Honeman Close Warehouse Facility - SSD-79500208

Noise and Vibration Impact Assessment

Goodman Property Services (Aust) Pty Limited

1-11 Hayes Road
Roseberry NSW 2018

Prepared by:

SLR Consulting Australia

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Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Goodman Property Services (Aust) Pty Limited (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.

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Acronyms and Abbreviations

dBA	Decibel, A-weighted
DA	Development Application
DPHI	Department of Planning, Housing and Infrastructure
EPA	Environment Protection Authority
HNA	Highly Noise Affected. Relates to construction noise levels of ≥75 dBA and is the point above which there may be strong community reaction to construction noise levels
ICNG	*Interim Construction Noise Guideline* (DECC, 2009)
L_{Aeq}	The average noise level during a measurement period, such as the daytime or night-time
L_{AFmax}	The maximum noise level measured during a monitoring period, using 'fast' weighting (also known as the L_1 level)
L_{A90}	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.
NCA	Noise Catchment Area
NML	Noise Management Level
Noise intensive equipment	Construction equipment that is particularly noisy and causes annoyance. Includes items such as rockbreakers and concrete saws
NPfI	*Noise Policy for Industry* (NSW EPA, 2017)
NSW	New South Wales
NVIA	Noise and Vibration Impact Assessment
OOH	Out of Hours
OOHW	Out-of-Hours Work
Other sensitive receivers	Non-residential sensitive receivers, including hospitals, educational facilities, place of worship, child care centres, outdoor recreation areas, etc
Proposal/Project	Honeman Close Warehouse Facility
RBL	Rating Background Level. This is the background noise level measured at a particular location. The method for calculating the RBL is defined in the NSW *Noise Policy for Industry*
Realistic worst-case scenarios	Realistic worst-case construction scenarios have been developed to assess the potential impacts from the proposal. These scenarios are based on the noisiest items of equipment which would likely be required to complete the works
CNVG-R	Construction Noise and Vibration Guideline (Roads), (Transport for NSW)
RNP	*Road Noise Policy* (DECCW, 2011)
SLR	SLR Consulting Australia Pty Ltd
SPL / Lp	Sound Pressure Level
SSDA	State Significant Development Application
SWL / L_W	Sound Power Level
TfNSW	Transport for New South Wales
VDV	Vibration Dose Value
Worst-case impacts and noise levels	The worst-case (ie highest) impacts or noise levels predicted in this report

1.0 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Goodman Property Services (Aust) Pty Limited (Goodman) to undertake a noise and vibration impact assessment in support of a State Significant Development (SSD) application (SSD-79500208) for the Honeman Close Warehouse Facility, which is a proposed warehousing and distribution development at Honeman Close, Huntingwood (the 'proposal' or the 'project').

SLR is suitably qualified to produce this noise and vibration impact assessment. SLR staff are members of the Australian Acoustical Society (AAS) and SLR is a member firm of the Association of Australasian Acoustical Consultants (AAAC).

This report assesses the potential construction and operational noise and vibration impacts associated with the proposal.

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

1.1 Proposal Description

The proposal site is a 20 ha greenfield site located at Honeman Close, Huntingwood. The site comprises the following:

- Lot 1 in DP 1098102 – to facilitate the proposed two warehouse and distribution centre buildings with ancillary offices zoned IN1 General Industrial
- Great Western Highway, Lot 16 & 19 in DP1024111, and Lot 19 in DP819317 – to facilitate intersection upgrade works and formal access, zoned both SP2 Classified Road and IN1 General Industrial

The broader site is located to the north of the M4 Western Motorway, West of Reservoir Road, and South of Great Western Highway.

The site is affected by the following constraints that have all been considered as part of the masterplan and assessment reports for the site:

- State and Local Heritage classification of Honeman Close
- Threatened Ecological Communities / Serious and Irreversible Impact (SAII) entities;
- First and Second Order watercourse's
- TfNSW Crash lab design consideration for access
- Sydney Water Potable Water Service
- Aboriginal Heritage artefacts
- Contamination (Compromising of Friable & Non-Friable Asbestos and Septic Tank contamination)

This application seeks approval for the construction, operation, use and fit-out approval of two warehouses spanning 52,935 m^2 GLA and associated infrastructure and lead-in works.

