listed below were tested. The tests are based on the relevant clauses of IEC 61672-3:2013

Tests Performed:	*Clause*	*Result*
Absolute Calibration	10	Pass
Acoustical Frequency Weighting	12	Pass
Self-Generated Noise	11.1	Observed
Electrical Noise	11.2	Observed
Long Term Stability	15	Pass
Electrical Frequency Weightings	13	Pass
Frequency and Time Weightings	14	Pass
Reference Level Linearity	16	Pass
Range Level Linearity	17	Pass
Toneburst	18	Pass
Peak C Sound Level	19	Pass
Overload Indicator	20	Pass
High Level Stability	21	Pass

Statement of Compliance: The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:-2013, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:-2013 because evidence was not publically available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:-2013 and because the periodic tests of IEC 61672-3:-2013 cover only a limited subset of the specifications in IEC 61672-1:-2013.

This Sound Level Meter included an Octave Filter Set. Tests were based on IEC 61260-3:2016 and were conducted to test the following performance characteristics:

Tests performed	*Clause*	*Result*
Test of relative attenuation at filter midband frequency	10	Pass
Linear operating range including range control if fitted	11	Pass
Test of lower limit of linear operating range	12	Pass
Measurement of relative attenuation (filter shape)	13	Pass

The filter submitted for testing successfully completed the tests listed above for the environmental conditions under which the tests were performed. If the filter type has successfully completed the pattern-evaluation tests of IEC 61260-2 then it can be stated that the filter set continues to conform to the specifications of IEC 61260-1.

A full technical report is available on request.

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM32724

EQUIPMENT TESTED: Sound & Vibration Analyser

Manufacturer:	Svantek		
Type No:	Svan-957	**Serial No:**	20665
Mic. Type:	7052E	**Serial No:**	80497
Pre-Amp. Type:	SV12L	**Serial No:**	106966
Filter Type:	1/1 Octave	**Test No:**	FILT6780

Owner: SLR Consulting Australia Pty Ltd
120 High Street
North Sydney, NSW 2060

Tests Performed: IEC 61672-3:2013,
IEC 1260:1995, & AS/NZS 4476:1997

Comments: All Test passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	986	hPa ±1 hPa	**Date of Receipt :**	22/02/2022
Temperature	21	°C ±1° C	**Date of Calibration :**	30/05/2022
Relative Humidity	48	% ±5%	**Date of Issue :**	30/05/2022

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: ..... **AUTHORISED SIGNATURE:** .....

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab No. 9262
Acoustic and Vibration Measurements

Acu-Vib Electronics
CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

The performance characteristics listed below were tested. The tests are based on the relevant clauses of IEC 61672-3:2013

Tests Performed:	*Clause*	*Result*
Absolute Calibration	10	Pass
Acoustical Frequency Weighting	12	Pass
Self-Generated Noise	11.1	Observed
Electrical Noise	11.2	Observed
Long Term Stability	15	Pass
Electrical Frequency Weightings	13	Pass
Frequency and Time Weightings	14	Pass
Reference Level Linearity	16	Pass
Range Level Linearity	17	Pass
Toneburst	18	Pass
Peak C Sound Level	19	Pass
Overload Indicator	20	Pass
High Level Stability	21	Pass

Statement of Compliance: The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:-2013, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:-2013 because evidence was not publically available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:-2013 and because the periodic tests of IEC 61672-3:-2013 cover only a limited subset of the specifications in IEC 61672-1:-2013.

This Sound Level Meter included an Octave Filter Set. Tests were based on IEC 1260: 1995 and AS/NZS 4476 - 1997 and were conducted to test the following performance characteristics:

1. Relative attenuation clause 5.3

A full technical report is available on request.

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM30625

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	B & K		
Type No:	2270	**Serial No:**	2679354
Mic. Type:	4189	**Serial No:**	2695417
Pre-Amp. Type:	ZC0032	**Serial No:**	12254
Filter Type:	1/3 Octave	**Test No:**	FILT 6666

Owner: SLR Consulting Australia Pty Ltd
120 High Street
North Sydney, NSW 2060

Tests Performed: IEC 61672-3:2013,
IEC 1260:1995, & AS/NZS 4476:1997

Comments: All Test passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	994	hPa ±1 hPa	**Date of Receipt :**	17/09/2021
Temperature	24	°C ±1° C	**Date of Calibration :**	21/09/2021
Relative Humidity	27	% ±5%	**Date of Issue :**	21/09/2021

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: ..... **AUTHORISED SIGNATURE:** .....

Jack Kielt

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab No. 9262
Acoustic and Vibration Measurements

Acu-Vib Electronics
CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

The performance characteristics listed below were tested. The tests are based on the relevant clauses of IEC 61672-3:2013

Tests Performed:	*Clause*	*Result*
Absolute Calibration	10	Pass
Acoustical Frequency Weighting	12	Pass
Self-Generated Noise	11.1	Observed
Electrical Noise	11.2	Observed
Long Term Stability	15	Pass
Electrical Frequency Weightings	13	Pass
Frequency and Time Weightings	14	Pass
Reference Level Linearity	16	Pass
Range Level Linearity	17	Not Applicable
Toneburst	18	Pass
Peak C Sound Level	19	Pass
Overload Indicator	20	Pass
High Level Stability	21	Pass

Statement of Compliance: The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:-2013, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:-2013 because evidence was not publically available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:-2013 and because the periodic tests of IEC 61672-3:-2013 cover only a limited subset of the specifications in IEC 61672-1:-2013.

This Sound Level Meter included an Octave Filter Set. Tests were based on IEC 1260: 1995 and AS/NZS 4476 - 1997 and were conducted to test the following performance characteristics:

1. Relative attenuation clause 5.3

A full technical report is available on request.

Acoustic Research Labs Pty Ltd
Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
AS 1259-1:1990 - AS 1259-2:1990
Calibration Certificate

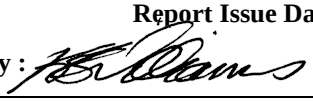
Calibration Number C22207

Client Details SLR Consulting Pty Ltd
Level 11, 176 Wellington Parade
East Melbourne VIC 3002

Equipment Tested/ Model Number : ARL EL-316
Instrument Serial Number : 16-306-042
Microphone Serial Number : 313469
Pre-amplifier Serial Number : 28223

Atmospheric Conditions
Ambient Temperature : 24°C
Relative Humidity : 63.6%
Barometric Pressure : 100.9kPa

Calibration Technician : Lucky Jaiswal
Secondary Check: Shaheen Boaz
Calibration Date : 7 Apr 2022
Report Issue Date : 7 Apr 2022

Approved Signatory :  Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
10.2.2: Absolute sensitivity	*Pass*	10.3.4: Inherent system noise level	*Pass*
10.2.3: Frequency weighting	*Pass*	10.4.2: Time weighting characteristic F and S	*Pass*
10.3.2: Overload indications	*Pass*	10.4.3: Time weighting characteristic I	*Pass*
10.3.3: Accuracy of level range control	*Pass*	10.4.5: R.M.S performance	*Pass*
8.9: Detector-indicator linearity	*Pass*	9.3.2: Time averaging	*Pass*
8.10: Differential level linearity	*Pass*	9.3.5: Overload indication	*Pass*

Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.14dB*	*Temperature*	*±0.1°C*
12.5kHz	*±0.19dB*	*Relative Humidity*	*±1.9%*
16kHz	*±0.29dB*	*Barometric Pressure*	*±0.014kPa*
Electrical Tests			
31.5 Hz to 20 kHz	*±0.11dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

The sound level meter under test has been shown to conform to the type 1 requirements for periodic testing as described in AS 1259.1:1990 and AS 1259.2:1990 for the tests stated above.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

Acoustic Research Labs Pty Ltd
Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
AS 1259-1:1990 - AS 1259-2:1990
Calibration Test Report

Calibration Number C22207

Client Details SLR Consulting Pty Ltd
Level 11, 176 Wellington Parade
East Melbourne VIC 3002

Equipment Tested/ Model Number : ARL EL-316
Instrument Serial Number : 16-306-042
Microphone Serial Number : 313469
Pre-amplifier Serial Number : 28223

Atmospheric Conditions
Ambient Temperature : 24°C
Relative Humidity : 63.6%
Barometric Pressure : 100.9kPa

Calibration Technician : Lucky Jaiswal
Calibration Date : 7 Apr 2022
Secondary Check: Shaheen Boaz
Report Issue Date : 7 Apr 2022

Approved Signatory :  Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
10.2.2: Absolute sensitivity	*Pass*	10.3.4: Inherent system noise level	*Pass*
10.2.3: Frequency weighting	*Pass*	10.4.2: Time weighting characteristic F and S	*Pass*
10.3.2: Overload indications	*Pass*	10.4.3: Time weighting characteristic I	*Pass*
10.3.3: Accuracy of level range control	*Pass*	10.4.5: R.M.S performance	*Pass*
8.9: Detector-indicator linearity	*Pass*	9.3.2: Time averaging	*Pass*
8.10: Differential level linearity	*Pass*	9.3.5: Overload indication	*Pass*

Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.14dB*	*Temperature*	*±0.1°C*
12.5kHz	*±0.19dB*	*Relative Humidity*	*±1.9%*
16kHz	*±0.29dB*	*Barometric Pressure*	*±0.014kPa*
Electrical Tests			
31.5 Hz to 20 kHz	*±0.11dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

The sound level meter under test has been shown to conform to the type 1 requirements for periodic testing as described in AS 1259.1:1990 and AS 1259.2:1990 for the tests stated above.

1. OVERVIEW

This report presents the calibration test results of a ARL EL-316 Sound Level Meter, and associated equipment. Calibration is carried out in accordance with *AS1259.1:1990, Sound Level Meters, Non Integrating*, and if applicable, *AS1259.2:1990, Sound Level Meters, Integrating-averaging*.

Relevant clauses from this standard have been used for periodic testing in conjunction with Acoustic Research Labs internal test methods described in Section 2 of the calibration work instruction manual.

1.1 UNCERTAINTIES

For each test performed, the associated measurement uncertainties are derived at the 95% confidence level and are given with a coverage factor of 2.

The uncertainty applies at the time of measurement only, and takes no account of any drift or other effects that may apply afterwards. When estimating uncertainty at any later time, other relevant information should also be considered, including, where possible, the history of the performance of the instrument and the manufacturer's specifications.

1.2 DOCUMENT CONVENTIONS

Test results which highlight non-conformances relative to the standard, and the sound level meter type specified by the manufacturer have been marked with an **F** in the respective tests.

Any tests that are not required, due to sound level meter configuration, are marked N/A.

2. GENERAL

2.1 ENVIRONMENTAL CONDITIONS DURING TEST

No corrections have been applied to any results obtained to compensate for the above environmental conditions.

2.2 CALIBRATION TESTS

Where applicable the following tests were performed in accordance with AS1259.1:1990. These clauses are used for periodic calibration testing of Sound Level Meters, Non-integrating.

Clause 8.9	Detector-Indicator linearity
Clause 8.10	Differential level linearity
Clause 10.2.2	Absolute sensitivity
Clause 10.2.3	Frequency weighting
Clause 10.3.2	Overload indication
Clause 10.3.3	Accuracy of level range control
Clause 10.3.4	Inherent weighted system noise level
Clause 10.4.2	Time-weighting characteristics F and S
Clause 10.4.3	Time weighting characteristics I
Clause 10.4.4	Time weighting characteristics P
Clause 10.4.5	RMS performance

Where the sound level meter includes an integrating or averaging function, the following additional tests were performed in accordance with AS1259.2:1990. These clauses are used for periodic calibration testing of Sound Level Meters, Integrating-averaging.

Clause 9.3.2	Time Averaging
Clause 9.3.5	Overload Indication

2.3 TEST EQUIPMENT USED

All test equipment used during periodic testing are calibrated every 12months by an accredited laboratory, traceable to SI units.

The performance of all equipment during these calibrations and the effects of instrument stability are used to determine the measurement uncertainty of each reported result.

2.3.1 Multi-function Acoustic Calibrator

A Bruel & Kjaer 4226 Multi-function calibrator (S/N - 3215300) was used for frequency response testing of the entire instrument (including microphone). This instrument was used as a reference calibrator and for frequency response verification.

2.3.2 Microphone Electrical Equivalent Circuit

Calibration of most instrument parameters is carried out using electrical signals fed to the unit via a two-port electrical equivalent circuit of the microphone.

A N/ApF capacitance dummy microphone was used during testing.

2.3.3 Adjustable Attenuator

A means for varying the attenuation of electrical signals via the dummy microphone was provided by a JFW Industries dual rotary attenuator (S/N - 792819 2132). The attenuator is switchable in 1dB steps between 0dB and 60dB.

2.3.4 Arbitrary Function Generator

A Hewlett Packard 33120A (S/N - US36047448) was used to generate the required electrical signals.

2.3.5 Environmental Monitoring

A MHB-382SD (S/N –AH.88227) was used for measuring environmental conditions during device calibration. It is capable of providing temperature, relative humidity and pressure measurements.

3. CALIBRATION TEST RESULTS

3.1 ACOUSTIC CALIBRATION TEST RESULTS

The following tests were performed on the complete sound level meter with the associated pre-amplifier and microphone attached. A multi-function acoustic calibrator was used for providing test signals for testing the acoustic measurement capabilities.

3.1.1 Absolute Sensitivity

The absolute sensitivity test was performed by providing an acoustic signal at the reference frequency and reference level at the reference direction of the sound level meter as specified by the manufacturer and recording the results. The instrument's absolute sensitivity was then adjusted according to manufacturer's specifications and a post adjustment measurement was taken.

Table 1 – Pre-Adjustment Absolute sensitivity test results

Frequency Weighting	Sound Pressure Level (dB)
A	94.2
C	94.2
Linear	N/A

Table 2 – Post-Adjustment Absolute sensitivity test results

Frequency Weighting	Sound Pressure Level (dB)
A	94.2
C	94.2
Linear	N/A

The measurement uncertainty for the above tests, derived at the 95% confidence level is 0.13dB.

3.1.2 Frequency Weighting

The frequency weighting test was performed by providing an acoustic signal at the reference level of the sound level meter as specified by the manufacturer.

Frequencies were then altered in nominal full octave steps to test the frequency weighting performance.

Table 3 - Acoustic frequency response test

Frequency (Hz)	A Weighted Response (dB)	C Weighted Response (dB)	Lin Weighted Response (dB)	Uncertainty (dB)
31.6	55.4	91.3	N/A	0.1
63.1	68.5	93.5	N/A	0.1
125.9	78.3	94.1	N/A	0.1
251.3	85.4	94.0	N/A	0.1
502.5	90.6	94.0	N/A	0.1
1005.1	94.2	94.2	N/A	0.1
1978.8	95.7	94.2	N/A	0.1
3957.5	95.9 (E)	93.9	N/A	0.1
7915.1	93.7	91.5	N/A	0.1
12664.1	89.7	87.6	N/A	0.2
15830.2	86.9	84.9	N/A	0.3

The measurement uncertainties for this test, derived at the 95% confidence level are as shown in Table 3.

3.1.3 Overload Indication Test - Acoustic Inverse A Weighting Test

The overload indication test was performed by providing an acoustic signal at the reference level and reference frequency. The frequency level was altered in octave steps, and the level was adjusted, according to the A weighting filter response in order to maintain the same sound pressure level display.

Where the sound pressure level is not within the A weighting tolerance, a clear overload indication is to be displayed.

Table 4 - Acoustic inverse A weighting test

Frequency (Hz)	Inverse A Weighting Level (dB)	Deviation From Expected Response (dB)	Overload Indicated (Y/N?)	Uncertainty (dB)
20.0	N/A	N/A	N/A	0.1
31.6	N/A	N/A	N/A	0.1
63.1	N/A	N/A	N/A	0.1
125.9	115.3	-0.3	Y	0.1
251.2	114.9	0.1	N	0.1
501.2	114.9	0.1	N	0.1
1000.0	115.0	0.0	N	0.1

The measurement uncertainties for this test, derived at the 95% confidence level are as shown in Table 4.

3.2 ELECTRICAL CALIBRATION TEST RESULTS

Electrical testing was performed by removing the microphone and substituting an equivalent electrical impedance by use of a dummy microphone. Electrical signals were then provided by an arbitrary waveform generator, via an adjustable attenuator to provide appropriate input levels.

3.2.1 Detector-Indicator Linearity

Detector-indicator linearity tests were performed by providing an electrical signal at the reference level of the sound level meter as specified by the manufacturer. Sound pressure levels were then altered to test the linearity of the sound level meter.

Tests were also performed at 31.5Hz and 8000Hz.

Table 5 - Detector-indicator linearity test

Amplitude (dB)	1000 Hz Response (dB)	8000 Hz Response (dB)	31.5 Hz Response (dB)
110.0	110.2	110.4	110.3
100.0	99.9	99.7	99.8
90.0	89.9	90.0	89.9
80.0	80.1	80.1	80.1
70.0	69.9	69.8	69.9
60.0	59.9	60.1	59.9
50.0	50.0	50.0	50.0

The measurement uncertainties for this test, derived at the 95% confidence level is 0.1dB for 1000Hz, 0.1db for 8000Hz tests and 0.1dB for 31.5Hz tests.

3.2.2 Differential Level Linearity

Differential level linearity tests were performed by providing an electrical signal at the Reference Level of the sound level meter as specified by the manufacturer. Sound pressure levels were then altered to test the linearity of the sound level meter.

Tests were also performed at 31.5Hz and 8000Hz.

Table 6 - Differential level linearity test

Amplitude (dB)	1000 Hz Response (dB)	8000 Hz Response (dB)	31.5 Hz Response (dB)
99.0	99.1	99.2 (E)	99.1
98.0	98.0	98.0	98.0
97.0	97.0	96.9	97.0
96.0	95.9	95.9	96.0
95.0	95.0	95.0	94.9
94.0	94.0	94.0	94.0
93.0	93.0	93.0	93.0
92.0	92.0	92.0	92.0
91.0	91.1	91.1	91.1
90.0	89.9	89.9	90.0
89.0	89.0	89.0	89.0

The measurement uncertainties for this test, derived at the 95% confidence level is 0.1dB for 1000Hz, 0.1db for 8000Hz tests and 0.1dB for 31.5Hz tests.

3.2.3 Frequency Weighting

The frequency weighting test was performed by providing an electrical signal at the reference level of the sound level meter as specified by the manufacturer.

Frequency levels were then altered in exact one third octave steps to test the frequency weighting performance.

Table 7 - Electrical frequency response test

Frequency (Hz)	A Weighted Response (dB)	C Weighted Response (dB)	Lin Weighted Response (dB)	Uncertainty (dB)
10.0	24.3	77.9	N/A	0.1
12.6	29.8	81.7	N/A	0.1
15.9	36.8	85.0	N/A	0.1
20.0	43.6	87.5	N/A	0.1
25.1	49.6	89.6	N/A	0.1
31.6	55.1	91.0	N/A	0.1
39.8	59.8	92.0	N/A	0.1
50.1	64.1	92.8	N/A	0.1
63.1	68.3	93.3	N/A	0.1
79.4	72.0	93.6	N/A	0.1
100.0	75.3	93.8	N/A	0.1
125.9	78.1	94.0	N/A	0.1
158.5	80.8	94.0	N/A	0.1
199.5	83.2	94.0	N/A	0.1
251.2	85.3	94.0	N/A	0.1
316.2	87.3	94.0	N/A	0.1
398.1	88.9	94.1	N/A	0.1
501.2	90.5	94.0	N/A	0.1
631.0	92.0	94.0	N/A	0.1
794.3	93.1	94.0	N/A	0.1
1000.0	94.0	94.0	N/A	0.1
1259.0	94.5	94.0	N/A	0.1
1585.0	95.0	94.0	N/A	0.1
1995.0	95.3	93.9	N/A	0.1
2512.0	95.3	93.6	N/A	0.1
3162.0	95.3	93.4	N/A	0.1
3981.0	95.0	92.9	N/A	0.1
5012.0	94.4	92.3	N/A	0.1
6310.0	93.5	91.4	N/A	0.1
7943.0	92.3	90.1	N/A	0.1
10000.0	90.6	88.4	N/A	0.1
12590.0	88.5	86.4	N/A	0.1
15850.0	86.1	83.9	N/A	0.1
19950.0	83.0	80.9	N/A	0.1

The measurement uncertainties for this test, derived at the 95% confidence level are as shown in Table 7.

3.2.4 Overload Indication - Electrical Rectangular Pulse Test

The overload indication was tested electrically by applying rectangular test pulses of various crest factors at a level 2dB below the upper limit of the primary indicator range.

Where the response is not within the crest factor tolerance, a clear overload indication is to be displayed.

Table 8 - Electrical rectangular pulse test

Pulse Direction and Crest Factor	Response (dB)	Overload Indicated (Y/N?)
CF3 Positive	108.0	N
CF3 Negative	107.9	N
CF5 Positive	N/A	N/A
CF5 Negative	N/A	N/A
CF10 Positive	N/A	N/A
CF10 Negative	N/A	N/A

The measurement uncertainty for this test, derived at the 95% confidence level is 0.2dB.

3.2.5 Accuracy of Level Range Control

The accuracy of the level range control was tested by applying a sound pressure level half way between the maximum and minimum of the highest scale. The sound pressure level was then reduced by half of the scale range, each time reducing the level range by one step.

Table 9 - Accuracy of level range control - C Weighting

Range (dB)	20 Hz Level (dB)	31.5 Hz Level (dB)	1000 Hz Level (dB)	8000 Hz Level (dB)	12500 Hz Level (dB)
30 - 120	N/A	N/A	N/A	N/A	N/A

The measurement uncertainties for this test, derived at the 95% confidence level are 0.1dB for 20Hz-31.5Hz tests and 0.1dB for 1000Hz-12500Hz tests.

3.2.6 Inherent Weighted System Noise Level

The weighted inherent system noise level (electrical noise floor) was tested by removing any input signal to the dummy microphone, and electrically shorting the input to this device.

Table 10 - Inherent weighted system noise level

Frequency Weighting	Level (dB)	Under Range
A	21.0	N/A
C	19.7	N/A
Lin	N/A	N/A

3.2.7 Time Weighting Characteristics - Fast and Slow

3.2.7.1 Onset Transient Characteristics

Onset Transient Characteristics were tested by applying single sinusoidal tonebursts of specified duration and amplitude, and recording the maximum response sound pressure level.

Table 11 - Onset transient characteristics

Continuous Level (dB)	Fast Weighting Response (dB) (200ms Toneburst)	Slow - 500ms Toneburst (dB) (500ms Toneburst)
106.0	105.1	N/A
96.0	94.7	N/A
86.0	84.9	N/A
76.0	75.0	N/A
66.0	64.8	N/A
56.0	55.1	N/A

The measurement uncertainty for this test, derived at the 95% confidence level is 0.1dB.

3.2.7.2 Overshoot

Overshoot was tested by suddenly increasing the sound pressure level by 20dB, and recording the maximum response sound pressure level.

Table 12 - Overshoot

Continuous Level (dB)	Fast Weighting Response (dB) (200ms Toneburst)	Slow - 500ms Toneburst (dB) (500ms Toneburst)
106.0	106.0	N/A
96.0	96.0	N/A
86.0	85.9	N/A
76.0	76.0	N/A
66.0	66.0	N/A
56.0	56.0	N/A

The measurement uncertainty for this test, derived at the 95% confidence level is 0.1dB.

3.2.7.3 Decay Time

Decay times were tested by measuring the amount of time taken for the sound pressure level to fall by 10dB, after an input signal is suddenly withdrawn.

Table 13 - Decay Time

Continuous Level (dB)	Fast Weighting Response 10dB Decay Time (s)	Slow Weighting Response 10dB Decay Time (s)
106.0	0.3	N/A

The measurement uncertainty for this test, derived at the 95% confidence level is 0.1dB.

3.2.8 Time Weighting Characteristic - Impulse

3.2.8.1 Response to a Single Burst

The time weighting characteristic I was tested by applying single sinusoidal tonebursts of specified duration and amplitude, and recording the maximum response sound pressure level.

Table 14 - Response to a single burst

Amplitude (dB)	20ms Burst Response (dB)	5ms Burst Response (dB)	Increase in reading for +5dB input for 5ms Burst (dB)	2ms Burst Response (dB)	Increase in reading for +10dB input for 2ms Burst (dB)
100.0	N/A	N/A	N/A	N/A	N/A
90.0	N/A	N/A	N/A	N/A	N/A
80.0	N/A	N/A	N/A	N/A	N/A
70.0	N/A	N/A	N/A	N/A	N/A
60.0	N/A	N/A	N/A	N/A	N/A

3.2.8.2 Response to a Continuous Sequence of Bursts

The time weighting characteristic I was tested by applying a continuous sequence of bursts of a fixed reference amplitude, frequency and duration at various burst frequencies. The sound pressure level was recorded for each burst frequency at various levels.

Table 15 - Response to a continuous sequence of bursts

Amplitude (dB)	100Hz Response (dB)	20Hz Response (dB)	2Hz Response (dB)	Increase in reading for +5dB input for 2Hz (dB)
100.0	N/A	N/A	N/A	N/A
90.0	N/A	N/A	N/A	N/A
80.0	N/A	N/A	N/A	N/A
70.0	N/A	N/A	N/A	N/A
60.0	N/A	N/A	N/A	N/A

3.2.8.3 Decay Time

Decay rate for impulse response was tested by measuring the amount of time taken for the sound pressure level to fall by 10dB, after an input signal is suddenly withdrawn.

Table 16 - Decay Time

Continuous Level (dB)	Impulse Response Decay Rate (dB/s)
100.0	N/A

3.2.9 Time Weighting Characteristic - Peak

The time weighting characteristic P was tested by applying a rectangular test pulse equal to the onset time as specified by the manufacturer. The onset time was then calculated by reducing the width of the test pulse until the instrument indicated a level 2dB less than that of the Reference Test Pulse.

Table 17 - Onset time pulse test

	Positive Pulse	Negative Pulse
Reference Test Pulse (dB)	N/A	N/A
Onset Time (μs)	N/A	N/A

3.2.10 RMS Performance

3.2.10.1 Rectangular Pulse Test

The RMS Performance was tested by producing repetitive short term rectangular pulses of different crest factors with an equal RMS level to that of a reference continuous sinusoidal signal. The output level of the rectangular pulse was measured in order to verify the RMS performance.

Table 18 - RMS performance for rectangular pulse

Amplitude (dB)	CF = 3 Positive Pulse Response (dB)	CF = 3 Negative Pulse Response (dB)	CF = 5 Positive Pulse Response (dB)	CF = 5 Negative Pulse Response (dB)	CF = 10 Positive Pulse Response (dB)	CF = 10 Negative Pulse Response (dB)
108.0	108.0	107.9	N/A	N/A	N/A	N/A
98.0	98.0	97.8	N/A	N/A	N/A	N/A
88.0	87.7	87.6	N/A	N/A	N/A	N/A
78.0	77.9	77.8	N/A	N/A	N/A	N/A
68.0	67.9	67.7	N/A	N/A	N/A	N/A
58.0	57.6	57.4 (E)	N/A	N/A	N/A	N/A

The measurement uncertainty for this test, derived at the 95% confidence level is 0.2dB.

3.2.10.2 Continuous Toneburst Test

The RMS performance was tested by applying a continuous sequence of bursts of a fixed reference amplitude and burst frequency. The burst count was altered in order to provide various signals of different crest factor.

The sound pressure level was recorded for each test signal of different crest factor at different levels.

Table 19 - RMS performance for continuous toneburst

Amplitude (dB)	CF = 3 Response (dB)	CF = 5 Response (dB)	CF = 10 Response (dB)
108.0	108.1	N/A	N/A
98.0	98.1	N/A	N/A
88.0	88.0	N/A	N/A
78.0	78.0	N/A	N/A
68.0	68.0	N/A	N/A
58.0	57.8	N/A	N/A

The measurement uncertainty for this test, derived at the 95% confidence level is 0.2dB.

3.2.11 Time Averaging

3.2.11.1 Leq Test

The time averaging (Leq) function of the sound level meter is tested by applying continuous toneburst signals of a fixed amplitude, frequency and burst frequency. The duty cycle of the signal is adjusted, and the Leq display is recorded at the end of the integration period, specified by the manufacturer, up to a maximum of 1 hour.

Table 20 - Leq performance for continuous tonebursts

Burst Duty Cycle	Increase in Gain (dB)	Response (dB)	Uncertainty (dB)
"1/10"	10.0	69.9	0.1
"1/100"	20.0	69.8	0.1
"1/1000"	30.0	69.8	0.1
"1/10000"	40.0	69.7	0.1

The measurement uncertainties for this test, derived at the 95% confidence level are as shown in Table 20.

3.2.11.2 SEL Test

The sound exposure level (SEL) function of the sound level meter is tested by applying the same signals as for the Leq test above.

Table 21 - SEL performance for continuous tonebursts

Burst Duty Cycle	Increase in Gain (dB)	Response (dB)	Uncertainty (dB)
"1/10"	10.0	N/A	0.1
"1/100"	20.0	N/A	0.1
"1/1000"	30.0	N/A	0.1
"1/10000"	40.0	N/A	0.1

The measurement uncertainties for this test, derived at the 95% confidence level are as shown in Table 21.

3.2.12 Overload Indication - Time Averaging

The overload indication for time averaging is tested by applying individual toneburst signals of a specified duration and frequency, and increasing the level until such time an overload indication occurs. Once an overload is indicated, the level was reduced below the point of threshold, and the overload indication was checked to make sure the indication remains until reset.

Overload Indication remains ON until reset ?	Y

Acoustic Research Labs Pty Ltd

Unit 36, 14 Loyalty Road
North Rocks NSW Australia 2151
Ph: +61 2 9484 0800
ABN: 65 160 399 119
www.acousticresearch.com.au

Service Report

Report Number:	21025
Date:	11/03/2021
Equipment:	ARL EL-316 SN: 16-203-529
Client Name:	SLR Consulting Pty Ltd (East Melbourne)
Contact Name:	Simon De Lisle

Accesories:

UC-53A SN:318848, (OLD)NH-17 SN:26872 post, cables, post case and case.

1. Information from customer:

Upgrade to 4 piece mic post set.

2. Condition of the instrument:

Fair.

3. Corrective action required:

Installed mic base lid, attached mic Post (4 piece post set).
Replaced old post preamp with new NH-17 cable preamp.
Old preamp SN 26872, new NH-17 preamp SN 28624.
Logger hardware adjusted to correct linearity and dB levels.

4. Tests conducted to ensure fault rectification

Microphone connected with Calibrator at 94dB and read 94dB.
Logger links and displays status correctly.
Full NATA calibration carried out.

Acoustic Research Labs Pty Ltd
Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
AS 1259.1:1990 - AS 1259.2:1990
Calibration Certificate

Calibration Number C21096

Client Details SLR Consulting Pty Ltd
Level 11, 176 Wellington Parade
East Melbourne VIC 3002

Equipment Tested/ Model Number : ARL EL-316
Instrument Serial Number : 16-203-529
Microphone Serial Number : 318848
Pre-amplifier Serial Number : 28624

Atmospheric Conditions
Ambient Temperature : 23.5°C
Relative Humidity : 56.3%
Barometric Pressure : 100.19kPa

Calibration Technician : Jeff Yu
Calibration Date : 9 Mar 2021
Secondary Check: Max Moore
Report Issue Date : 11 Mar 2021

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
10.2.2: Absolute sensitivity	*Pass*	10.3.4: Inherent system noise level	*Pass*
10.2.3: Frequency weighting	*Pass*	10.4.2: Time weighting characteristic F and S	*Pass*
10.3.2: Overload indications	*Pass*	10.4.3: Time weighting characteristic I	*Pass*
10.3.3: Accuracy of level range control	*Pass*	10.4.5: R.M.S performance	*Pass*
8.9: Detector-indicator linearity	*Pass*	9.3.2: Time averaging	*Pass*
8.10: Differential level linearity	*Pass*	9.3.5: Overload indication	*Pass*

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.13dB*	*Temperature*	*±0.2°C*
12.5kHz	*±0.19dB*	*Relative Humidity*	*±2.4%*
16kHz	*±0.31dB*	*Barometric Pressure*	*±0.015kPa*
Electrical Tests			
31.5 Hz to 20 kHz	*±0.1dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

The sound level meter under test has been shown to conform to the type 1 requirements for periodic testing as described in AS 1259.1:1990 and AS 1259.2:1990 for the tests stated above.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

Acoustic Research Labs Pty Ltd
Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
AS 1259-1:1990 - AS 1259-2:1990
Calibration Certificate

Calibration Number C22130

Client Details SLR Consulting Australia Pty Ltd
Level 16, 175 Eagle Street
Brisbane QLD 4000

Equipment Tested/ Model Number : ARL EL-316
Instrument Serial Number : 16-203-526
Microphone Serial Number : 322264
Pre-amplifier Serial Number : 28144

Atmospheric Conditions
Ambient Temperature : 25.4°C
Relative Humidity : 61.4%
Barometric Pressure : 100.09kPa

Calibration Technician : Lucky Jaiswal
Secondary Check: Rhys Gravelle
Calibration Date : 1 Mar 2022
Report Issue Date : 1 Mar 2022

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
10.2.2: Absolute sensitivity	*Pass*	10.3.4: Inherent system noise level	*Pass*
10.2.3: Frequency weighting	*Pass*	10.4.2: Time weighting characteristic F and S	*Pass*
10.3.2: Overload indications	*Pass*	10.4.3: Time weighting characteristic I	*Pass*
10.3.3: Accuracy of level range control	*Pass*	10.4.5: R.M.S performance	*Pass*
8.9: Detector-indicator linearity	*Pass*	9.3.2: Time averaging	*Pass*
8.10: Differential level linearity	*Pass*	9.3.5: Overload indication	*Pass*

Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.14dB*	*Temperature*	*±0.1°C*
12.5kHz	*±0.19dB*	*Relative Humidity*	*±1.9%*
16kHz	*±0.29dB*	*Barometric Pressure*	*±0.014kPa*
Electrical Tests			
31.5 Hz to 20 kHz	*±0.11dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

The sound level meter under test has been shown to conform to the type 1 requirements for periodic testing as described in AS 1259.1:1990 and AS 1259.2:1990 for the tests stated above.