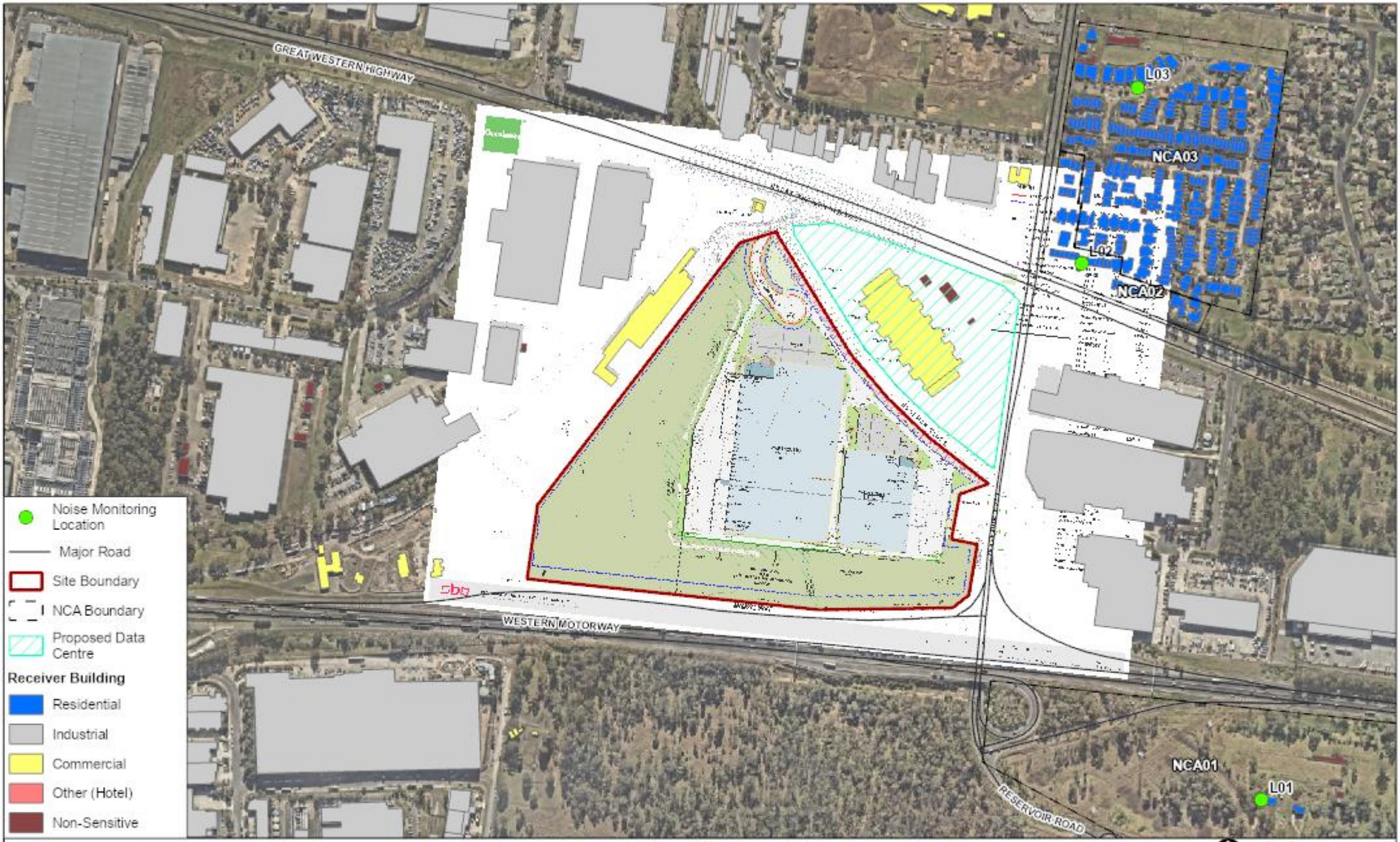
Approval is sought for 24/7 operation of the proposed Warehouse and Distribution use.

The development is proposed to be constructed in one stage and will generally consist of the following scope:

- Infrastructure and Lead-in Works:

  - Estate wide infrastructure and preparation works including vegetation clearing, bulk earthworks and remediation, watercourse realignment, retaining walls, internal services reticulation
  - Lead in services including stormwater, sewer, potable water, electrical and communications
  - New left-in/left-out intersection at Great Western Highway / new proposed estate road including services relocation and eventual dedication
- Warehouse with ancillary office development:
  - Construction, operation, fit-out and use of two warehouses, totalling 52,935 m^2 GLA of warehouse, including ancillary office spaces, access and hardstand, guardhouses, loading bays, landscaping, car parking, electric vehicle charging, solar panels and signage
  - Warehouse proposed height limit of 15 m
  - 24/7 operation
  - Warehouse and distribution use with generic racking layout

The site location and nearby sensitive receivers are shown in **Figure 1,** the proposed site layout is shown in **Figure 2**.



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SITE LOCATION AND SURROUNDINGS

FIGURE 1

Figure 2 Proposed Site Layout

1.2 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements (SEARs) for SSD 79500208 were issued by the Department of Planning, Housing and Infrastructure (DPHI) in January 2025. The requirements relevant to noise and vibration are shown in **Table 1**.

Table 1 Secretary's Environmental Assessment Requirements – SSD 79500208

Noise and Vibration	Where Addressed
SEARs – January 2025	
11. Noise and Vibration Provide a noise and vibration assessment prepared in accordance with the relevant EPA guidelines. The assessment must detail construction and operational noise and vibration impacts on nearby sensitive receivers and structures and outline the proposed management and mitigation measures that would be implemented.	Existing Noise Environment and Sensitive Receivers: **Section 2.0** Assessment Criteria: **Section 3.0** Assessment Methodology: **Section 4.0** Assessment of Impacts: **Section 5.0** Cumulative Impacts: **Section 6.0** Mitigation and Management Measures: **Section 7.0**

1.3 Test of Adequacy Comments

Test of Adequacy comments on the Draft EIS were received from DPE on 12 May 2025. The noise-related comments are shown in **Table 2**.

Table 2 Noise Related Test of Adequacy Comments

No.	Noise and Vibration	Response / where Addressed
1	The construction hours referred to in the EIS (particularly those for Saturday works) appear to differ across Table 1, Table 4, Section 6.7.6 and Section 6.8.2 of the EIS and across the NVIA and the TIA. Please review and update accordingly.	The construction hours in **Section 4.1.2** have been updated to be consistent with other SSD documentation.
22	The Department notes the NVIA has been informed by the establishment of three noise catchment areas covering nearby residential receivers. However, the Department is concerned that the background noise monitoring undertaken for NCA02 and NCA03 has not been undertaken at locations that can be considered representative of all residences within those noise catchment areas. In this regard, the Department notes the following: a. L02 has been used to establish background noise levels for NCA02 but is located in close proximity to the Great Western Highway. While this data may be applicable to certain residences fronting the highway, based on assessment data from other projects, existing background noise levels elsewhere in NCA02 are likely to be at least 10dB(A) lower than those observed at L02. b. L03 has been used to establish background noise levels for NCA03, but is located directly opposite a kiosk substation. The use of this location for background noise monitoring is considered unacceptable, particularly as the Noise Policy for Industry (NPfI) emphasises	**NCA02/L02** Background levels measured at location L02 are considered representative of receivers along the Great Western Highway. Similar levels were also recorded near 181 Reservoir Road, Blacktown (refer to the NVIA for SSD-58601963). As such, the monitoring data from L02 is considered representative of residences that are adjacent to the Great Western Highway and Reservoir Road. Accordingly, the extents of NCA02 have been revised (see **Figure 2**) to include residences with line-of-sight to the Great Western Highway and Reservoir Road, within 170 m north and 230 m east of the intersection. **NCA03/L03** The daily L_{A90} noise levels measured at L03 (refer to **Appendix B**) exhibit a typical 24-hour noise pattern influenced by traffic movements and nearby industrial operations, consistent with suburban areas located adjacent to such sources. Based on previous measurements conducted by SLR, a large street transformer (500kVA) has a