NATA
WORLD RECOGNISED ACCREDITATION

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

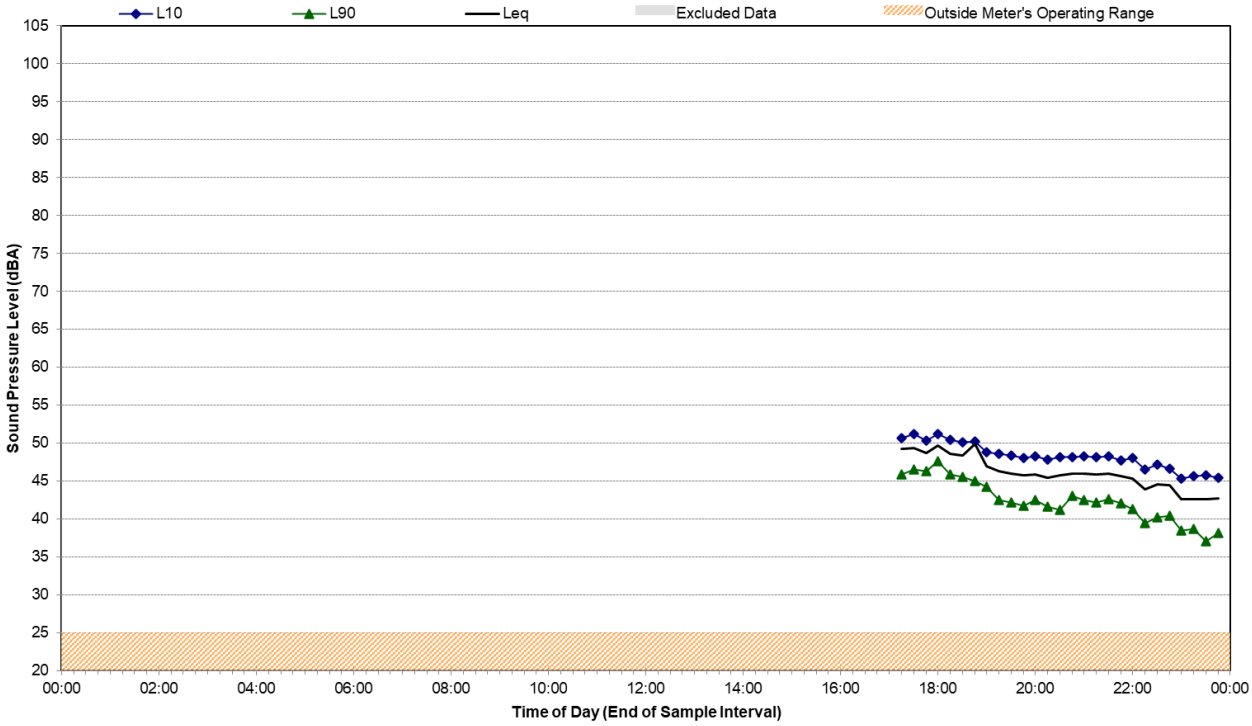
Appendix C contents here

APPENDIX D

Statistical Ambient Noise Levels

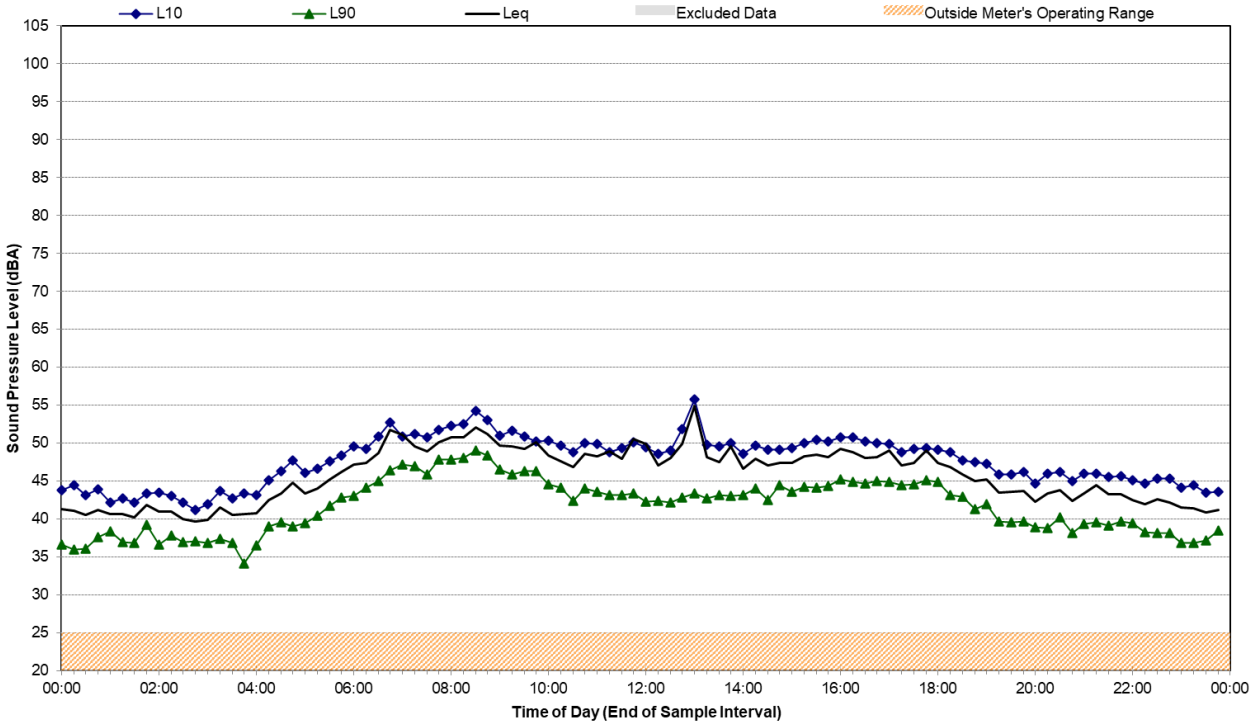
Statistical Ambient Noise Levels

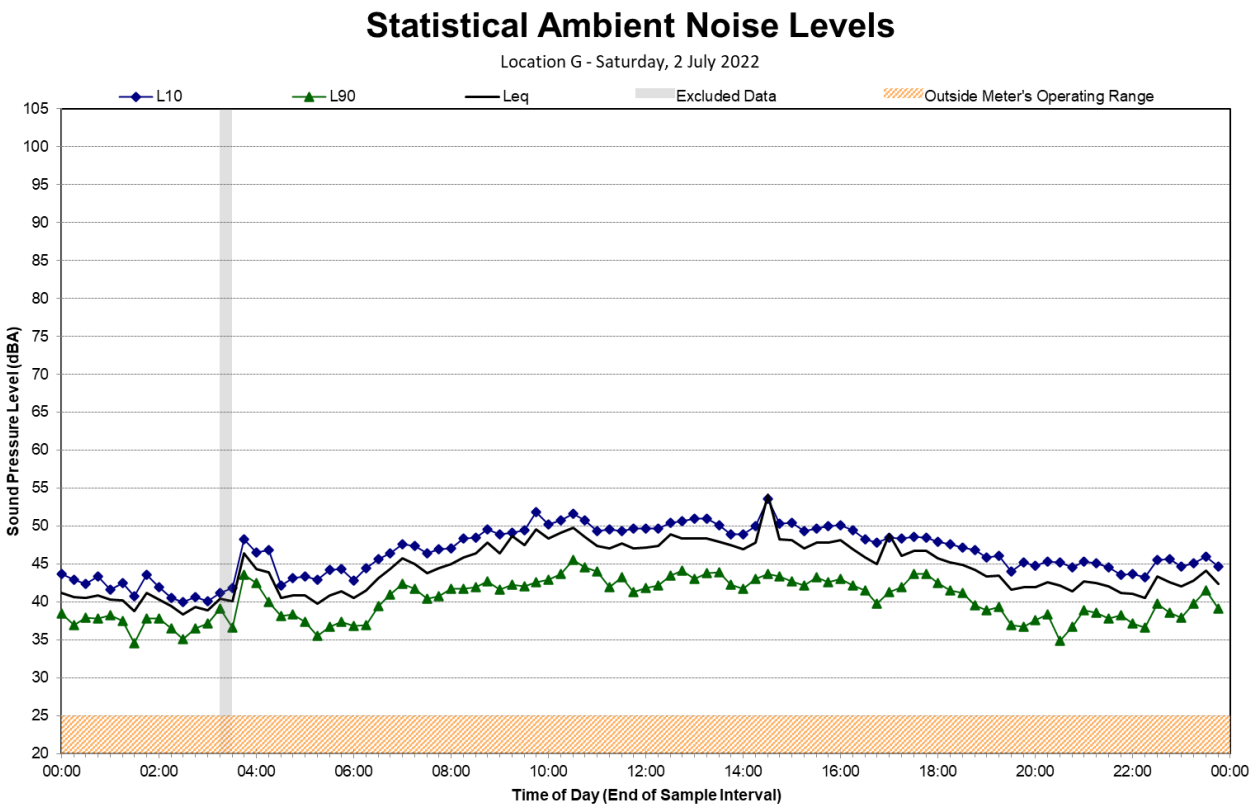
Location G - Thursday, 30 June 2022

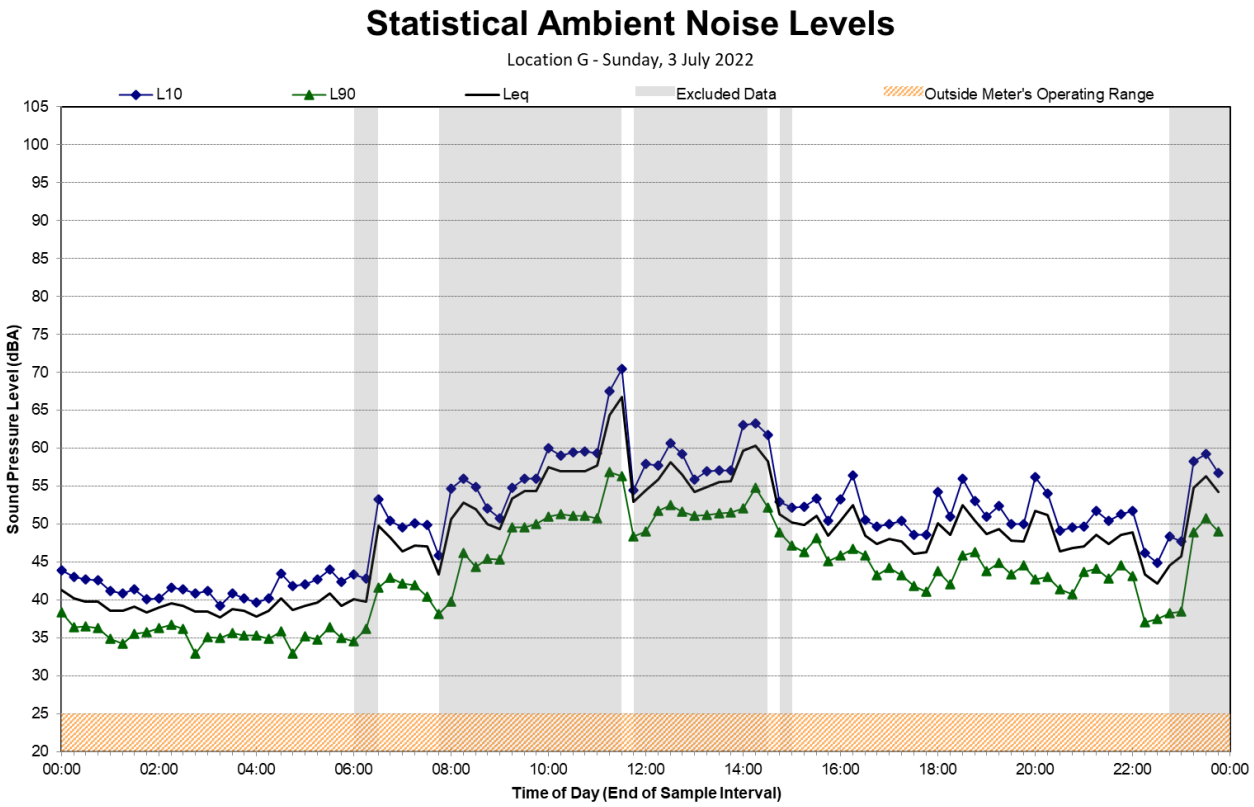


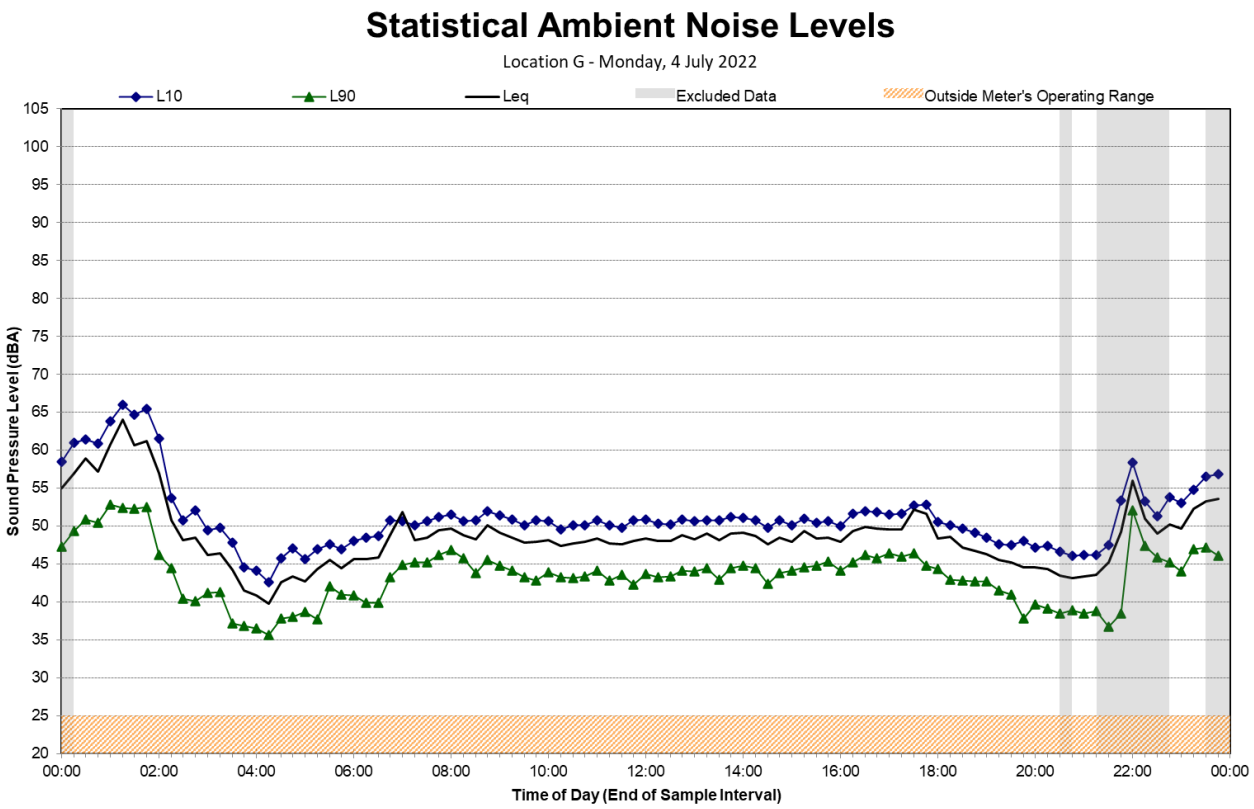
Statistical Ambient Noise Levels

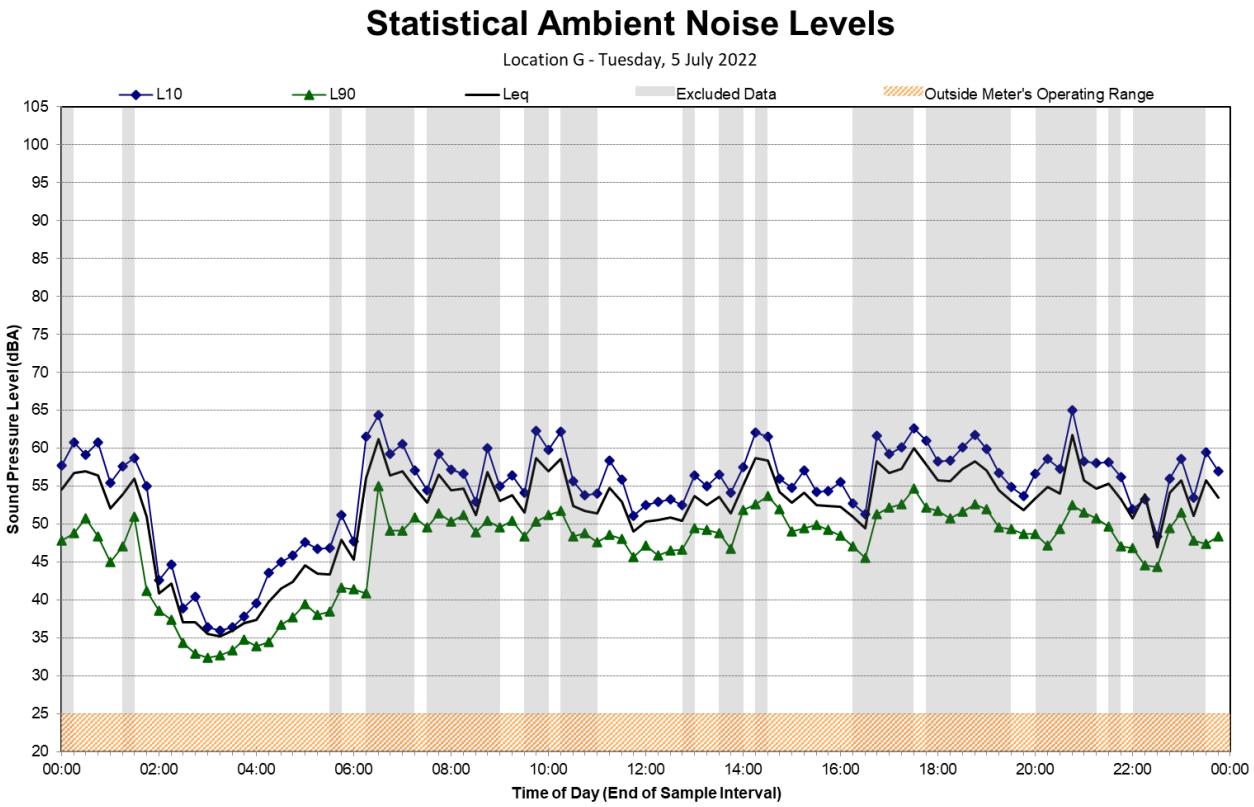
Location G - Friday, 1 July 2022

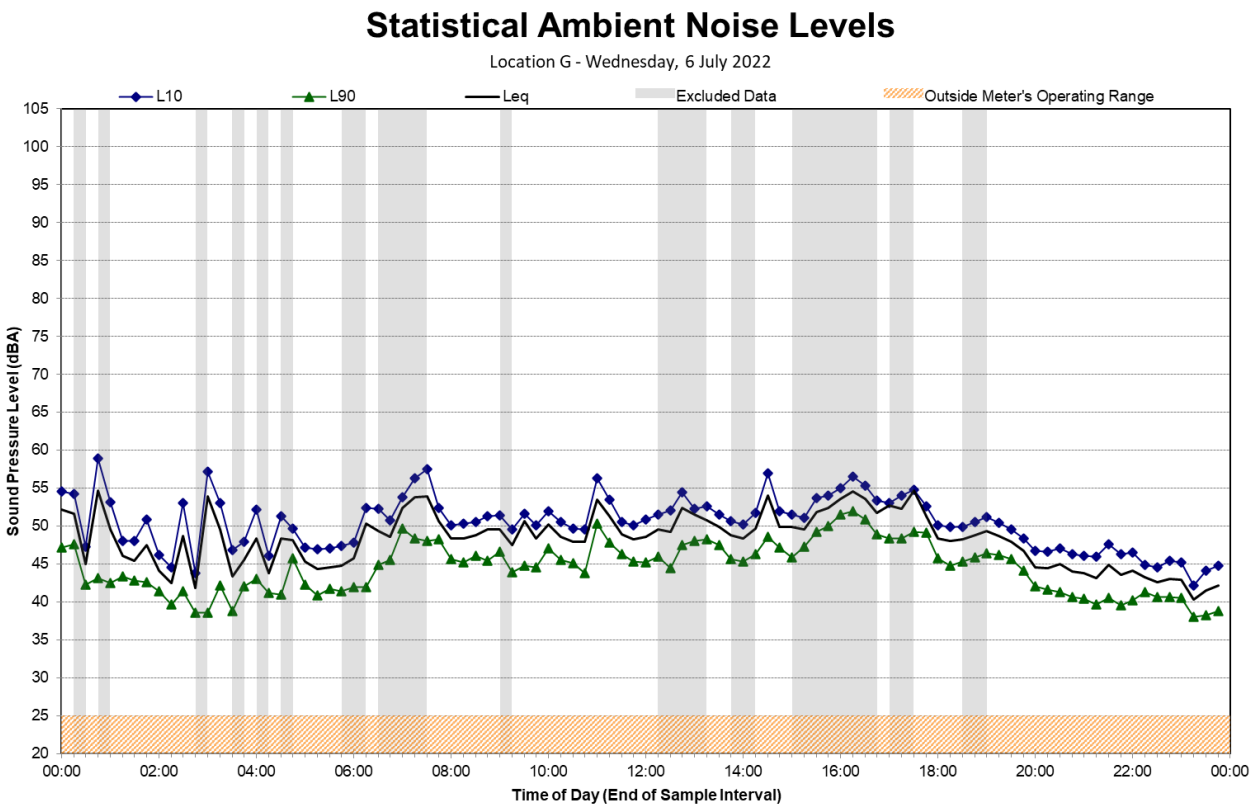


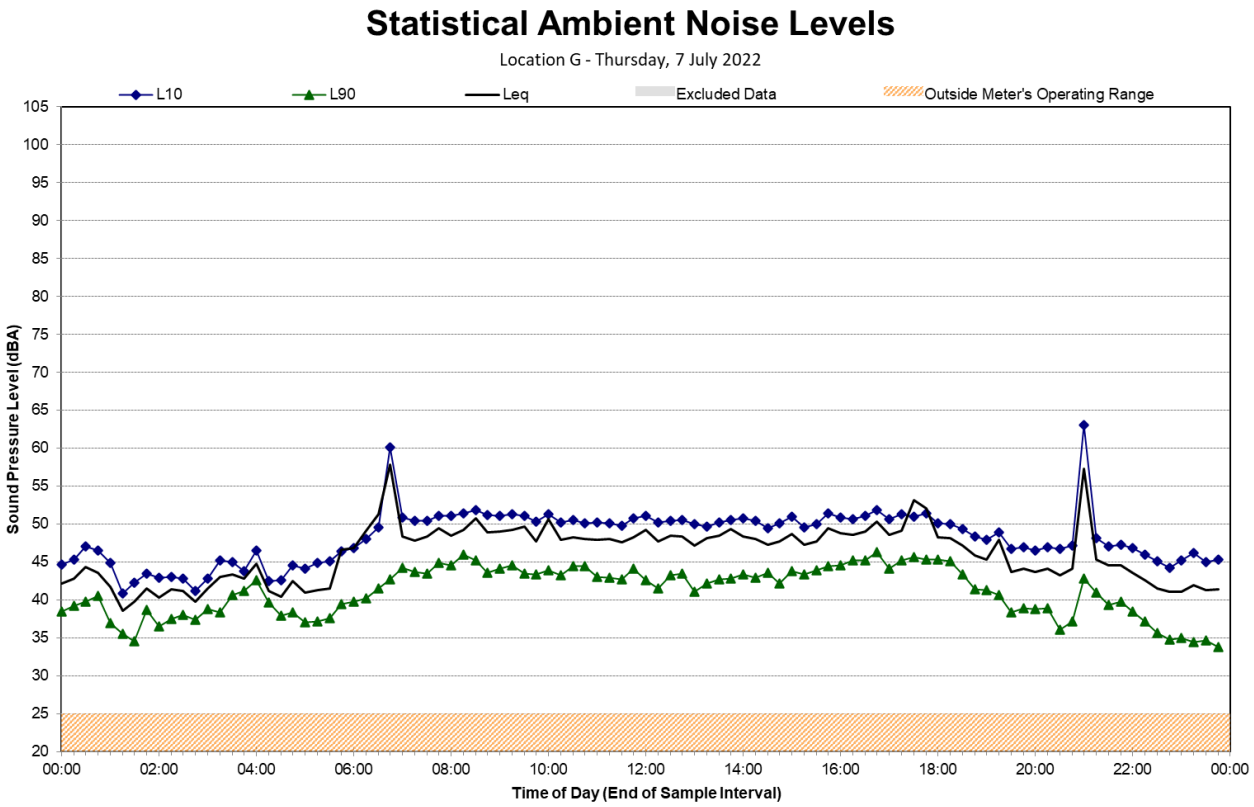

Statistical Ambient Noise Levels
Location G - Saturday, 2 July 2022
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

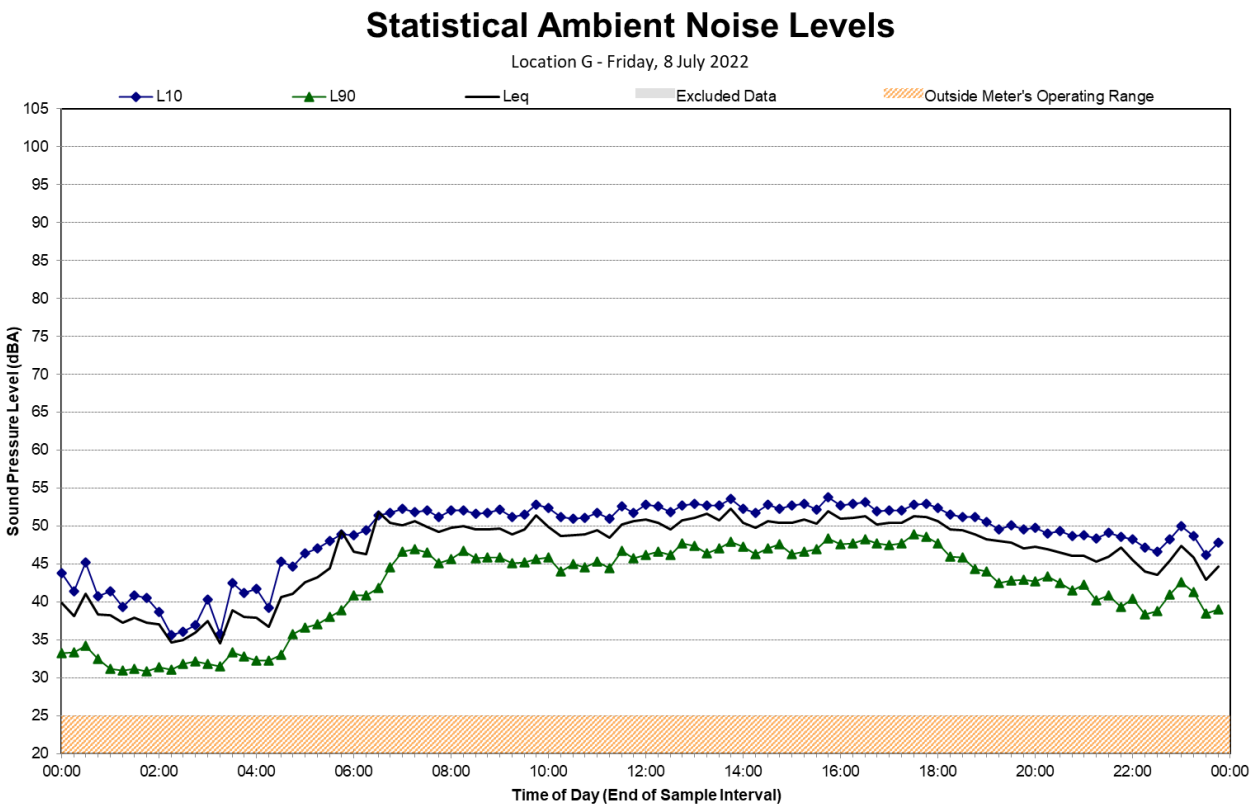

Statistical Ambient Noise Levels
Location G - Sunday, 3 July 2022
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

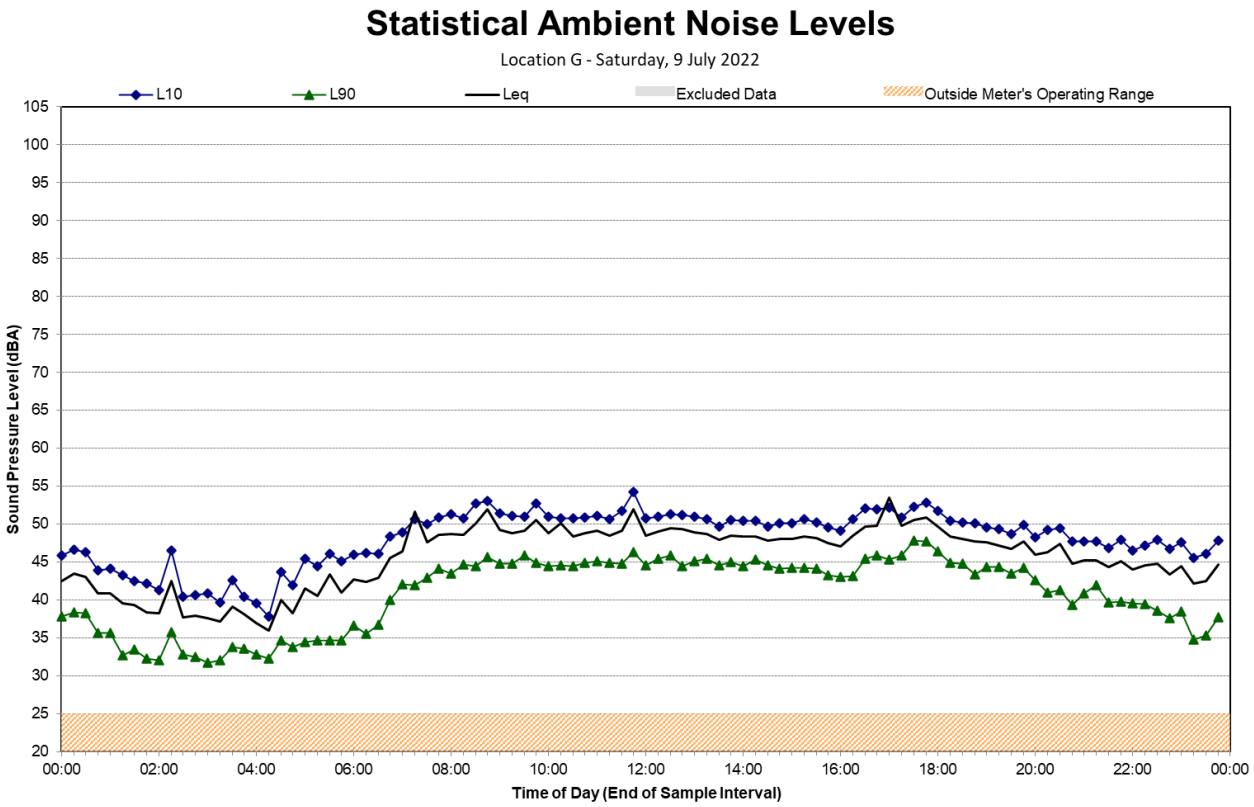

Statistical Ambient Noise Levels
Location G - Monday, 4 July 2022
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

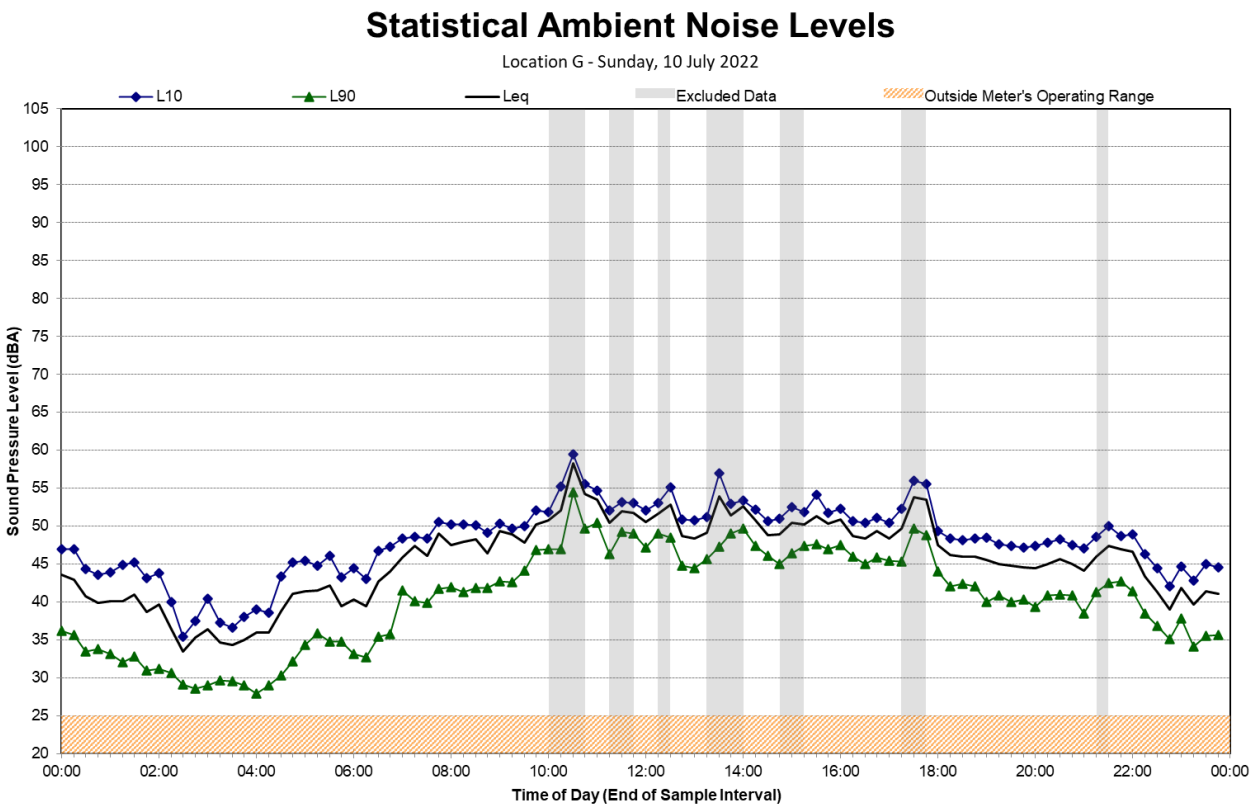

Statistical Ambient Noise Levels
Location G - Tuesday, 5 July 2022
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

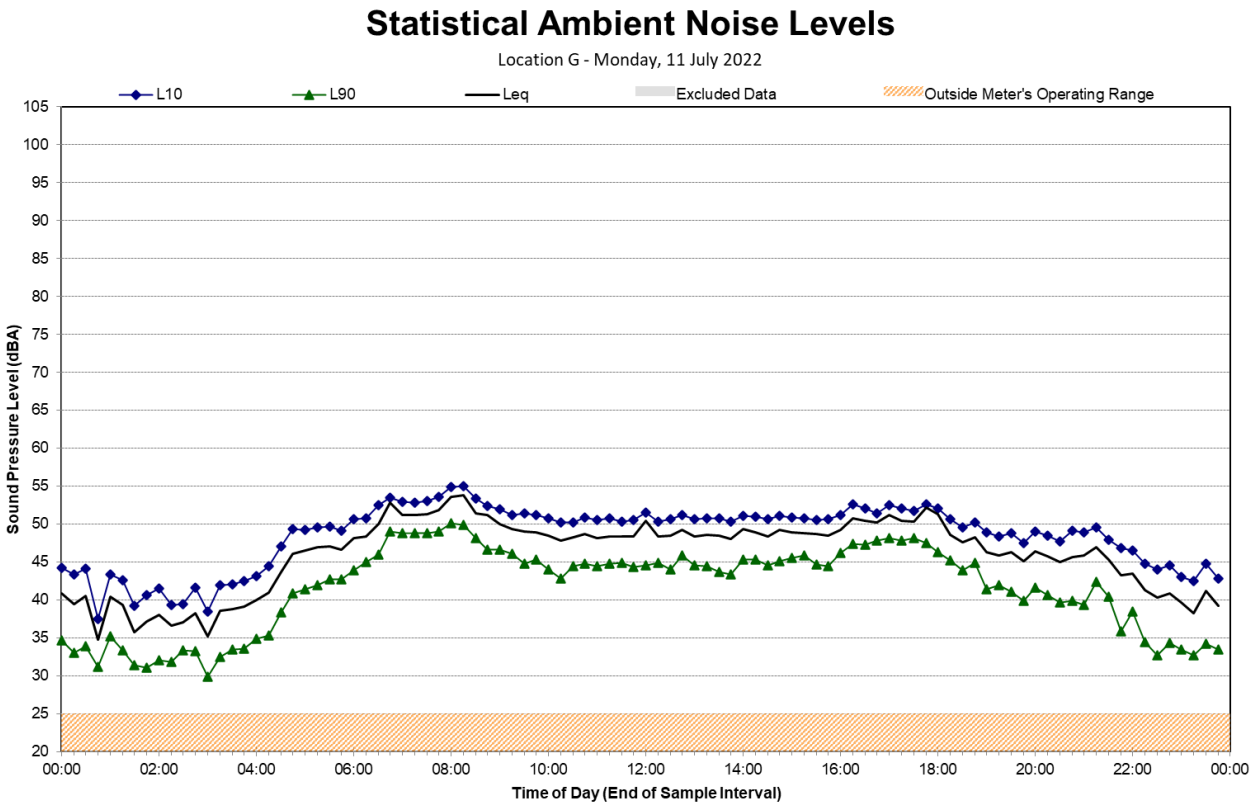

Statistical Ambient Noise Levels
Location G - Wednesday, 6 July 2022
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

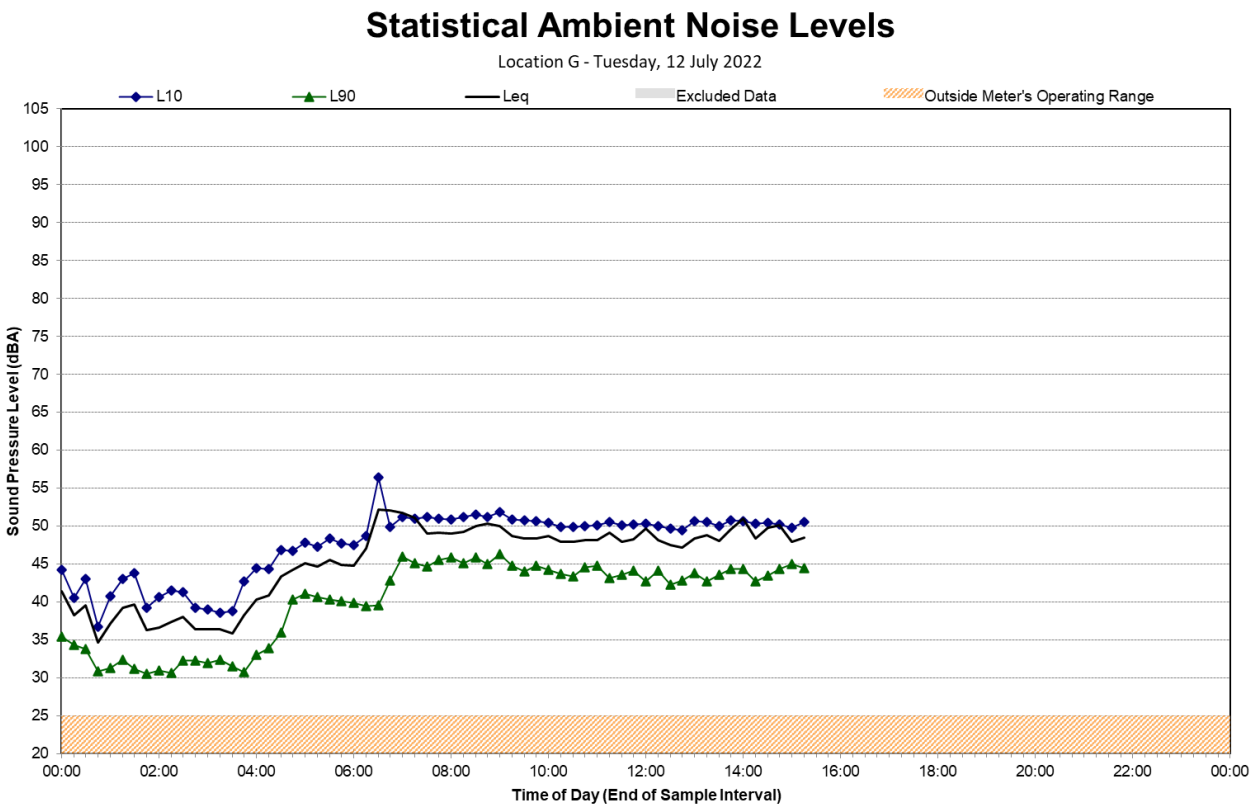

Statistical Ambient Noise Levels
Location G - Thursday, 7 July 2022
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

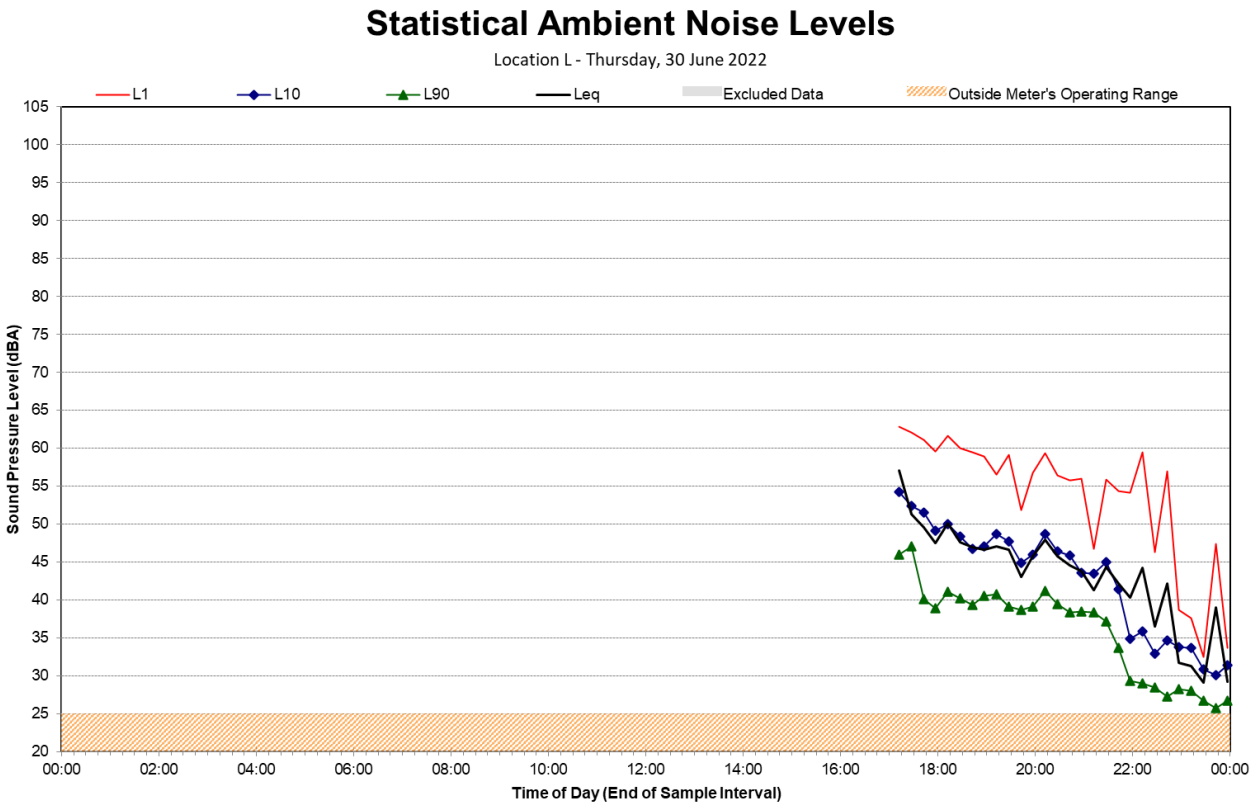

Statistical Ambient Noise Levels
Location G - Friday, 8 July 2022
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