No.	Noise and Vibration	Response / where Addressed
	that continuous, extraneous noise must be excluded from all monitoring data. Given the above, further background monitoring should be undertaken for the development, in accordance with the requirements outlined in Fact Sheet A of the NPfI. Where monitoring data is applied to an entire noise catchment area, sufficient justification should be provided to confirm the data is representative of existing levels at all residences in that area.	SWL of around 60 dBA with high quality tones at 100 Hz and harmonics up to 600 Hz. As L03 is 21 m from the sub-station, the likely SPL would be around 25 dBA which is more than 10 dB below the night-time RBL. A review of the measured octave band data at L03 indicated that tonal components typically associated with kiosk substations were not present. Additionally, attended measurements conducted at L03 indicate that distant road traffic is the primary contributor to background noise levels, with noise from the nearby kiosk substation being inaudible. As such, the kiosk substation noise is not considered to be influencing the RBL Accordingly, the extents of NCA03 have been revised (see **Figure 2**) to include residences to the north of the revised NCA02. This conservatively assumes that background noise levels at some receivers near the Great Western Highway and Reservoir are similar to those at L03. However, they are likely to be higher.
23	Under Table 12, the Department notes both NCA01 and NCA02 have been assigned the 'urban' amenity classification, on the basis of that noise in these areas is dominated by traffic noise. However, the Department notes this approach is inconsistent with the guidance provided in the NPfI and the EPA's article in Acoustics Australia titled Determining the Noise Policy for Industry noise amenity category for residential receivers (EPA, 2022)). Accordingly (and in the absence of compelling justification to the contrary), the amenity classification for NCA01 and NCA02 should be set as follows: a. NCA01 – Rural (Note: While the land in this area is unzoned, it is characterised as a rural landscape under the Western Sydney Parklands Plan of Management 2030. The use of the high traffic project amenity noise level for receivers in this area may be possible, subject to sufficient justification/establishment of the relevant $L_{Aeq,period(traffic)}$ level). b. NCA02 – Suburban, based on the applicable land use zoning (Note: The use of the high traffic project amenity noise level for receivers adjoining the Great Western Highway may be possible, subject to sufficient justification/establishment of the relevant $L_{Aeq,period(traffic)}$ level). **Note**: The high traffic amenity noise level may be applicable at specific receiver location/s where the conditions outlined in section 2.4.1 of the NPfI apply.	**<u>Amenity Classification</u>** Although NCA01 is characterised as a 'rural landscape' under the Western Sydney Parklands Plan of Management 2030, and NCA02 is zoned 'R2 – Low Density Residential', the 'urban' amenity classification is considered more appropriate for both areas from an acoustical perspective, for the following reasons: • The measured RBLs at L01 and L02 are predominantly influenced by road traffic noise from the M4 Western Motorway and the Great Western Highway (see **Appendix B**). • The measured RBLs at L01 (representative of NCA01) are 10 - 15 dB higher the typical existing background noise levels for urban environment (see **Table 12**). • The measured RBLs at L02 (representative of NCA02) are 9–11 dB above the typical existing background noise levels for urban environment (see **Table 12**). • Traffic volumes on these roads are heavy and continuous, particularly during peak periods, which is consistent with an urban acoustic environment (see **Table 12**). • The urban amenity classification has previously been applied to the two receivers in NCA01 in earlier approved SSD projects (refer to NVIA for SSD–36138263). • NCA02 is also located in close proximity to an industrial district (see **Table 12**). Hence the 'urban' amenity classification is justified in accordance with the guidance in the EPA's article in Acoustics Australia titled Determining the Noise Policy for Industry noise amenity category for residential receivers (EPA, 2022).
24	Under Table 13, the Department notes the project amenity level during the night-time period was set at 15 dB below the existing road traffic noise level for receivers in both NCA01 and NCA02. However, the Department notes that insufficient information has been provided to establish the relevant $L_{Aeq,period(traffic)}$ levels and to demonstrate that <u>all</u> residences within these noise catchment	

No.	Noise and Vibration	Response / where Addressed
	areas are currently subject to elevated levels of traffic noise, as per the requirements outlined under section 2.4.1 of the NPfI. Accordingly, this concession should not be used to establish the development's night-time Project Noise Trigger Levels (PNTLs).	**Applicability of High-Traffic Amenity Noise Level** The application of the high traffic amenity noise level to NCA01 and the revised NCA02 is justified for the following reasons: • Attended and unattended noise monitoring data, along with site observations at L01 and L02, indicate that receivers near these monitoring locations are subject to high levels of road traffic noise, which is the primary contributor to the measured RBLs and $L_{Aeq(period)}$ traffic noise levels (see **Appendix B** and **Table 4**). Similar conditions are evident for residences along Reservoir Road, based on unattended monitoring data presented in Appendix B of the NVIA for SSD–36138263. • The $L_{Aeq(night-time)}$ noise levels at both L01 and L02 (see **Table 4**) exceed the nigh-time amenity level for urban receivers by at least 12 dB (see **Table 14**). • NCA01 comprises two receivers located at a similar offset from the M4 Western Motorway, making the application of the high traffic amenity level appropriate for both. • The high traffic amenity classification has been applied to NCA01 in previously approved SSD projects (see NVIA for SSD – 36138263) • Monitoring data from L02, which is primarily influenced by road-traffic noise from the Great Western Highway is considered representative of the receivers within the revised NCA02 boundary (see response to ToA comment #22 and **Figure 2**).