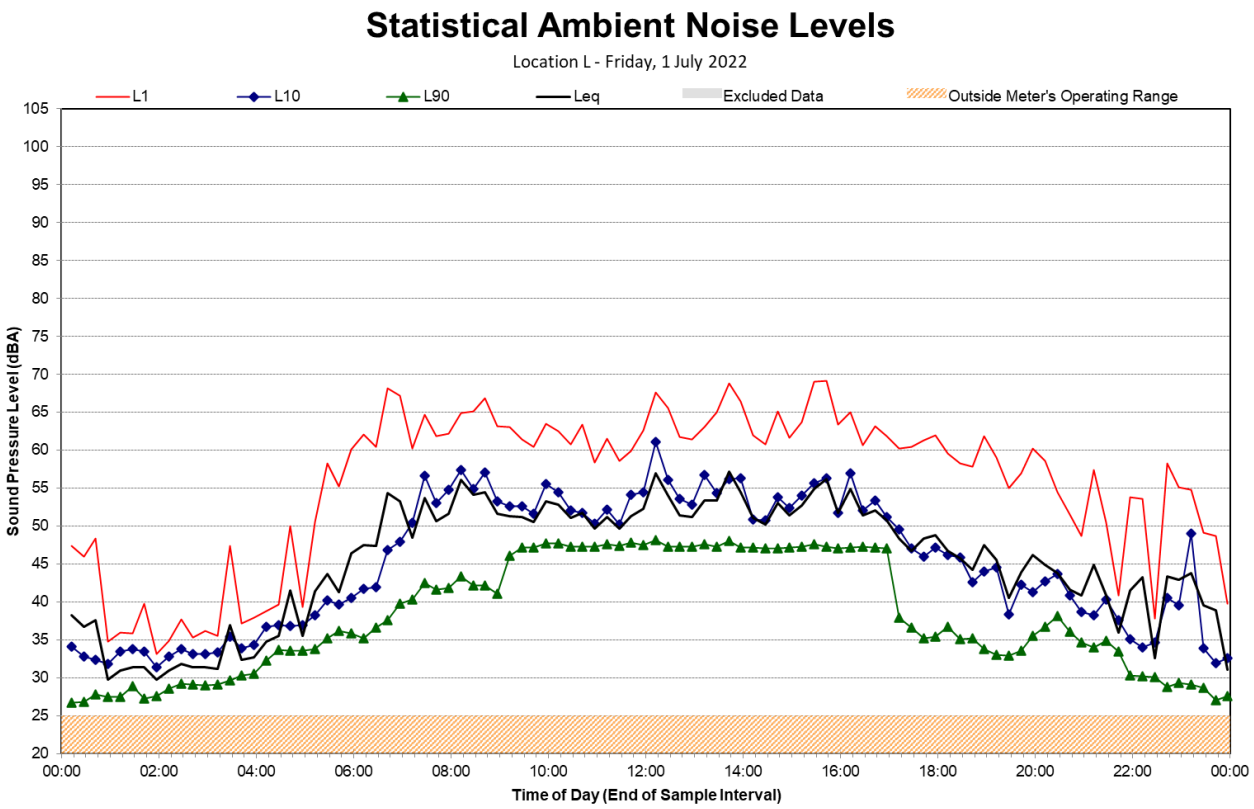

Statistical Ambient Noise Levels
Location G - Saturday, 9 July 2022
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

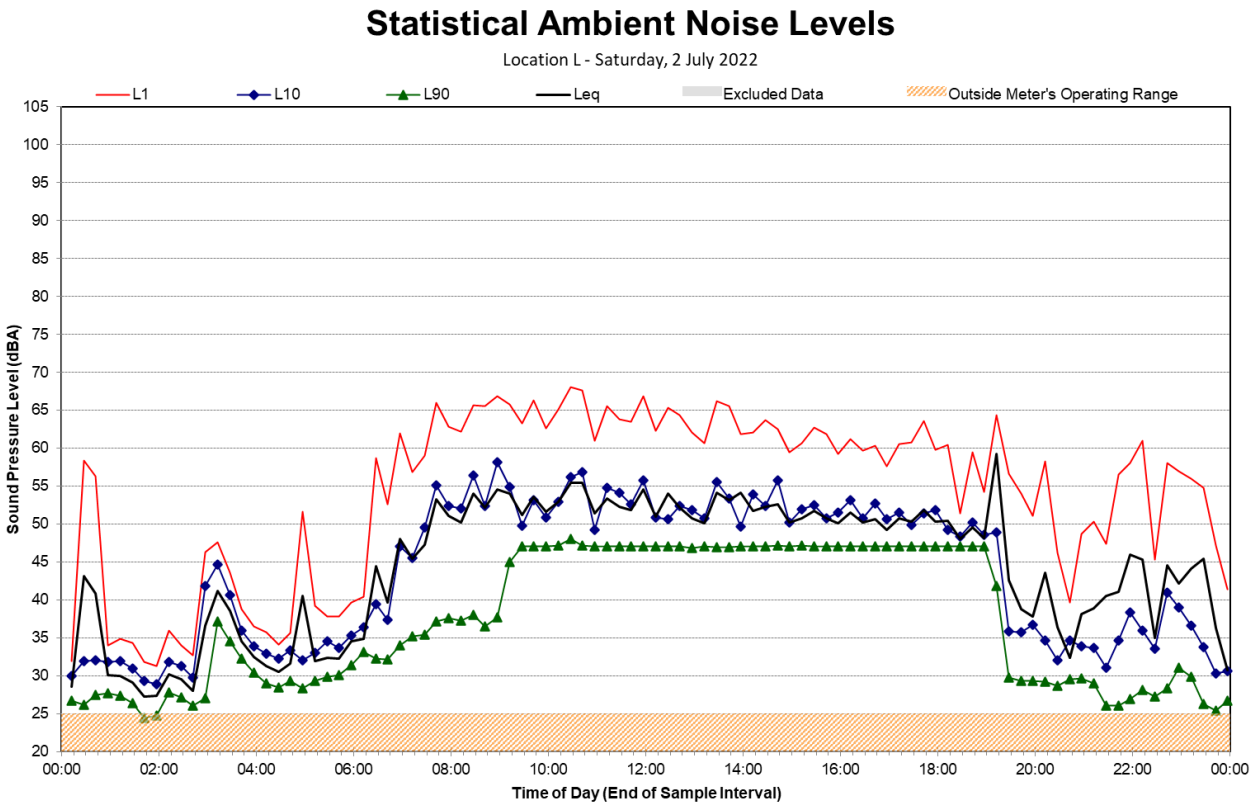

Statistical Ambient Noise Levels
Location G - Sunday, 10 July 2022
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

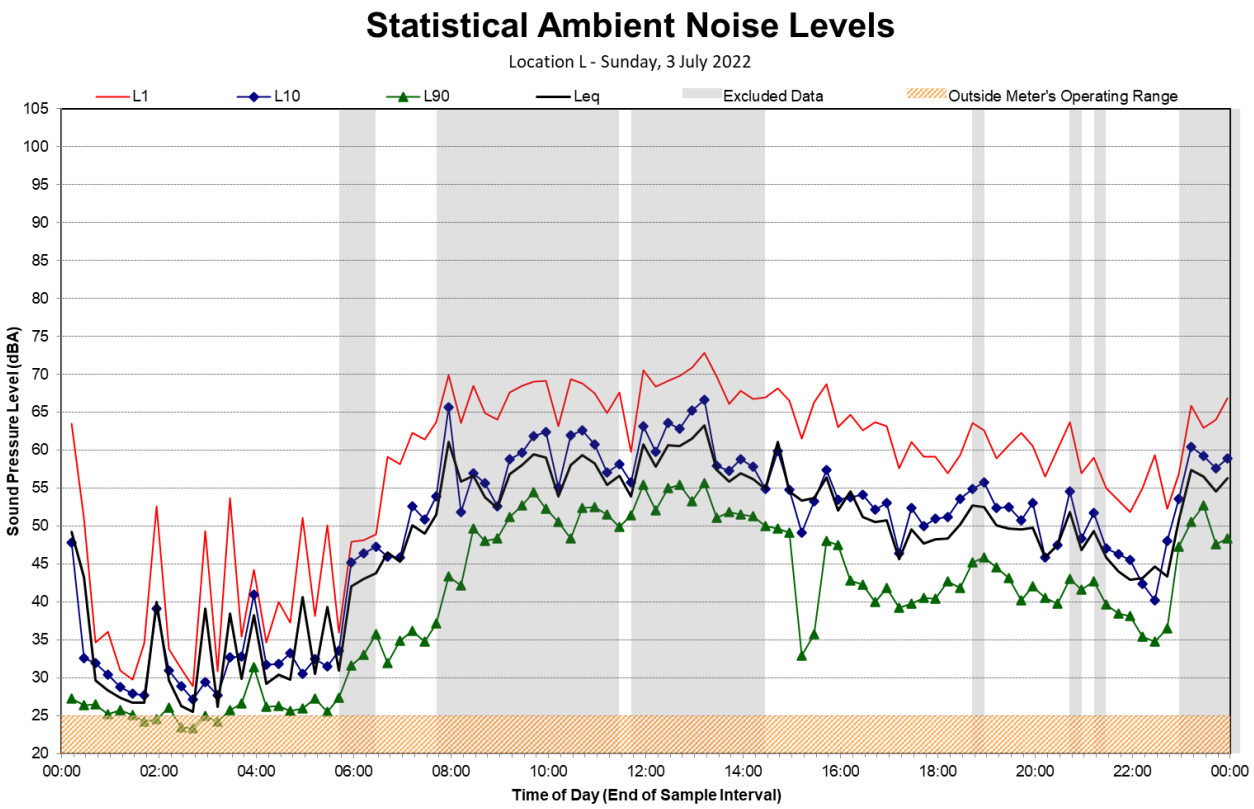

Statistical Ambient Noise Levels
Location G - Monday, 11 July 2022
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

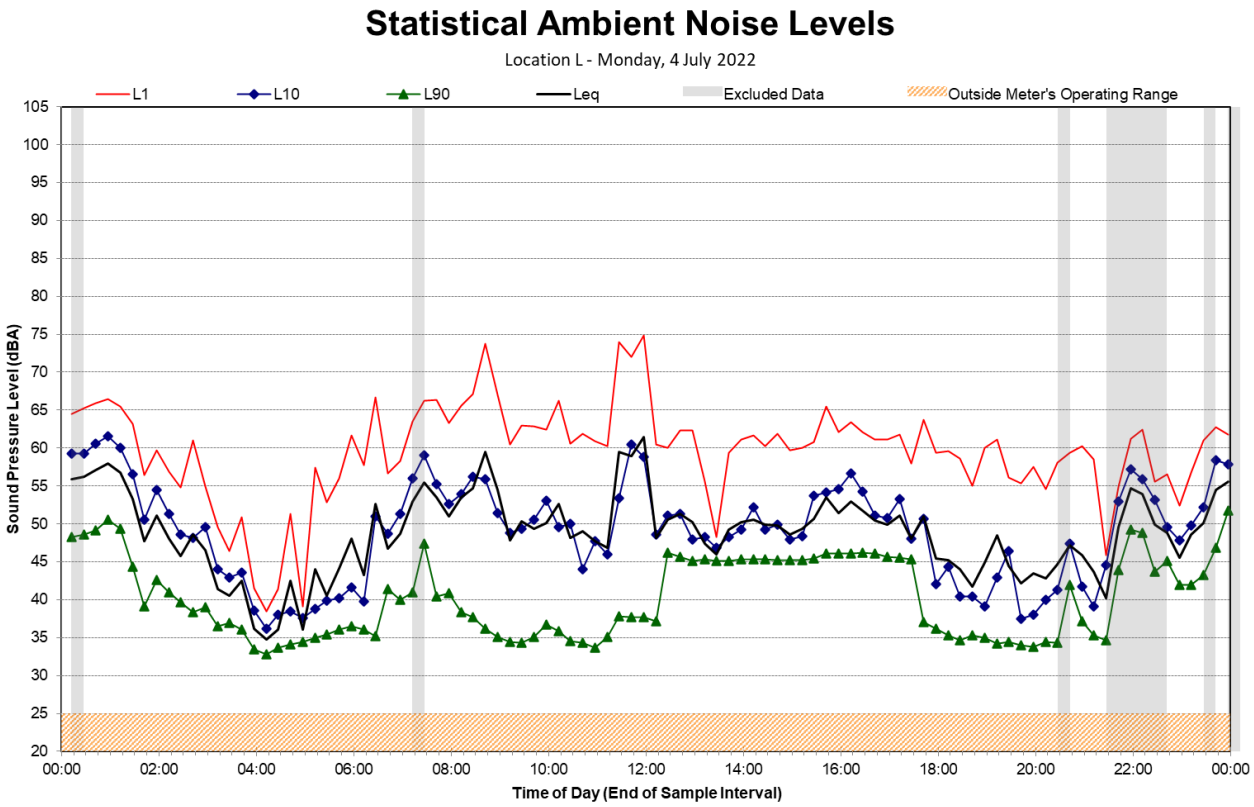

Statistical Ambient Noise Levels
Location G - Tuesday, 12 July 2022
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

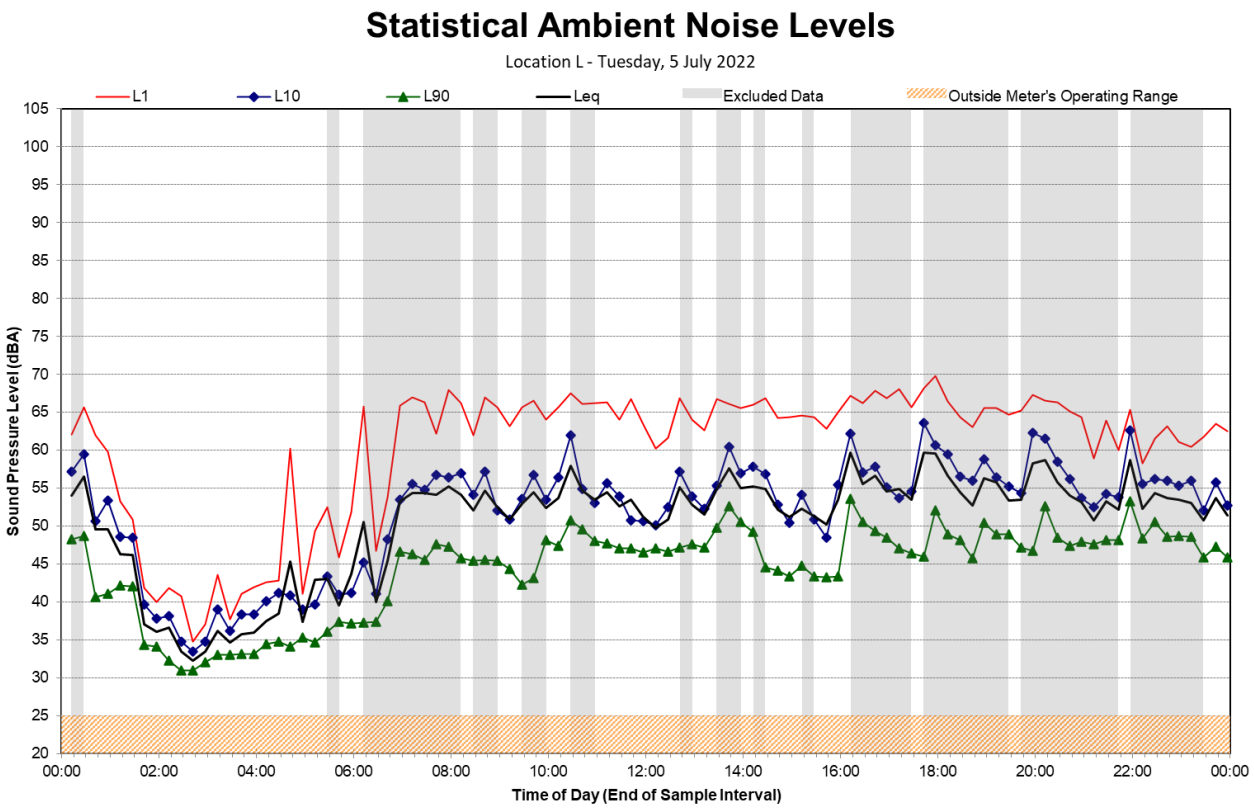

Statistical Ambient Noise Levels
Location L - Thursday, 30 June 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

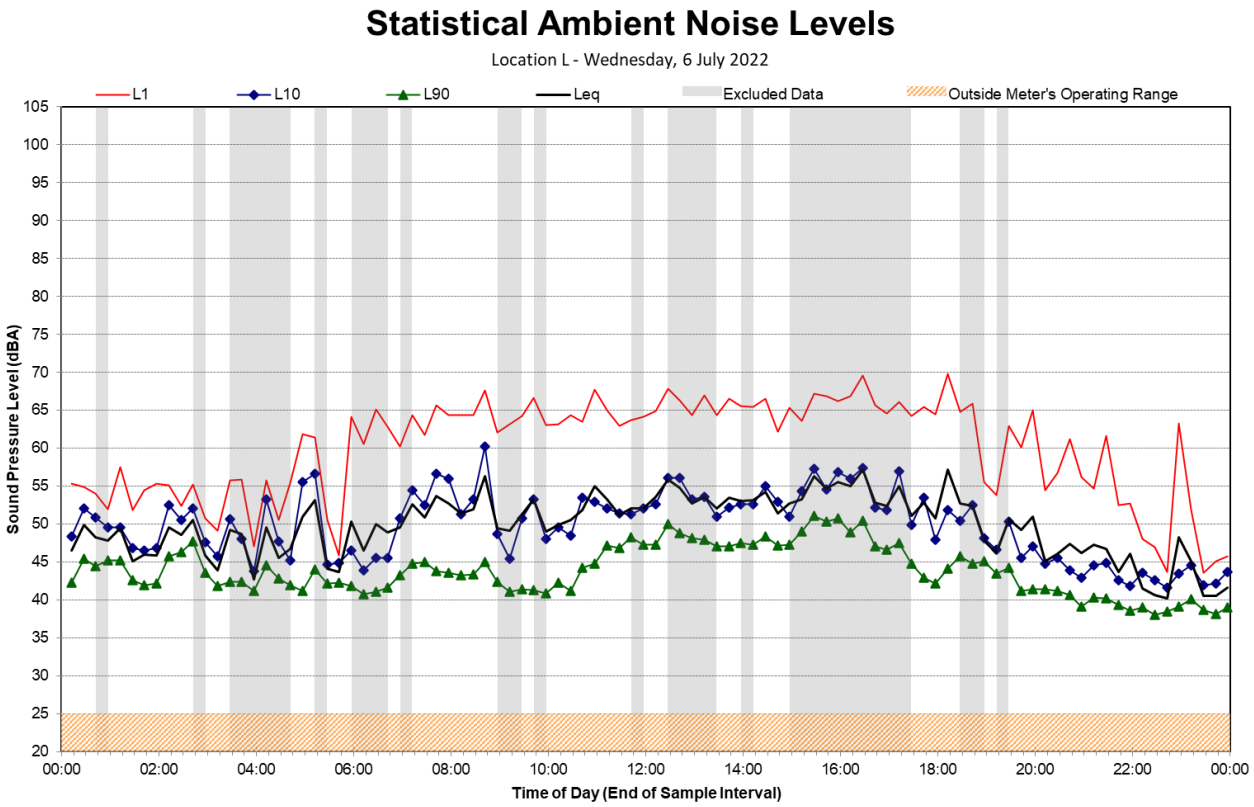

Statistical Ambient Noise Levels
Location L - Friday, 1 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

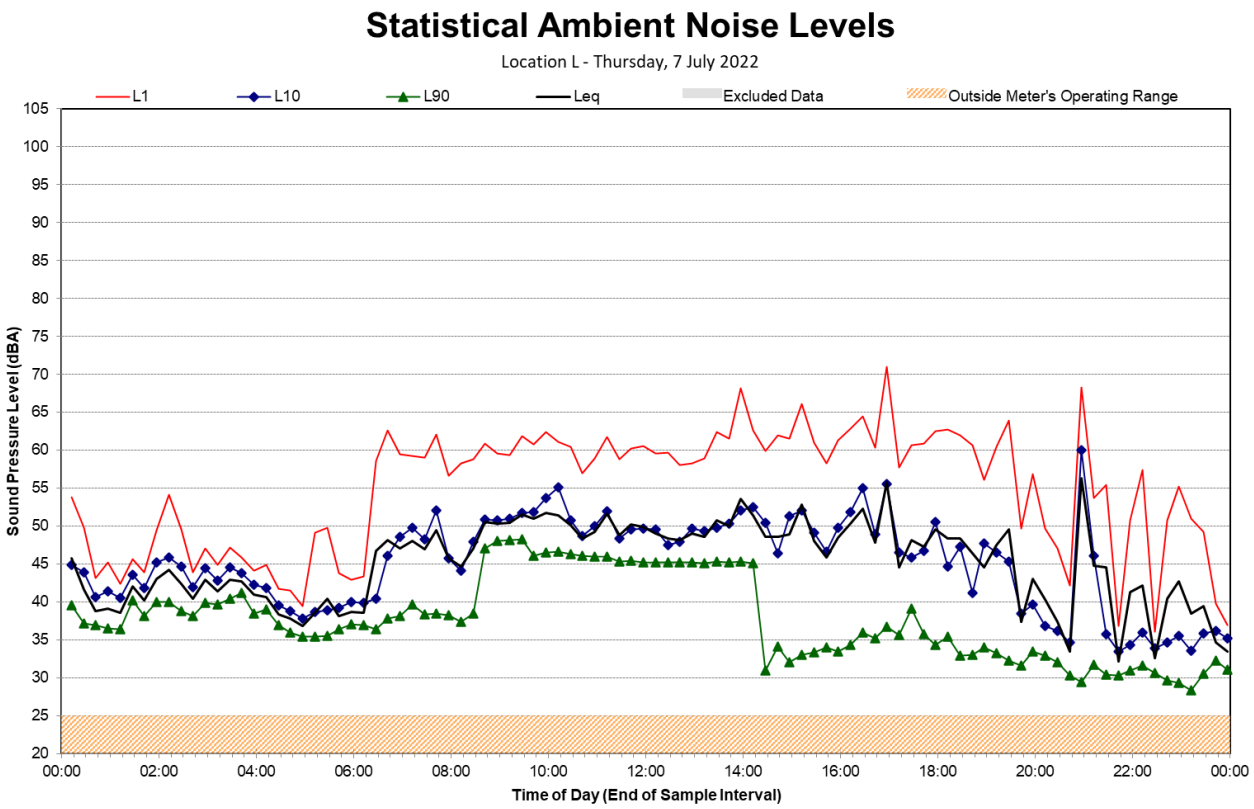

Statistical Ambient Noise Levels
Location L - Saturday, 2 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

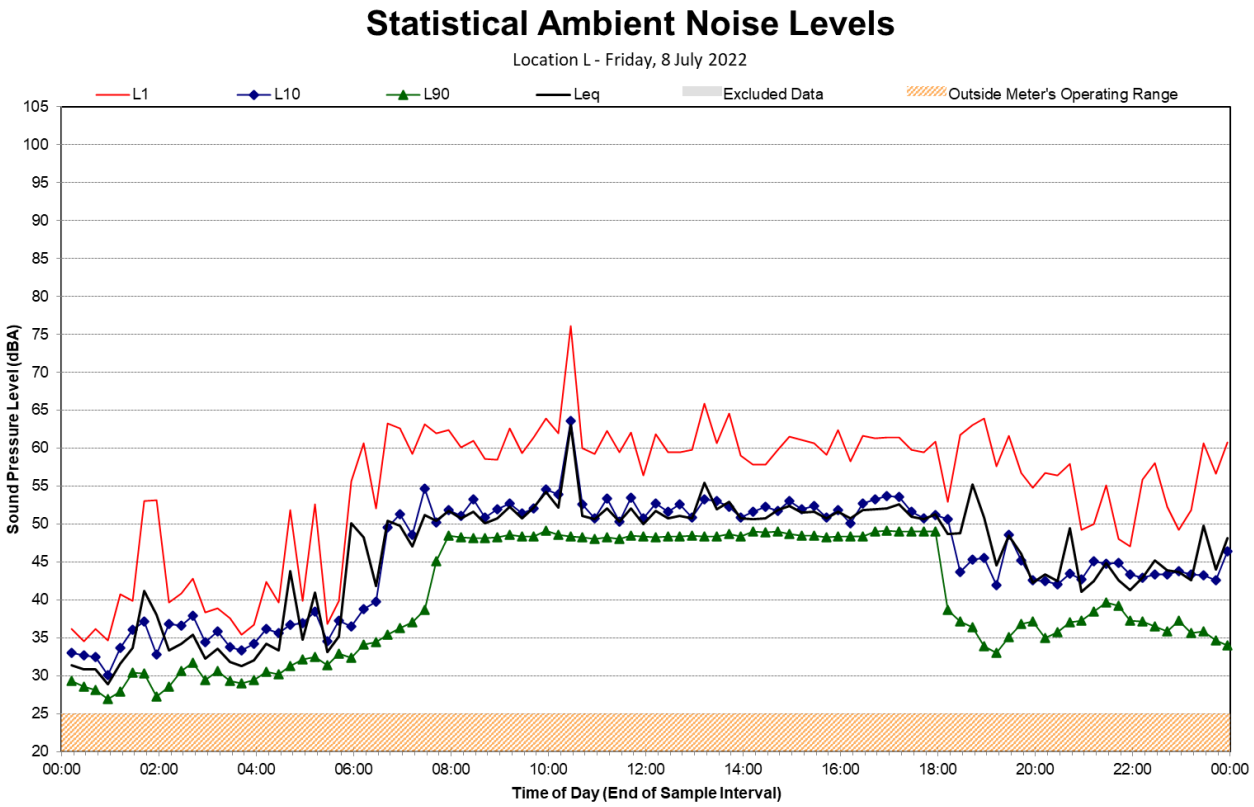

Statistical Ambient Noise Levels
Location L - Sunday, 3 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

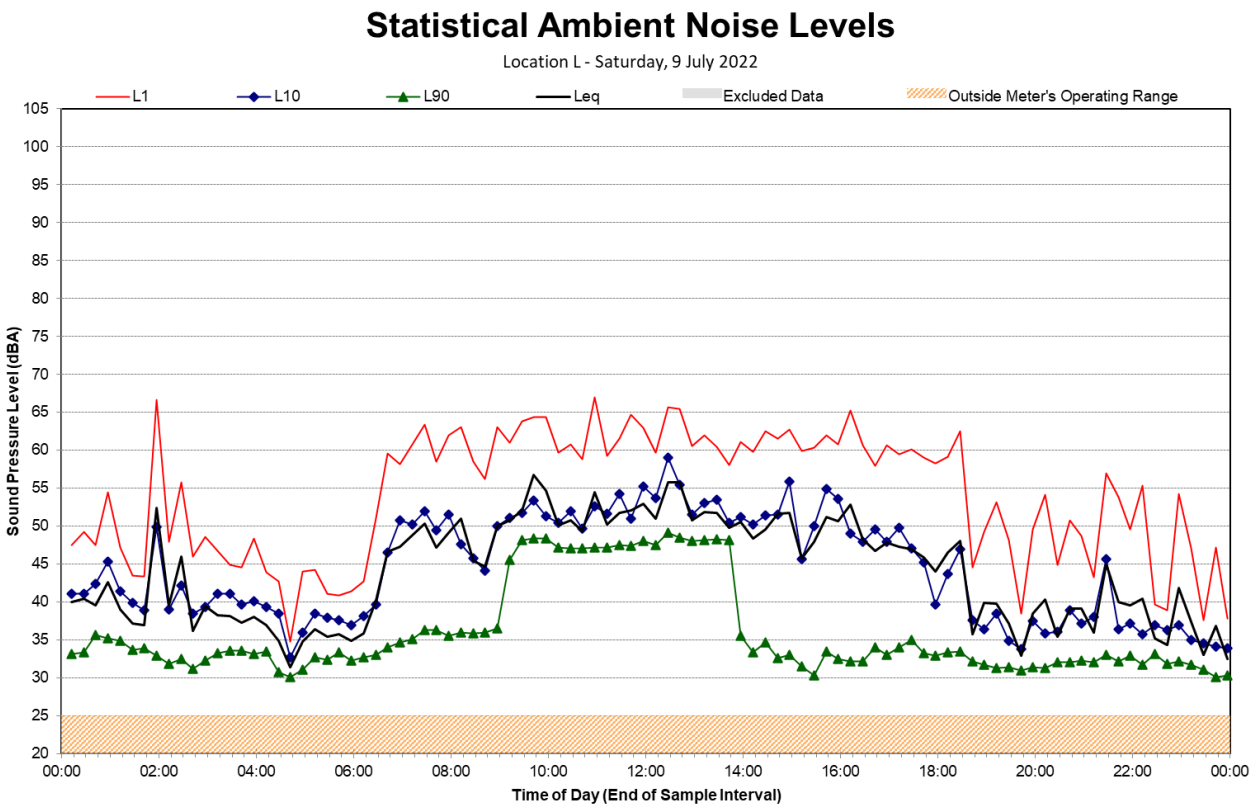

Statistical Ambient Noise Levels
Location L - Monday, 4 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

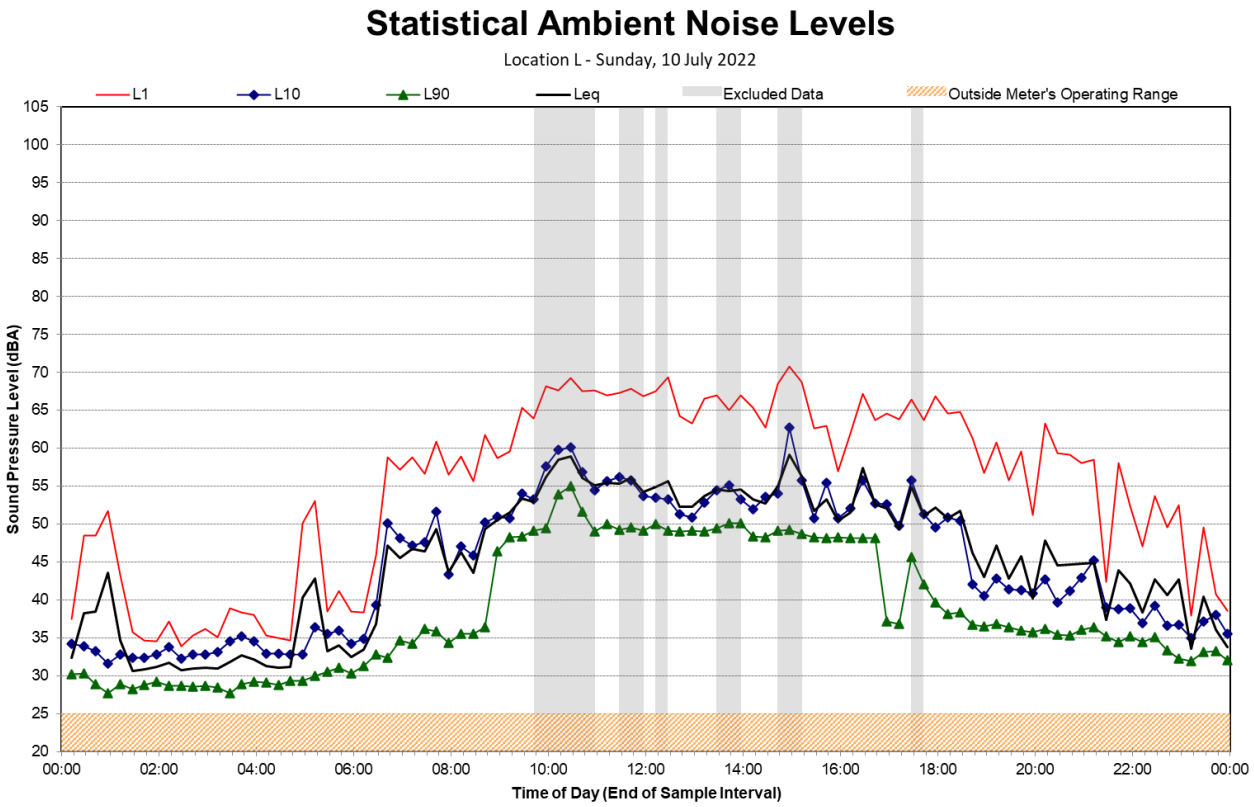

Statistical Ambient Noise Levels
Location L - Tuesday, 5 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
Time of Day (End of Sample Interval)

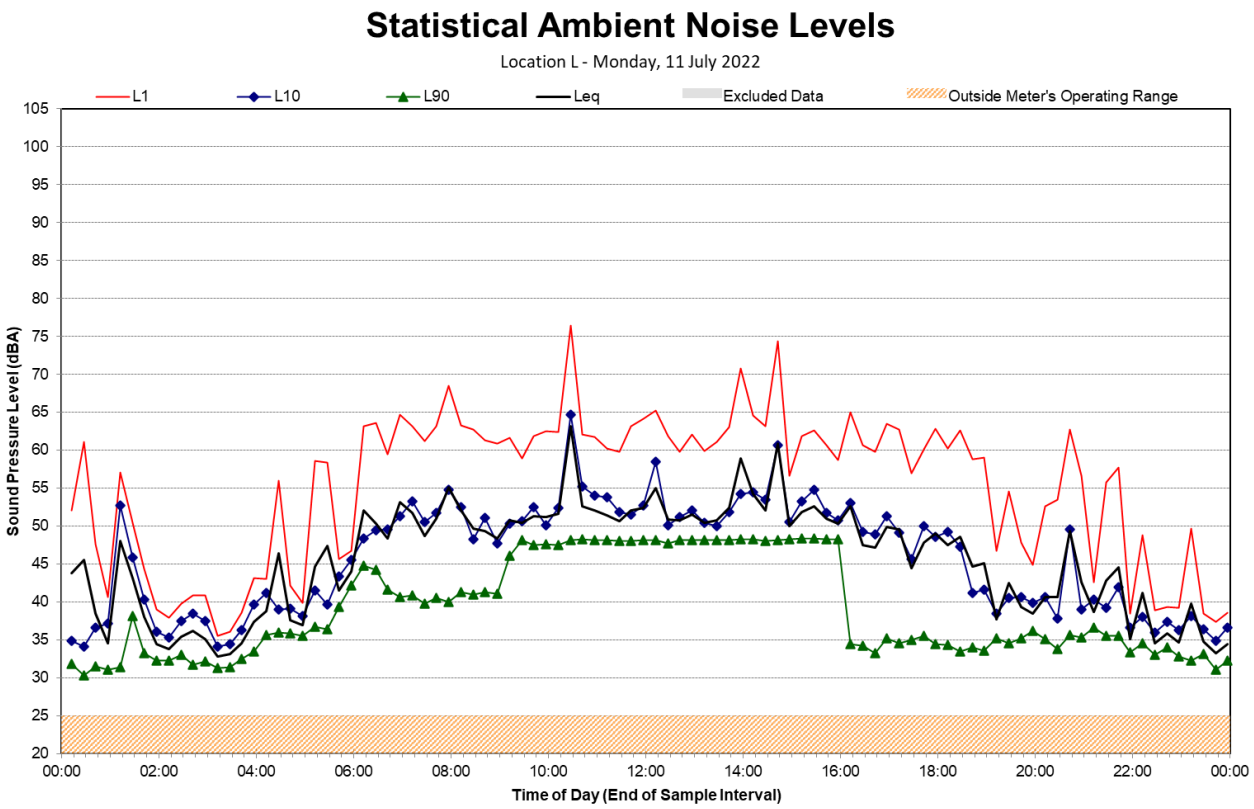

Statistical Ambient Noise Levels
Location L - Wednesday, 6 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
Time of Day (End of Sample Interval)

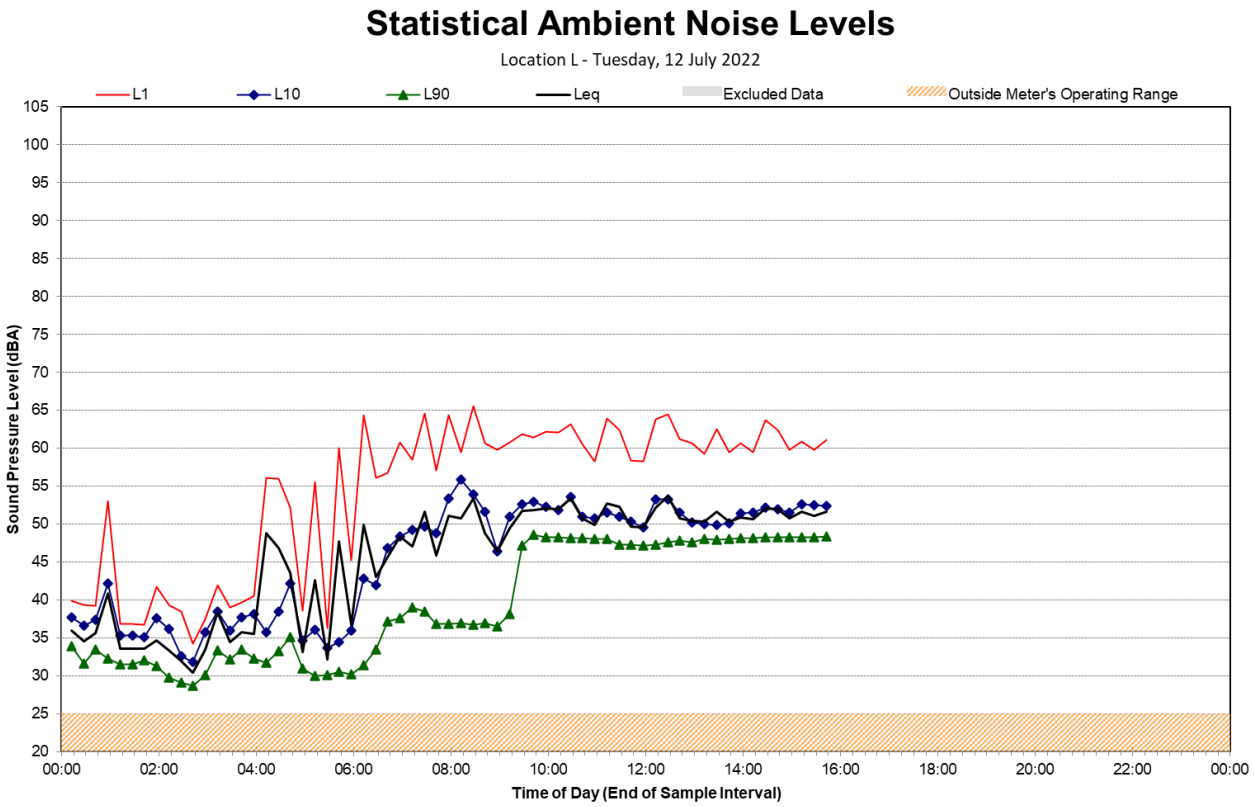

Statistical Ambient Noise Levels
Location L - Thursday, 7 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

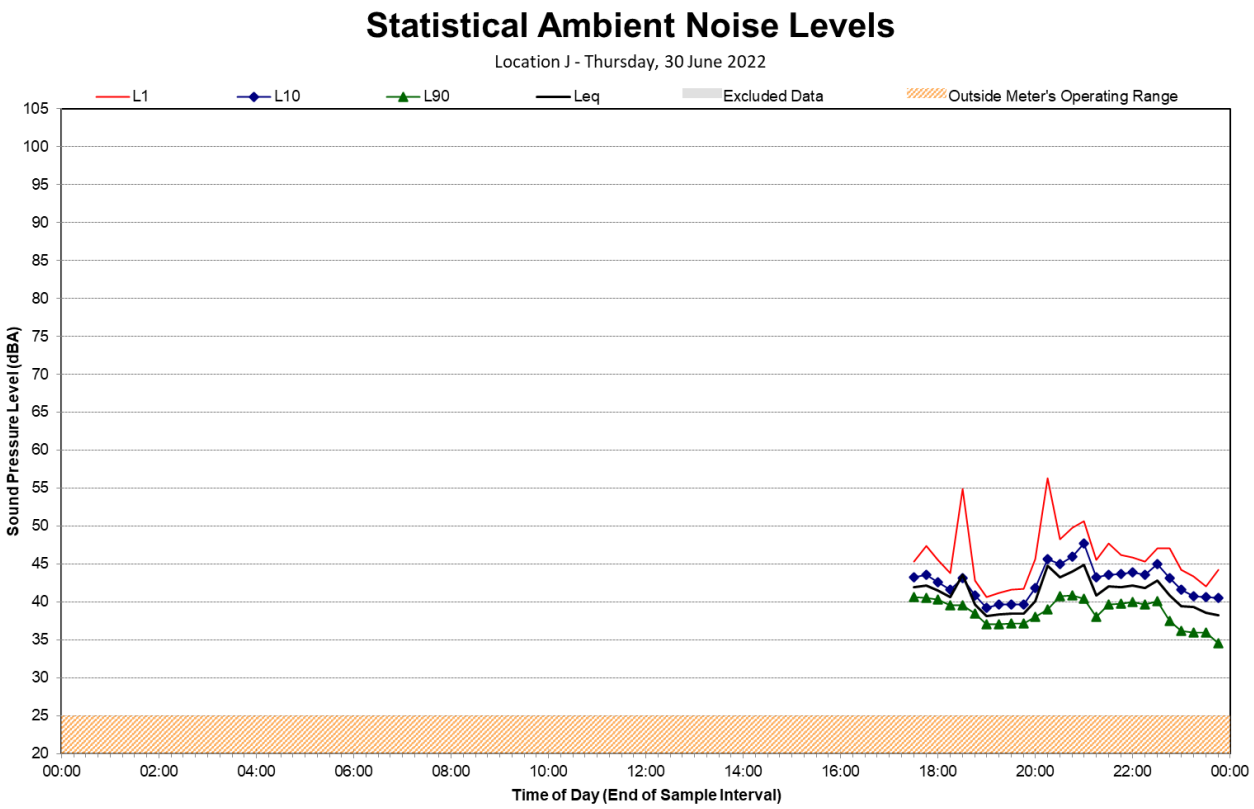

Statistical Ambient Noise Levels
Location L - Friday, 8 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