1.4 Nearest Sensitive Receivers

Sensitive receivers in the area surrounding the proposal have been identified and Noise Catchment Areas (NCAs) have been defined. These are summarised in **Table 3** and shown in **Figure 1**.

Table 3 NCAs and Sensitive Receivers

NCA/ Receiver Type	Description
NCA01/ Residential	NCA01 covers residential receivers to the south-east of the proposal in the suburb of Prospect. The nearest residential receivers in this area are located around 600 m to the south-east of the proposal.
NCA02/ Residential	NCA02 lies to the north-east of the proposal and encompasses residential receivers in Blacktown located around 300 m away from the proposal. In encompasses properties with direct line-of-sight to the Great Western Highway and Reservoir Road extending up to 170 m north and 230 m east of their intersection.
NCA03/ Residential	NCA03 covers residential receivers in Blacktown, to the north-east of the proposal and lies north of NCA02. The nearest residential receivers in this area are located around 350 m away from the proposal.

NCA/ Receiver Type	Description
Industrial and commercial	Various industrial and commercial developments both existing and upcoming surround the proposal. The nearest existing developments are the Huntingwood East Industrial Estate, which lies around 55 m to the east of the proposal, TfNSW Crash Lab, which lies around 110 m to the west of the proposal and TfNSW Driver Aid Servies, which lies around 30 m to the north west of the proposal. The proposed Huntingwood Data Centre, located at 6 Honeman Close lies around 50 m to the north east of the proposal and has also been considered as a noise-sensitive receiver in this assessment. As the existing TfNSW Crash lab and the proposed Huntingwood Data Centre would have offices facing the proposal, these receivers have been conservatively classified as commercial developments.

It is noted that there are other residential receivers further to the north and east of NCA02 and NCA03. These have not been included in the assessment as they are more distant and are not expected to be impacted by the proposal.

2.0 Existing Noise Environment

In order to determine the existing noise environment in the receiver areas around the site and to set the criteria used to assess the potential impacts from the proposal, the following noise surveys have been considered:

- Unattended noise monitoring completed in the residential areas to the north-east of the proposal site in December 2024.
- Unattended noise monitoring completed by SLR in May 2022 at 10 Yallock Place for Prospect for the Augusta Street Warehouse and Distribution Centre (SSD-36138263) Noise and Vibration Impact Assessment (see SLR report 610.30770-R01-v2.1 issued in May 2024).

The monitoring equipment was positioned to measure existing noise levels that are representative of receivers potentially most affected by the proposal, within constraints such as accessibility, security and landowner permission.

The noise monitoring equipment continuously measured existing noise levels in 15-minute periods during the daytime, evening and night-time. All equipment carried current National Association of Testing Authorities (NATA) or manufacturer calibration certificates and equipment calibration was confirmed before and after each measurement.

The measured data has been processed to exclude noise from extraneous events and periods affected by adverse weather conditions, such as strong wind or rain (measured at the BOM weather station at Horsley Park Equestrian Centre), to establish representative existing noise levels in the study area.

The noise monitoring locations are shown in **Figure 1** and the monitoring results are summarised in **Table 4**.

Table 4 Summary of Existing Noise Levels

ID	Address	Measured Noise Levels (dBA)					
		Background Noise (RBL)			Average Noise (L_{Aeq})		
		Day[1]	Eve.[1]	Night[1]	Day[1]	Eve.[1]	Night[1]
L01[2]	10 Yallock Place, Prospect	55	55	48	59	59	57
L02	59/179 Reservoir Road, Blacktown	54	51	45	61	59	58
L03	13 Clare Street, Blacktown	42	42[3] (43 actual)	39	52	51	49

Note 1: The assessment periods are the daytime which is 7 am to 6 pm Monday to Saturday and 8 am to 6 pm on Sundays and public holidays, the evening which is 6 pm to 10 pm, and the night-time which is 10 pm to 7 am on Monday to Saturday and 10 pm to 8 am on Sunday and public holidays. See the NSW EPA Noise Policy for Industry.

Note 2: Measured data for L01 taken from SLR report 610.30770-R01-v2.1 issued in May 2024

Note 3: RBL reduced to be no higher than the daytime RBL, as outlined in the NPfI.

Short-term attended noise monitoring was also completed at each monitoring location. The attended measurements allow the contributions of the various noise sources at each location to be determined. The attended measurements were generally found to be consistent with the results of the unattended noise monitoring and show that existing ambient noise levels are typically dominated by road traffic noise from the Western Motorway, the Great Western Highway and Reservoir Road.

Detailed observations from the attended measurements are provided in **Appendix B**.

3.0 Assessment Criteria

3.1 Construction Noise Criteria

3.1.1 Interim Construction Noise Guideline

The NSW *Interim Construction Noise Guideline* (ICNG) is used to assess and manage impacts from construction noise on residences and other sensitive land uses in NSW.

The ICNG contains procedures for determining project specific Noise Management Levels (NMLs) for sensitive receivers based on the existing background noise in the area. The 'worst-case' noise levels from construction of a proposal are predicted and then compared to the NMLs in a 15-minute assessment period to determine the likely impact of the proposal.

The NMLs are not mandatory limits, however, where construction noise levels are predicted or measured to be above the NMLs, feasible and reasonable work practices to minimise noise emissions are to be investigated.

3.1.1.1 Residential Receivers

The ICNG approach for determining NMLs at residential receivers is shown in **Table 5**.

Table 5 ICNG NMLs for Residential Receivers

Time of Day	NML $L_{Aeq(15minute)}$	How to Apply
	Noise affected RBL[1] + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise

Time of Day	NML $L_{Aeq(15minute)}$	How to Apply
Standard Construction Hours Monday to Friday 7:00 am to 6:00 pm Saturday 8:00 am to 1:00 pm No work on Sundays or public holidays		Where the predicted or measured $L_{Aeq(15minute)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly Noise Affected 75 dBA	The Highly Noise Affected (HNA) level represents the point above which there may be strong community reaction to noise Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restructuring the hours that the very noisy activities can occur, taking into account: Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools or mid-morning or mid-afternoon for works near residences If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside Standard Construction Hours	Noise affected RBL[1] + 5 dB	A strong justification would typically be required for works outside the recommended standard hours The proponent should apply all feasible and reasonable work practices to meet the noise affected level Where all feasible and reasonable practises have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.

Note 1: The RBL is the Rating Background Level and the ICNG refers to the calculation procedures in the NSW Industrial Noise Policy (INP). The INP has been superseded by the NSW EPA *Noise Policy for Industry* (NPfI).

3.1.1.2 Other Sensitive' Land Uses

The ICNG NMLs for 'other sensitive' non-residential land uses are shown in **Table 6**.

Table 6 Construction NMLs at 'Other Sensitive' Land Uses

Land Use	Noise Management Level $L_{Aeq(15minute)}$ (dBA) (applied when the property is in use)	
	Internal	External
ICNG 'Other Sensitive' Receivers		
Commercial	n/a	70
Industrial	n/a	75

3.1.1.3 NML Summary

The construction NMLs are summarised in **Table 7**. Out of hours NMLs would be applicable to works undertaken outside the ICNG standard construction hours.

Table 7 Construction Noise Management Levels

NCA/ Receiver Type	Mon. Location	Measured RBL[1] (dBA)			NML $L_{Aeq(15minute)}$ (dBA)				Sleep Disturbance Screening Level[2] L_{Amax} (dBA)
					Standard Construction Hours (RBL+10dB)	Out of Hours (RBL+5dB)			
		Day	Eve.	Night	Day	Day	Eve.	Night	Night
NCA01/ Residential	L01	55	55	48	65	60	60	53	63
NCA02/ Residential	L02	54	51	45	64	59	56	50	60
NCA03/ Residential	L03	42	42[3] (43 actual)	39	52	47	47	44	54
Industrial	n/a				75 when in use				n/a
Commercial	n/a				70 when in use				n/a

Note 1: RBL = Rating Background Level.

Note 2: Sleep disturbance screening level is RBL+15 dB or 52 dBA, whichever is higher.

Note 3: The evening RBL has been reduced to match the daytime RBL due to the measured evening RBL being higher than the daytime, as outlined in the NPfI.

3.2 Construction Vibration Guidelines

The effects of vibration from construction works can be divided into three categories:

- Those in which the occupants of buildings are disturbed (human comfort)
- Those where building contents may be affected (building contents)
- Those where the integrity of the building may be compromised (structural or cosmetic damage).

3.2.1 Human Comfort Vibration

People can sometimes perceive vibration impacts when vibration generating construction works are located close to occupied buildings.

Vibration from construction works tends to be intermittent in nature and the EPA's *Assessing Vibration: a technical guideline* (2006) provides criteria for intermittent vibration based on the Vibration Dose Value (VDV). The 'preferred' and 'maximum' VDVs for human comfort impacts are shown in **Table 8**.

Table 8 Vibration Dose Values for Intermittent Vibration

Building Type	Assessment Period	Vibration Dose Value[1] (m/s1.75)	
		Preferred	Maximum
Critical Working Areas (eg operating theatres or laboratories)	Day or night-time	0.10	0.20
Residential	Daytime	0.20	0.40
	Night-time	0.13	0.26
Offices, schools, educational institutions and places of worship	Day or night-time	0.40	0.80

Building Type	Assessment Period	Vibration Dose Value[1] (m/s1.75)	
		Preferred	Maximum
Workshops	Day or night-time	0.80	1.60

Note 1: The VDV accumulates vibration energy over the daytime and night-time assessment periods and is dependent on the level of vibration as well as the duration.

3.2.2 Effects on Building Contents

People perceive vibration at levels well below those likely to cause damage to building contents. For most receivers, the human comfort vibration criteria are the most stringent and it is generally not necessary to set separate criteria for vibration effects on typical building contents.

Exceptions to this can occur when vibration sensitive equipment, such as electron microscopes, are located in buildings near to construction works. No such items of equipment have been identified in the proposal area.

3.2.3 Structural and Cosmetic Damage Vibration

If vibration from construction works is sufficiently high it can cause damage to structural elements of affected buildings. The levels of vibration required to cause cosmetic damage tend to be at least an order of magnitude (10 times) higher than those at which people can perceive vibration.

Examples of damage that can occur includes cracks or loosening of drywall surfaces, cracks in supporting columns and loosening of joints. Structural damage vibration limits are contained in British Standard BS 7385 and German Standard DIN 4150.

BS 7385

British Standard BS 7385 recommends vibration limits for transient vibration judged to give a minimal risk of vibration induced damage to affected buildings. The limits for residential and industrial buildings are shown in **Table 9**.

Table 9 BS 7385 Transient Vibration Values for Minimal Risk of Damage

Group	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4 Hz to 15 Hz	15 Hz and Above
1	Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures. Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 1: Where the dynamic loading caused by continuous vibration may give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values may need to be reduced by up to 50%.

For heritage buildings, the standard states that *"a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive".*

DIN 4150

German Standard DIN 4150 also provides guideline vibration limits for different buildings. Damage is not expected to occur where the values are complied with and the values are generally recognised to be conservative. The DIN 4150 values for buildings and structures are shown in **Table 10**.