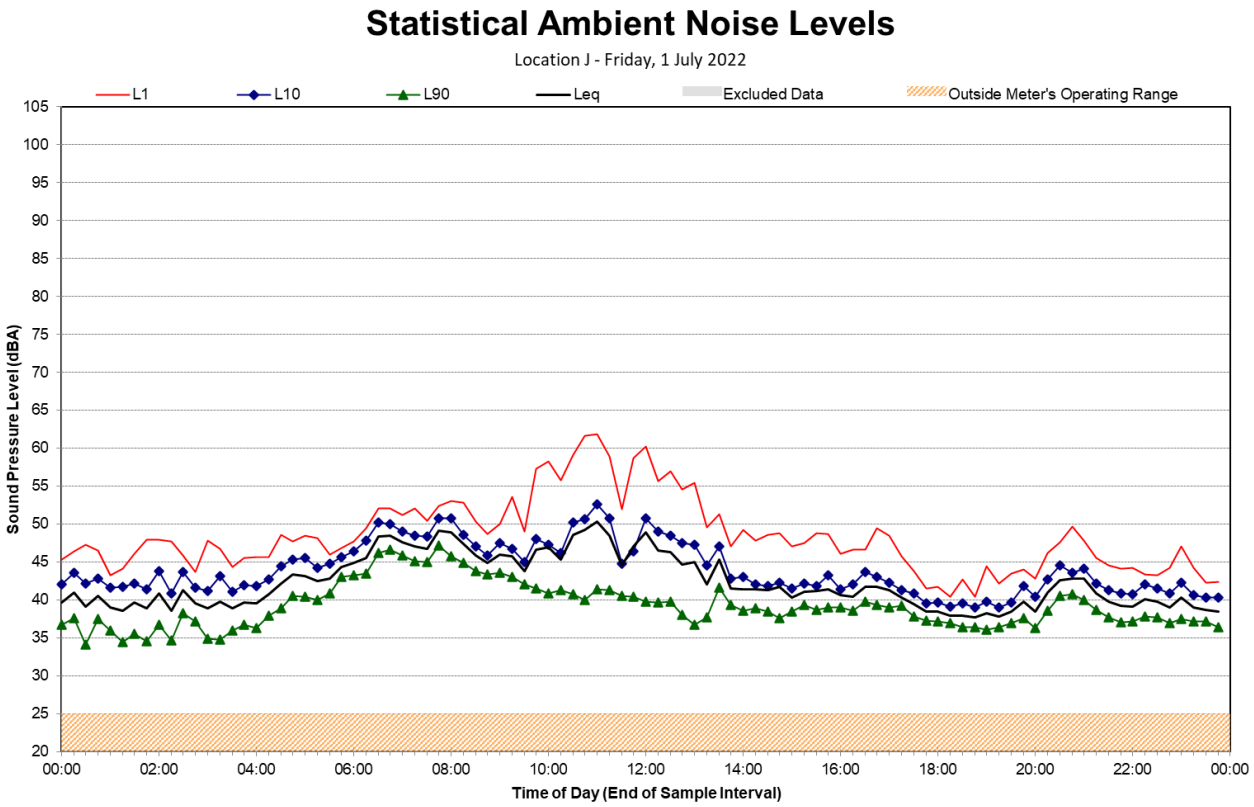

Statistical Ambient Noise Levels
Location L - Saturday, 9 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

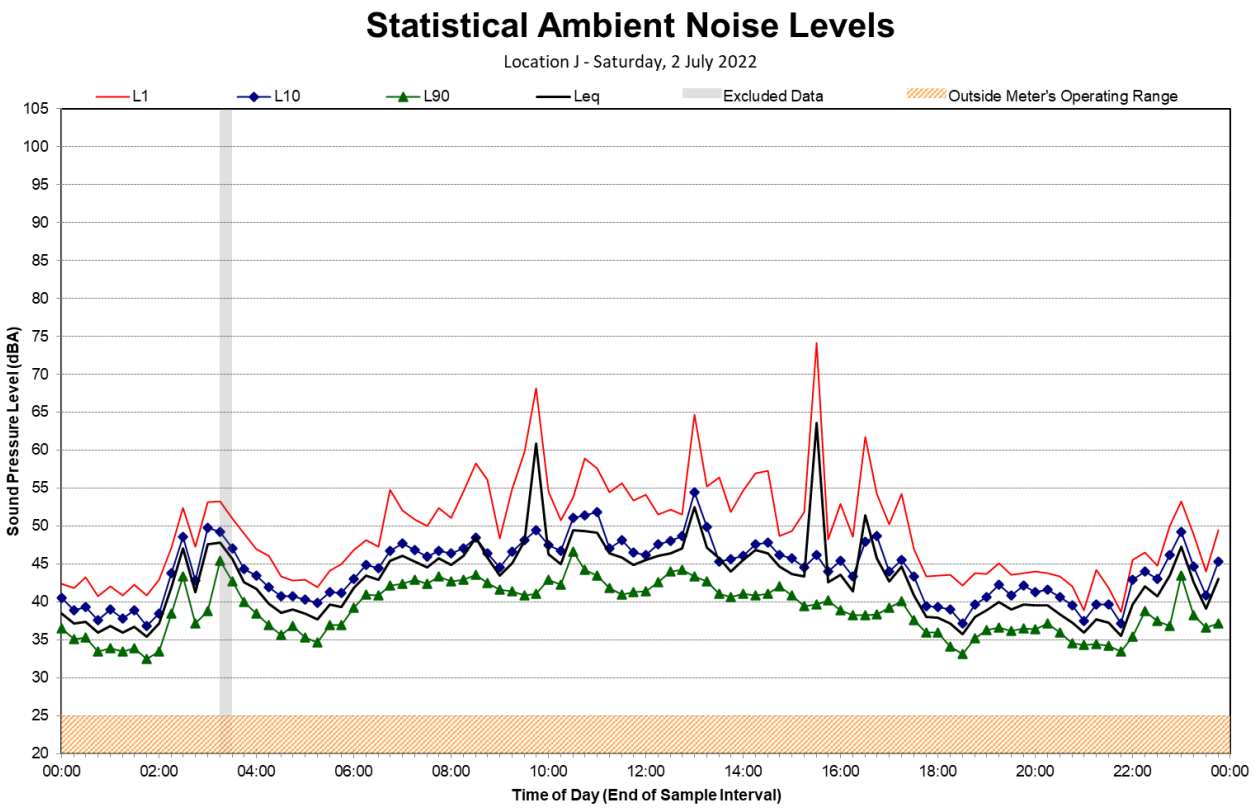

Statistical Ambient Noise Levels
Location L - Sunday, 10 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

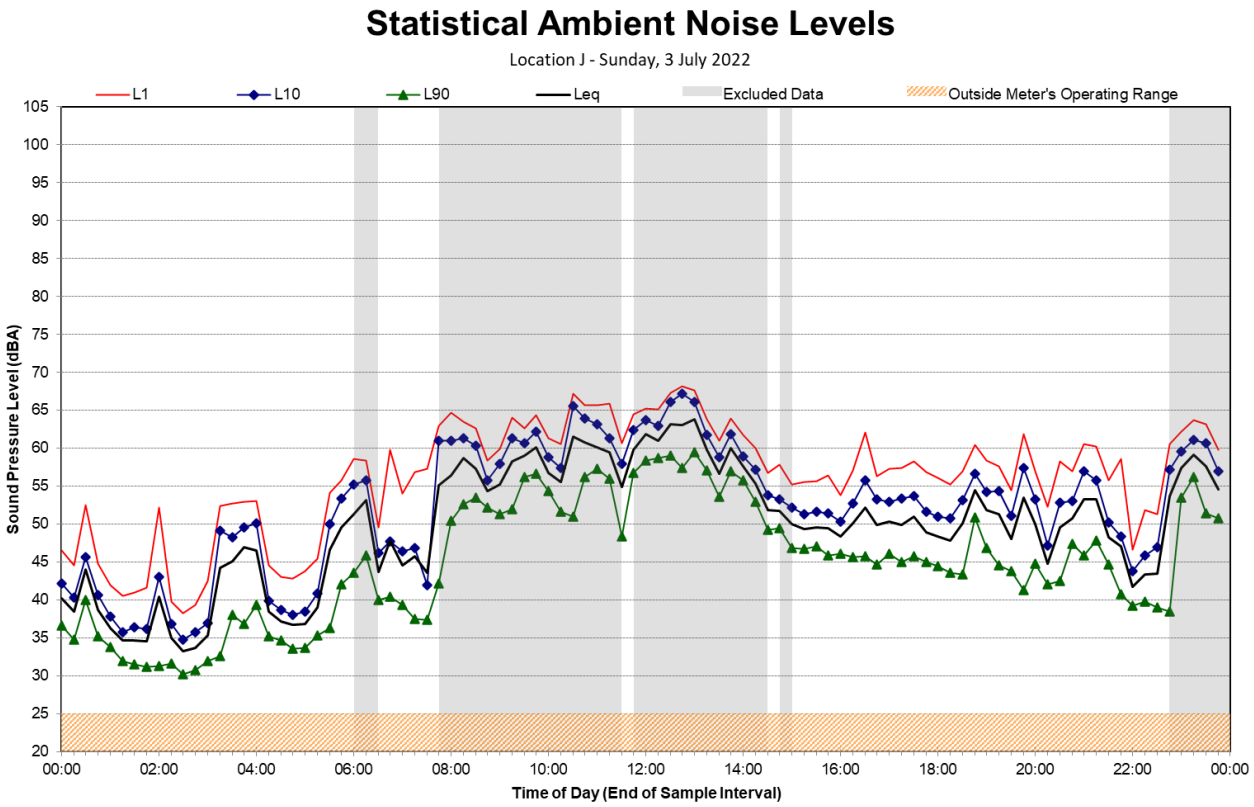

Statistical Ambient Noise Levels
Location L - Monday, 11 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

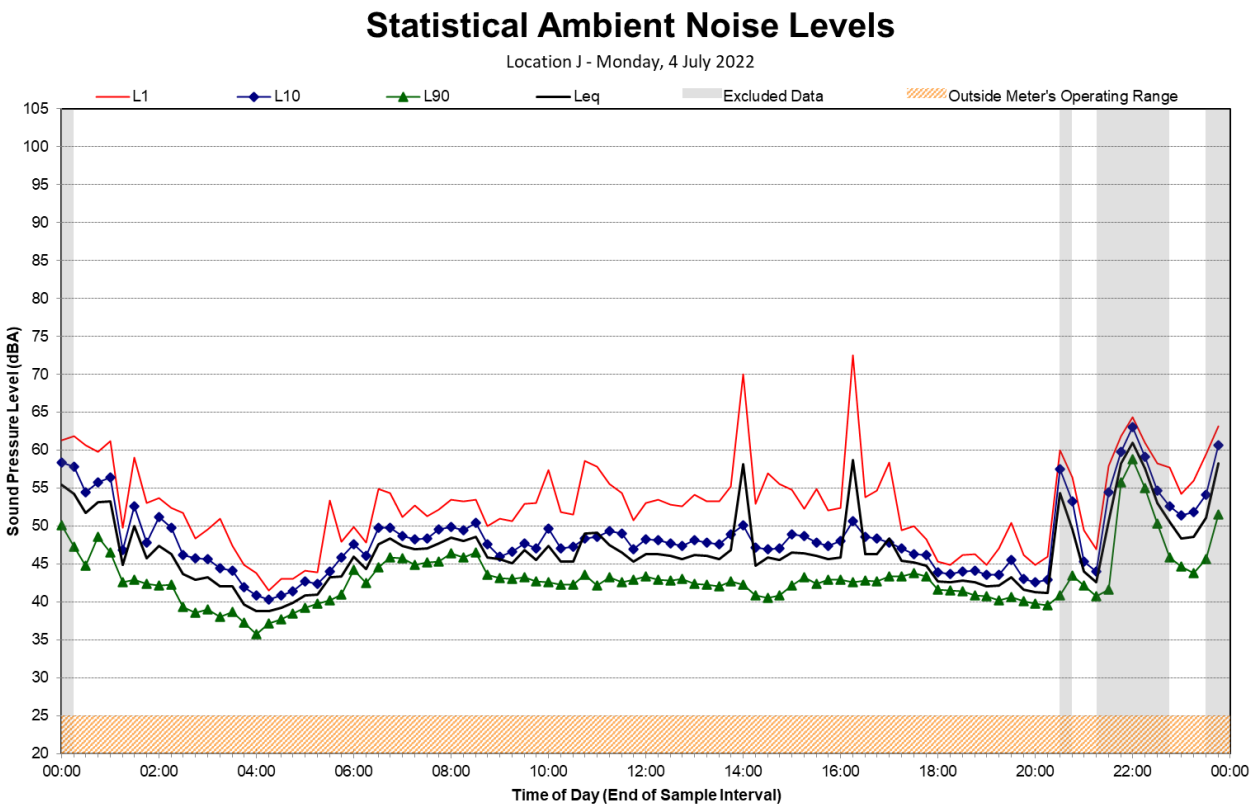

Statistical Ambient Noise Levels
Location L - Tuesday, 12 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

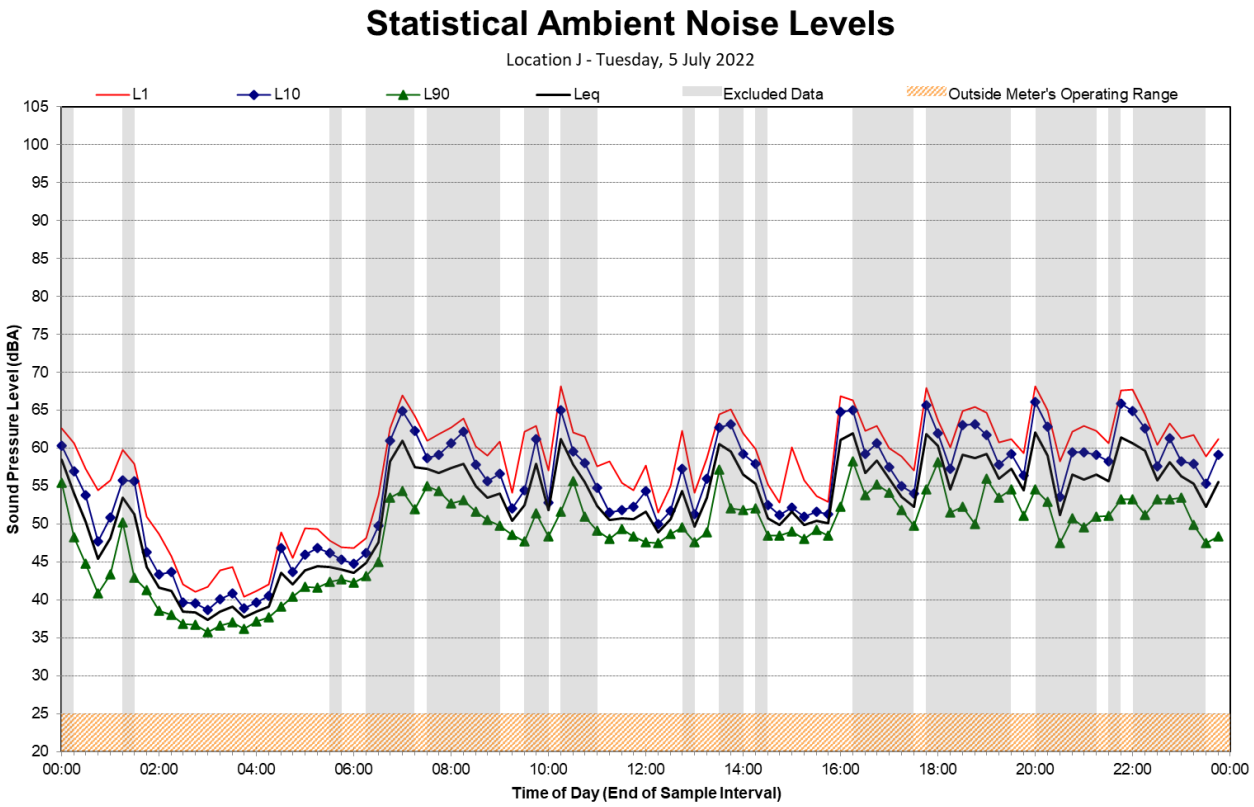

Statistical Ambient Noise Levels
Location J - Thursday, 30 June 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

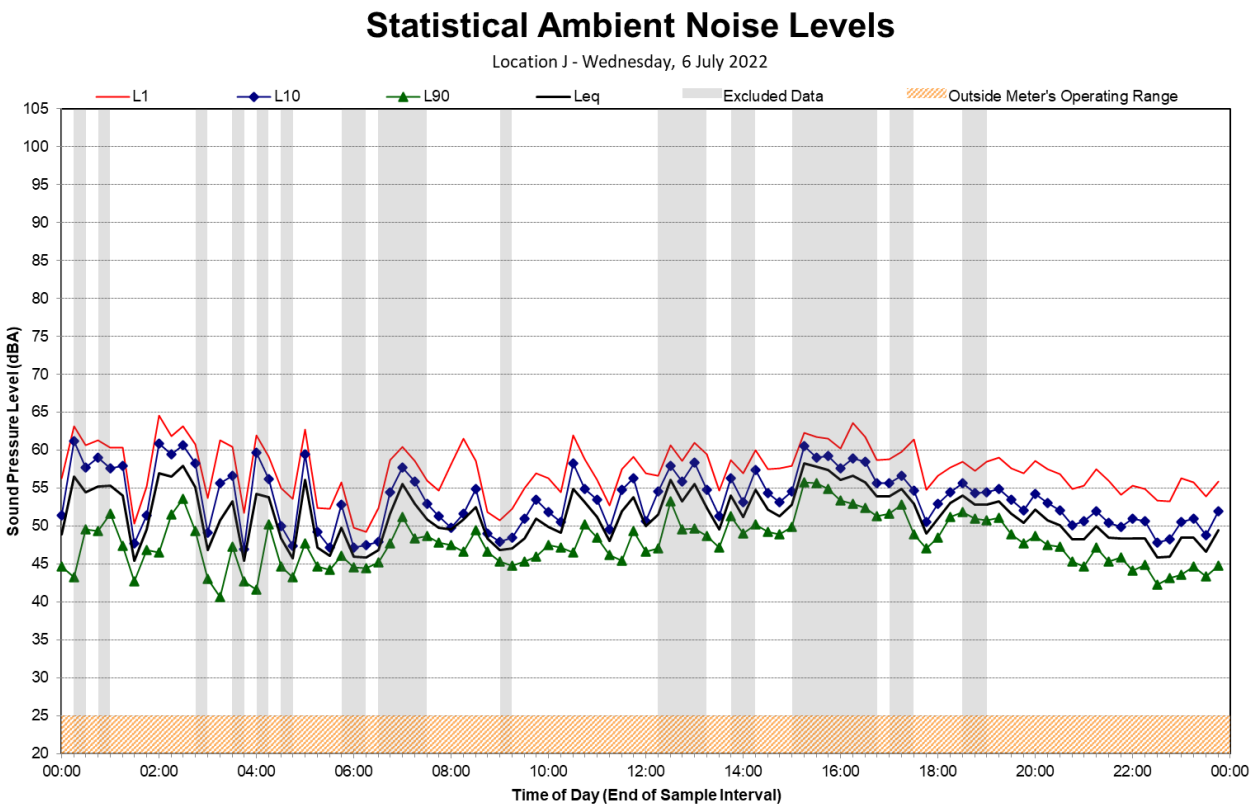

Statistical Ambient Noise Levels
Location J - Friday, 1 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