Table 10 DIN 4150 Guideline Values for Short-term Vibration on Structures

Group	Type of Structure	Guideline Values Vibration Velocity (mm/s)				
		Foundation, All Directions at a Frequency of			Topmost Floor, Horizontal	Floor Slabs, Vertical
		1 to 10 Hz	10 to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	20
2	Residential buildings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15	20
3	Structures that, because of their particular sensitivity to vibration, cannot be classified as Group 1 or 2 **and** are of great intrinsic value (eg heritage listed buildings)	3	3 to 8	8 to 10	8	20[1]

Note 1: It may be necessary to lower the relevant guideline value markedly to prevent minor damage.

3.2.4 Minimum Working Distances for Vibration-intensive Works

Minimum working distances for typical vibration-intensive construction equipment are provided in the Transport for NSW *Construction Noise and Vibration Guideline (Roads)* (CNVG-R) and are shown in **Table 11**. The minimum working distances are for both cosmetic damage (from BS 7385 and DIN 4150) and human comfort (from the NSW EPA Vibration Guideline). They are based on empirical data which suggests that where works are further from receivers than the quoted minimum distances then impacts are not considered likely.

Table 11 Recommended Minimum Working Distances from Vibration-intensive Equipment

Plant Item	Rating/Description	Minimum Distance		
		Cosmetic Damage		Human Response (NSW EPA Guideline)
		Residential and Light Commercial (BS 7385)	Heritage Items (DIN 4150, Group 3)	
Vibratory Roller	<50 kN (1–2 tonne)	5 m	11 m	15 m to 20 m
	<100 kN (2–4 tonne)	6 m	13 m	20 m
	<200 kN (4–6 tonne)	12 m	25 m	40 m
	<300 kN (7–13 tonne)	15 m	31 m	100 m
	>300 kN (13–18 tonne)	20 m	40 m	100 m

Plant Item	Rating/Description	Minimum Distance		
		Cosmetic Damage		Human Response (NSW EPA Guideline)
		Residential and Light Commercial (BS 7385)	Heritage Items (DIN 4150, Group 3)	
	>300 kN (>18 tonne)	25 m	50 m	100 m
Small Hydraulic Hammer	300 kg (5 to 12 t excavator)	2 m	5 m	7 m
Medium Hydraulic Hammer	900 kg (12 to 18 t excavator)	7 m	15 m	23 m
Large Hydraulic Hammer	1,600 kg (18 to 34 t excavator)	22 m	44 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	5 m to 40 m	20 m
Piling Rig – Bored	≤ 800 mm	2 m (nominal)	5 m	4 m
Jackhammer	Hand held	1 m (nominal)	3 m	2 m

The minimum working distances are indicative and will vary depending on the particular item of equipment and local geotechnical conditions. The distances apply to cosmetic damage of typical buildings under typical geotechnical conditions.

3.3 Operational Noise Criteria

The NSW *Noise Policy for Industry* (NPfI) was released in 2017 and sets out the requirements for the assessment and management of operational noise from industry in NSW.

The NPfI defines how to determine 'trigger levels' for noise emissions from industrial developments. Where a development is likely to exceed the trigger levels at existing noise sensitive receivers, feasible and reasonable noise management measures are required to be considered to reduce the impacts.

There are two types of trigger levels – one to account for 'intrusive' noise impacts and one to protect the 'amenity' of particular land uses:

- The **intrusiveness** of an industrial noise source is generally considered acceptable if the L_{Aeq} noise level of the source, measured over a period of 15-minutes, does not exceed the representative background noise level by more than 5 dB. Intrusive noise levels are only applied to residential receivers. For other receiver types, only the amenity levels apply.
- To limit continual increases in noise levels from the use of the intrusiveness level alone, the ambient noise level within an area from all industrial sources should remain below the recommended **amenity** levels specified in the NPfI for that particular land use.

Intrusive and amenity noise levels are not used directly as regulatory limits. They are used to assess the potential impact of noise, assess feasible and reasonable mitigation options and subsequently determine achievable noise requirements.

The NPfI provides guidance on assigning residential receiver amenity noise categories based on the site-specific features shown in **Table 12**.

Table 12 Residential Receiver Amenity

Receiver Category	Typical Planning Land Use Zoning	Typical Existing Background Noise Levels (RBL)	Description
Rural	RU1 – primary production RU2 – rural landscape RU4 – primary production small lots R5 – large lot residential E4 – environmental living	Daytime <40 dBA Evening <35 dBA Night <30 dBA	Rural – an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels. Settlement patterns would be typically sparse. Note: Where background noise levels are higher than those presented due to existing industry or intensive agricultural activities, the selection of a higher noise amenity area should be considered.
Suburban residential	RU5 – village RU6 – transition R2 – low density residential R3 – medium density residential E2 – environmental conservation E3 – environmental management	Daytime <45 dBA Evening <40 dBA Night <35dBA	Suburban – an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic: evening ambient noise levels defined by the natural environment and human activity.

Receiver Category	Typical Planning Land Use Zoning	Typical Existing Background Noise Levels (RBL)	Description
Urban residential	R1 – general residential R4 – high density residential B1 – neighbourhood centre (boarding houses and shop-top housing) B2 – local centre (boarding houses) B4 – mixed use	Daytime >45 dBA Evening >40 dBA Night >35 dBA	Urban – an area with an acoustical environment that: • Is dominated by 'urban hum' or industrial source noise, where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources • Has through-traffic with characteristically heavy and continuous traffic flows during peak periods • Is near commercial districts or industrial districts • Has any combination of the above.

Amenity noise categories have been determined with reference to the NPfI. The assessment is shown in **Table 13**.

Table 13 Residential Receiver Amenity Category Assessment

Area	Land Use Zoning	Existing Background Noise Levels RBL (dBA)			Resulting Amenity Classification	Discussion
		Day	Eve	Night		
NCA01	Unzoned	55	55	48	Urban	Although NCA01 is identified as a 'rural landscape' under the Western Sydney Parklands Plan of Management 2030 and NCA02 is zoned 'R2 – Low Density Residential', an 'urban' amenity classification is considered more appropriate for both areas due to the following: • Measured RBLs at L01 and L02 are primarily influenced by road traffic noise from the M4 Western Motorway and the Great Western Highway. • RBLs at L01 and L02 exceed typical urban background levels by 10–15 dB and 9–11 dB respectively (see **Table 12**). • Traffic volumes are heavy and continuous, particularly during peak periods, reflecting an urban acoustic environment (see **Table 12**). • The urban amenity classification has been applied to the two receivers in NCA01 in previously approved SSDs (e.g. SSD–36138263). • NCA02 is located near an industrial district, further supporting an urban classification (see **Table 12**).
NCA02	R2 – low density residential	54	51	45		
NCA03	R2 – low density residential	42	42[1] (43 actual)	39	Suburban	The residential receivers in NCA03 are zoned as R2 – low density residential. Although existing noise levels are generally dominated by traffic noise from the Great Western Highway and Western Motorway, the 'Suburban' amenity classification has been chosen as these receivers are situated further away from these roads.

Note 1: RBL reduced to be no higher than the daytime RBL, as outlined in the NPfI.

3.3.1 Project Noise Trigger Levels

The trigger levels for industrial noise from the proposal are summarised in **Table 14**. The Project Noise Trigger Levels (PNTL) are the most stringent of the intrusiveness and amenity trigger level for each period and are highlighted below.

Table 14 Operational Project Noise Trigger Levels

NCA/ Receiver Type	Period	Amenity Noise Level L_{Aeq} (dBA)	Measured Noise Level (dBA)		Project Noise Trigger Levels $L_{Aeq(15minute)}$ (dBA)	
			RBL[1]	L_{Aeq}	Intrusiveness	Amenity[2,3]
NCA01/ Residential	Day	60	55	59	60	**58**
	Evening	50	55	59	60	**48**
	Night	45	48	57	53	**45[4]**
NCA02/ Residential	Day	60	54	61	59	**58**
	Evening	50	51	59	56	**48**
	Night	45	45	58	50	**46[4]**
NCA03/ Residential	Day	55	42	52	**47**	53
	Evening	45	42[5] (43 actual)	51	47	**43**
	Night	40	39	49	44	**38**
Industrial	When in use	70	-	-	-	68
Commercial		65	-	-	-	63

Note 1: RBL = Rating Background Level.

Note 2: The project amenity noise levels have been converted to a 15-minute level by adding 3 dB, as outlined in the NPfI.

Note 3: The recommended amenity noise levels have been reduced by 5 dB, where appropriate, to give the project amenity noise levels.

Note 4: Project amenity level was set at 15 dB below the existing road traffic noise level, as outlined in the NPfI.

Note 5: RBL reduced to be no higher than the daytime RBL, as outlined in the NPfI.

3.3.2 Sleep Disturbance

The potential for sleep disturbance from maximum noise level events during the night-time period from the proposal is required to be considered.

The NPfI defines the sleep disturbance screening level as 52 dBA L_{AFmax} or the prevailing background level plus 15 dB, whichever is greater.

The sleep disturbance screening levels for the proposal are shown in **Table 15**.

Table 15 Sleep Disturbance Screening Levels

NCA/Receiver Type	Noise Level (dBA)	
	Measured Prevailing Night-time Background Level (RBL)	Sleep Disturbance Screening Level (L_{AFmax})
NCA01/Residential	48	63
NCA02/Residential	45	60
NCA03/Residential	39	54

A detailed maximum noise level event assessment should be completed where the sleep disturbance screening level is exceeded. The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the RBL, and the number of times this happens during the night-time period.

The NPfI refers to the *Road Noise Policy* (RNP) for additional information regarding sleep disturbance. enHealth Council studies are referenced which indicate that for short-term or transient noise events, for good sleep over eight hours the indoor L_{AFmax} sound pressure level should ideally not exceed around 45 dBA more than 10 or 15 times per night.

The RNP goes on to conclude that from the research on sleep disturbance to date:

- Maximum internal noise levels below 50 dBA to 55 dBA are unlikely to awaken people from sleep
- One or two events per night with maximum internal noise levels of 65-70 dBA are not likely to affect health and wellbeing significantly.

3.3.3 Corrections for Annoying Noise Characteristics

Sources of industrial noise can cause greater annoyance where they contain certain characteristics, such as tonality, intermittency or dominant low-frequency content. The NPfI specifies the following modifying factor corrections, shown in **Table 16**, which are to be applied where annoying characteristics are present.

Details of the modifying factor corrections applied in the assessment are provided in **Section 4.2.2**.

Table 16 NPfI Modifying Factors

Factor	Assessment/ Measurement	When to Apply	Correction[1]
Tonal noise	One-third octave or narrow band analysis	Level of one-third octave band exceeds the level of the adjacent bands on both sides by the levels defined in the NPfI.	5 dB[2]
Low-frequency noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements	Measure/assess source contribution C and A weighted Leq,t levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and the level to which the thresholds defined in the NPfI are exceeded.	2 or 5 dB[2]
Intermittent noise	Subjectively assessed but should be assisted with measurement to gauge the extent of change in noise level	The source noise heard at the receiver varies by more than 5 dB and the intermittent nature of the noise is clearly audible. The NPfI further defines intermittent noise as noise where the level suddenly drops/increases several times during the assessment period, with a noticeable change in source noise level of at least 5 dB, for example, equipment cycling on and off. The EPA has confirmed[4] that the intermittent correction does not apply to short-term events that emerge above the general industrial noise level and is therefore not applicable to industrial or commercial sites that have vehicle or plant movements at night, including audible reversing alarms. The intermittency correction is not intended to be applied to changes in noise level due to meteorology.	5 dB[3]

Factor	Assessment/ Measurement	When to Apply	Correction[1]
Maximum adjustment	Refer to individual modifying factors	Where two or more modifying factors are indicated.	Maximum correction of 10 dB[2] (excluding duration correction)

Note 1: Corrections to be added to the measured or predicted levels.