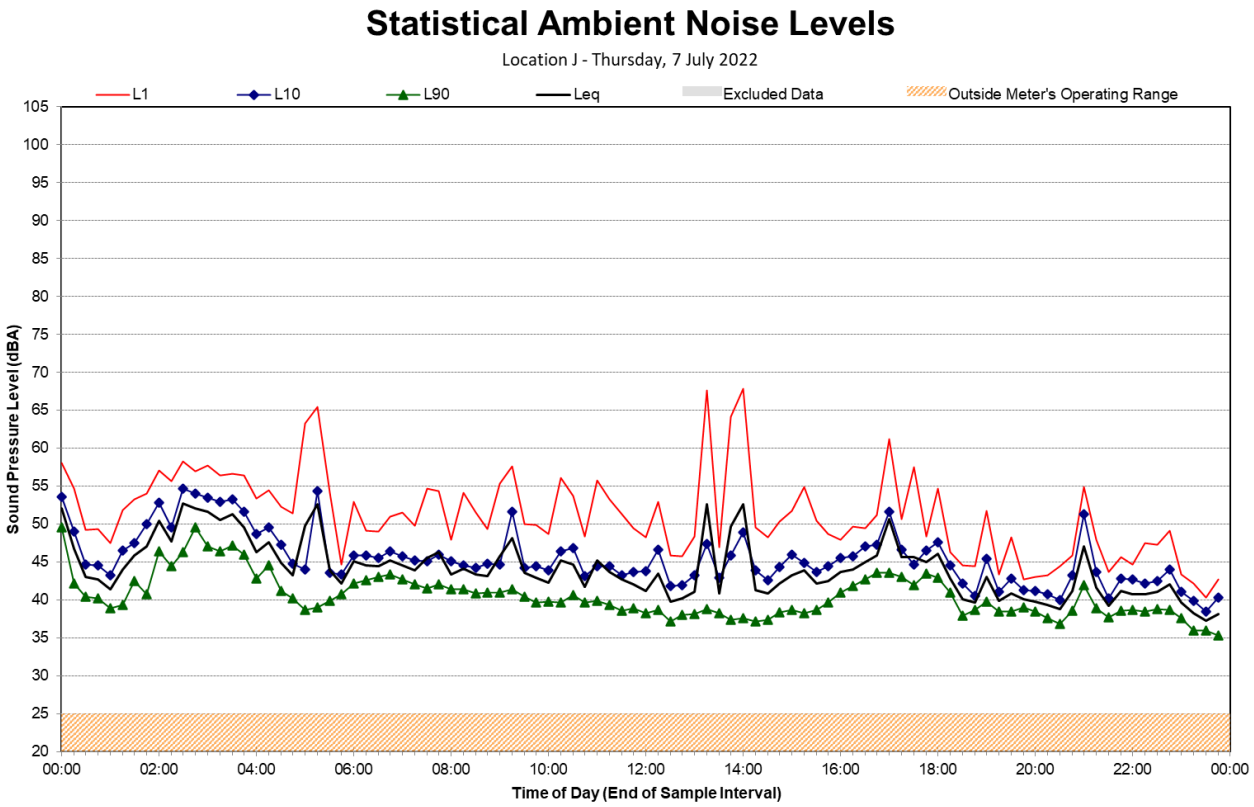

Statistical Ambient Noise Levels
Location J - Saturday, 2 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Location J - Sunday, 3 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Location J - Monday, 4 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

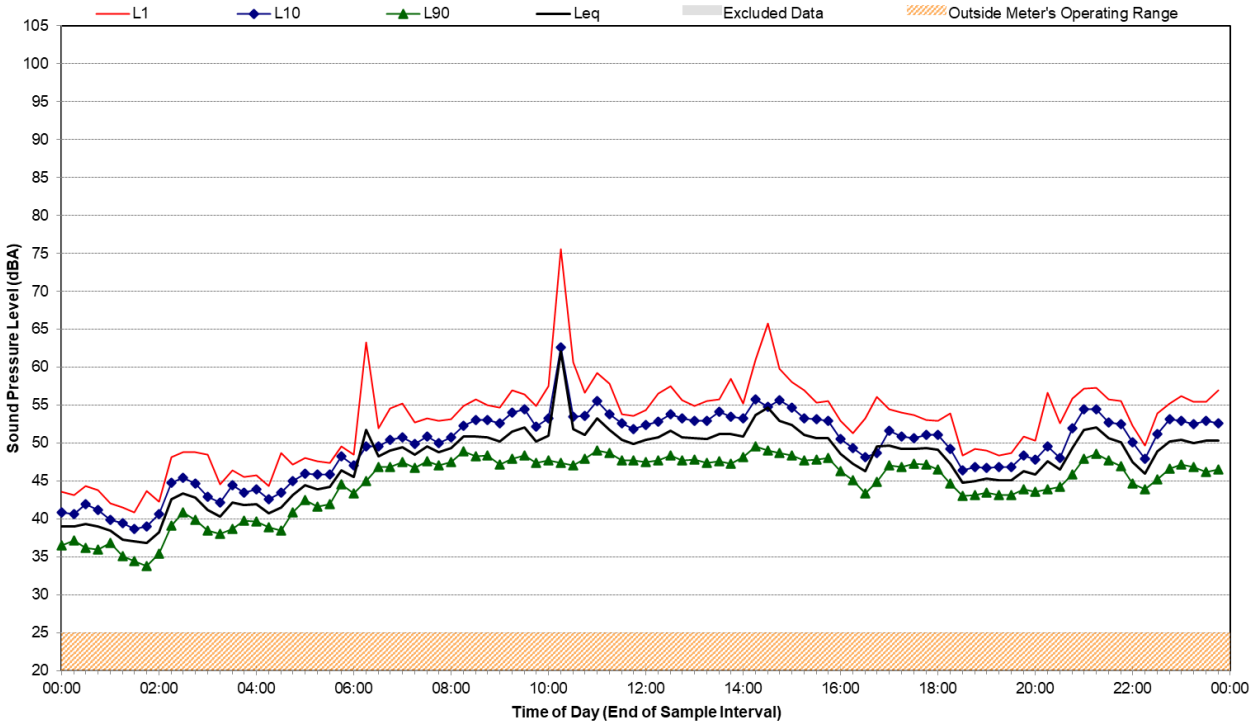

Statistical Ambient Noise Levels
Location J - Tuesday, 5 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Location J - Wednesday, 6 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Location J - Thursday, 7 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

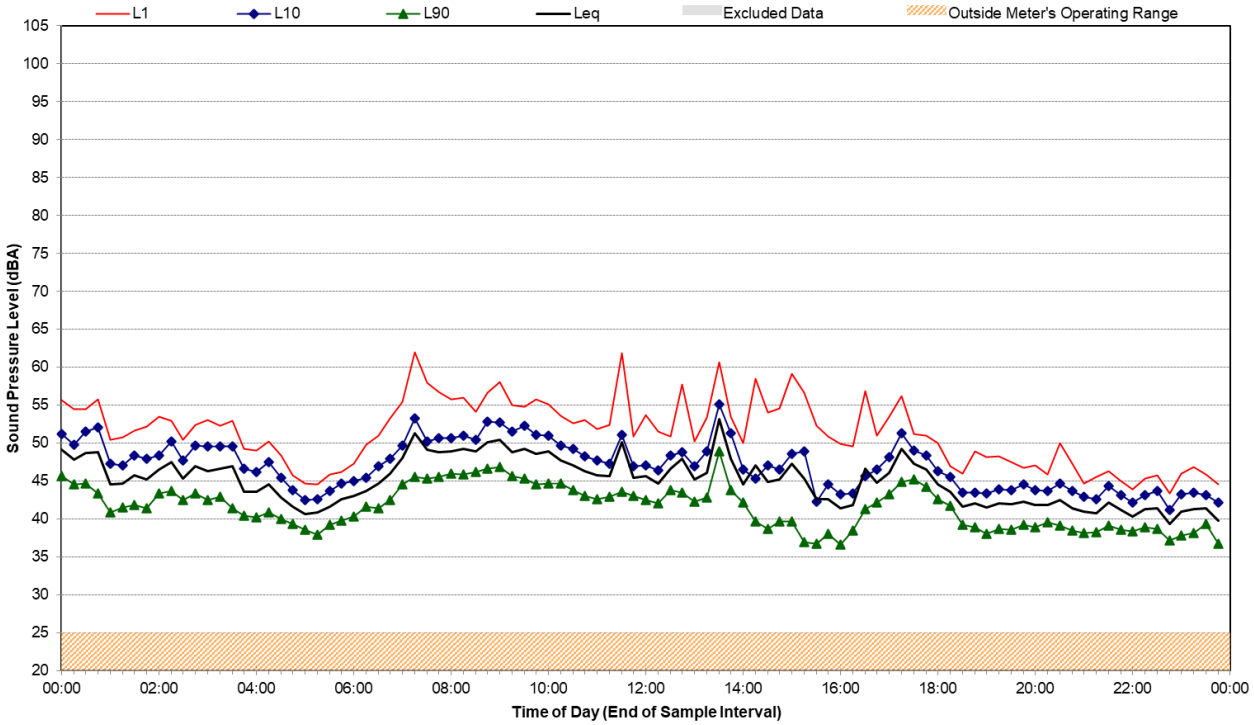
Statistical Ambient Noise Levels

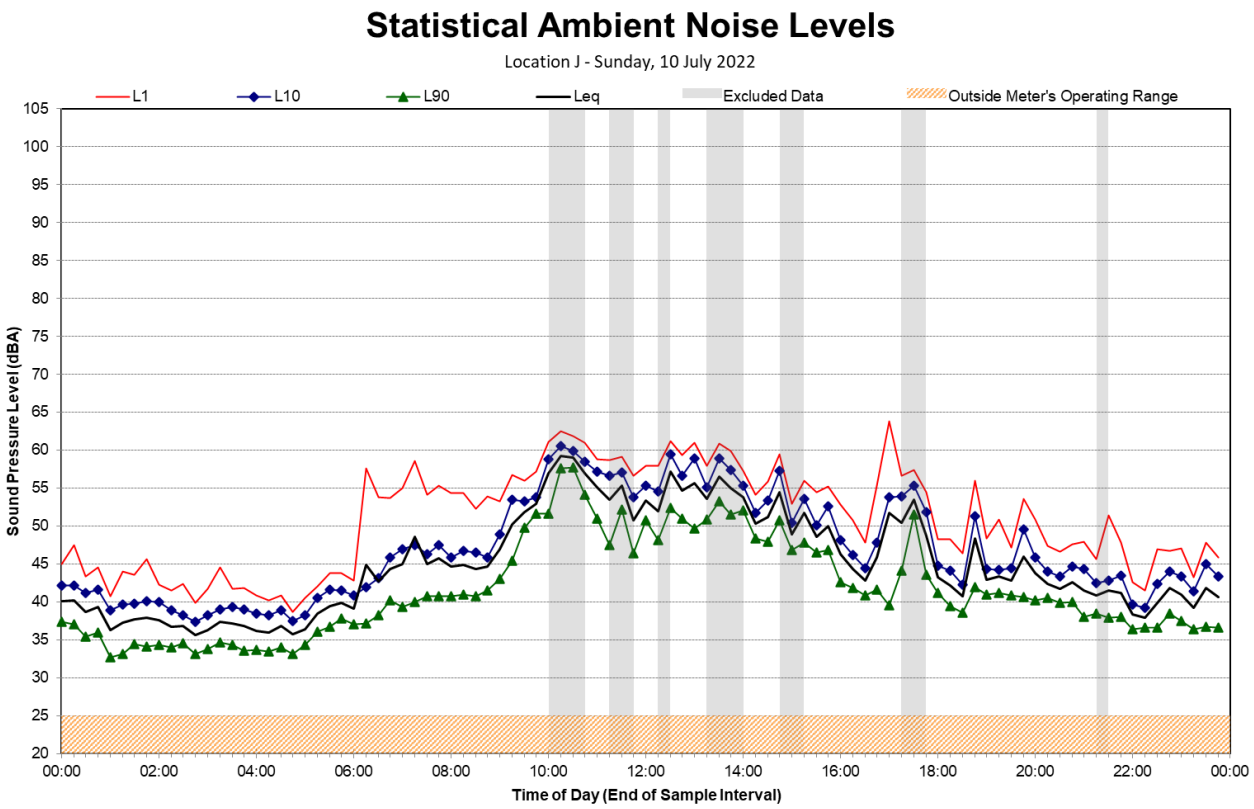
Location J - Friday, 8 July 2022

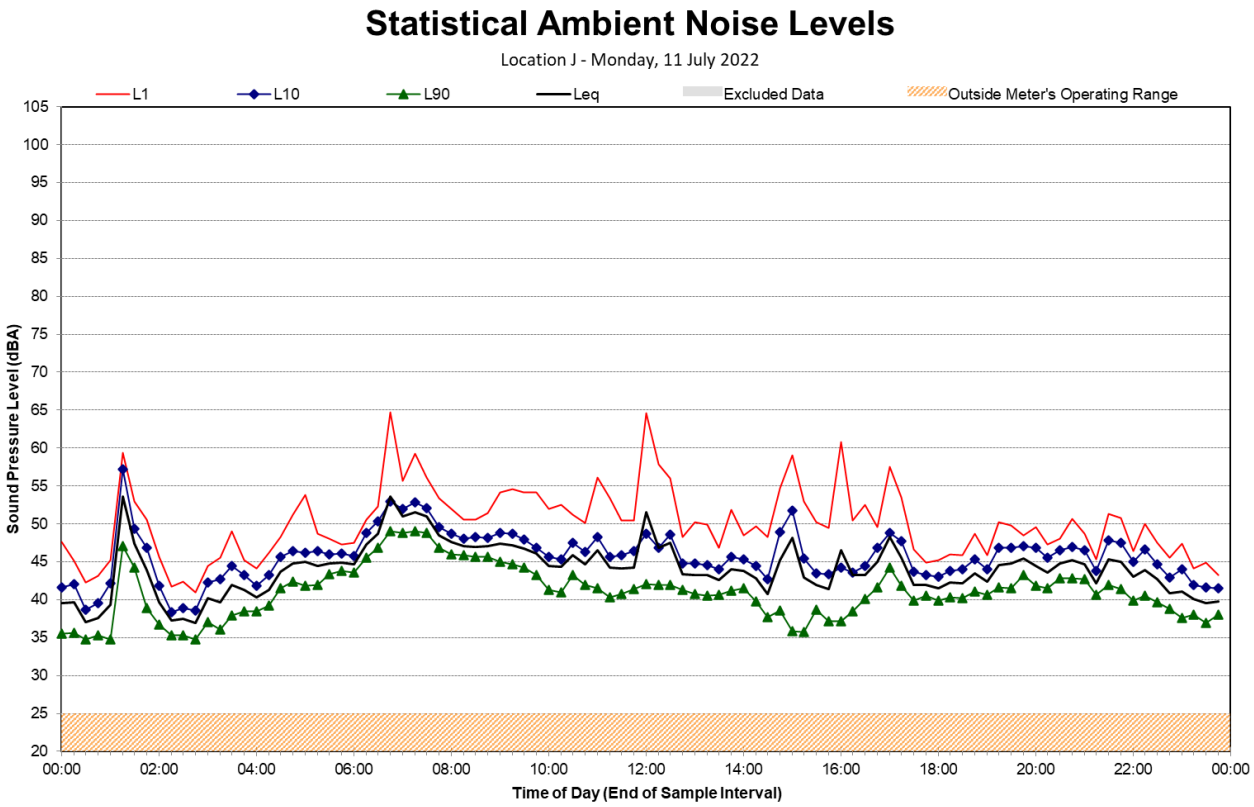


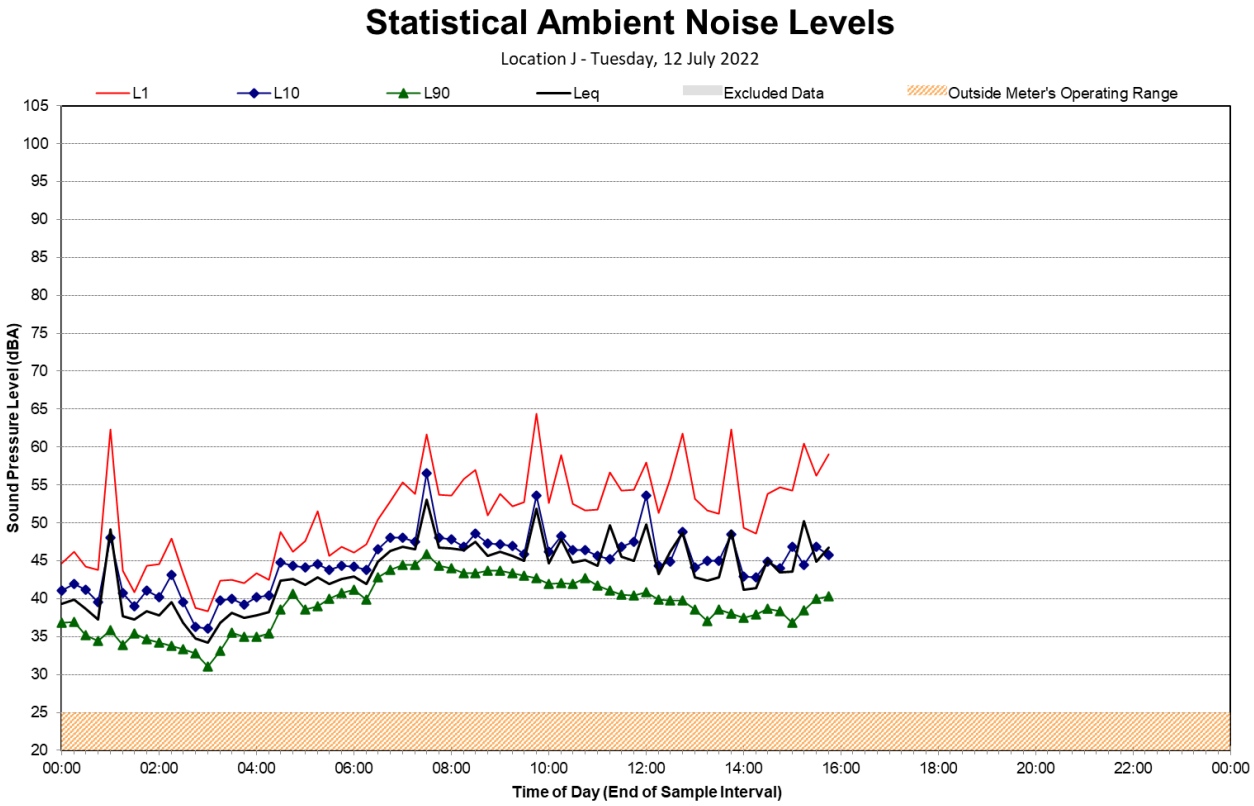
Statistical Ambient Noise Levels

Location J - Saturday, 9 July 2022




Statistical Ambient Noise Levels
Location J - Sunday, 10 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Location J - Monday, 11 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Location J - Tuesday, 12 July 2022
L1
L10
L90
Leq
Excluded Data
Outside Meter's Operating Range
Sound Pressure Level (dBA)
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Time of Day (End of Sample Interval)

ASIA PACIFIC OFFICES

BRISBANE
Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

CANBERRA
GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

DARWIN
Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

GOLD COAST
Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

MACKAY
21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

MELBOURNE
Level 11, 176 Wellington Parade
East Melbourne VIC 3002
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

NEWCASTLE
10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

PERTH
Ground Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

SYDNEY
Tenancy 202 Submarine School
Sub Base Platypus
120 High Street
North Sydney NSW 2060
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

TOWNSVILLE
12 Cannan Street
South Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

WOLLONGONG
Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 2 4249 1000

AUCKLAND
68 Beach Road
Auckland 1010
New Zealand
T: 0800 757 695

NELSON
6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628