Note 2: Where a source emits tonal and low-frequency noise, only one 5 dB correction should be applied if the tone is in the low-frequency range, that is, at or below 160 Hz.

Note 3: Adjustment to be applied to night-time only.

Note 4: *How to Apply the Noise Policy for Industry Intermittent Modifying Factor Corrections*, NSW Environment Protection Authority, Acoustics Australia Vol. 50, No. 3, September 2022.

3.3.4 Residual Impacts

The NPfI defines residual noise impacts as exceedances of the Project Noise Trigger Levels which remain after all feasible and reasonable source and pathway mitigation measures have been considered.

The significance of residual noise impacts, as defined in the NPfI, is shown in **Table 17**. Examples of receiver-based treatments that can be used to mitigate residual impacts are shown in **Table 18.**

Table 17 NPfI Significance of Residual Noise Impacts

If the Predicted Noise Level minus the Project Noise Trigger Level is:	And the Total Cumulative Industrial Noise Levels is:	Then the Significance of the Residual Noise Level is:
≤ 2 dBA	Not applicable	Negligible
≥ 3 but ≤ 5 dBA	< recommended amenity noise level or > recommended amenity noise level, but the increase in total cumulative industrial noise level resulting from the development is less than or equal to 1dB	Marginal
≥ 3 but ≤ 5 dBA	> recommended amenity noise level and the increase in total cumulative industrial noise level resulting from the development is more than 1 dB	Moderate
> 5 dBA	≤ recommended amenity noise level	Moderate
	> recommended amenity noise level	Significant

Table 18 NPfI Examples of Receiver-based Treatments to Mitigate Residual Noise Impacts

Significance of Residual Noise Impact	Example of Potential Treatment
Negligible	The exceedances would not be discernible by the average listener and therefore would not warrant receiver-based treatments or controls.
Marginal	Provide mechanical ventilation/comfort condition systems to enable windows to be closed without compromising internal air quality/amenity.
Moderate	As for 'marginal', but also upgraded facade elements, such as windows, doors or roof insulation, to further increase the ability of the building facade to reduce noise levels.
Significant	May include suitable commercial agreements where considered feasible and reasonable.

3.4 Traffic on Surrounding Roads

The potential impacts from project related traffic on the surrounding public roads are assessed using the NSW EPA *Road Noise Policy* (RNP).

An initial screening test is first applied to evaluate if existing road traffic noise levels are expected to increase by more than 2.0 dB. Where this is considered likely, further assessment is required using the RNP criteria shown in **Table 19**.

Table 19 RNP/NCG Criteria for Assessing Traffic on Public Roads

Road Category	Type of Project/Land Use	Assessment Criteria (dBA)	
		Daytime (7 am – 10 pm)	Night-time (10 pm – 7 am)
Freeway/ arterial/ sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq(15hour)}$ 60 (external)	$L_{Aeq(9hour)}$ 55 (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq(1hour)}$ 55 (external)	$L_{Aeq(1hour)}$ 50 (external)

4.0 Assessment Methodology

4.1 Construction Noise and Vibration Assessment Methodology

A noise model of the study area has been used to predict noise levels from the proposed construction work to all surrounding receivers. The construction noise model uses the ISO 9613 algorithm in SoundPLAN software.

Local terrain, receiver buildings and structures were digitised in the noise model to develop a three-dimensional representation of the construction sites and surrounding areas.

4.1.1 Construction Activities

Representative scenarios have been developed to assess the likely impacts from the various construction phases of the proposal including the construction of the new road and the new left-in/left-out intersection. These scenarios are shown in **Table 20**.

The assessment uses 'realistic worst-case' scenarios to determine the impacts from the noisiest 15-minute period that are likely to occur for each work scenario, as required by the ICNG.

The sound power levels for the construction equipment used in each scenario is presented in **Appendix C**.

Table 20 Construction Scenarios and Equipment

Scenario	Works Activity	Equipment
W.01	Vegetation Clearing	Excavator - Tracked (30 tonne), Tractor (Towing Trailer), Tub Grinder, Chainsaw
W.02	Earthworks	Excavator - Tracked (30 tonne), Dozer - CAT D9, Scraper 651, Dump Truck, Grader, Compactor, Vibratory Rollers (18 tonne), Water Cart
W.03	Retaining walls	Front-End Loader (23 tonne), Excavator - Tracked (20 tonne), Bobcat (approx. 1 tonne), Dump Truck, Vibratory Rollers (18 tonne), Water Cart, Concrete Pump, Concrete Mixer Truck, Concrete Vibrator
W.04	Piling	Mobile Crane, Excavator - Tracked (30 tonne), Piling – Bored, Concrete Pump, Concrete Vibrator, Concrete Mixer Truck, Truck and Dog (30 tonne), Concrete Vibrator
W.05	Construction of Roads	Grader, Paving Machine, Vibratory Rollers (18 tonne), Truck and Dog (30 tonne), Light Vehicle - 4WD
W.06	Signage and Line marking	Line Marking Plant, Light Vehicle - 4WD
W.07	Construction of Pads and Hardstands	Concrete Pump, Concrete Mixer Truck, Concrete Vibrator, Truck and dog (30 tonne), Vibratory Rollers (18 tonne)
W.08	Construction of Structures	Elevated Working Platform, Truck and dog (30 tonne), Hand tools (electric), Mobile Crane

4.1.2 Hours of Construction

Construction activities for the proposal would only be undertaken during the following standard daytime construction hours:

- 7:00 am to 6:00 pm, Mondays to Fridays
- 7:00 am to 1:00 pm on Saturdays

- At no time on Sundays or Public Holidays.

4.2 Operational Noise Assessment Methodology

The potential operational noise levels from the proposal have been predicted to the surrounding receivers using the ISO 9613-2 algorithm in SoundPLAN V8.2, implemented in accordance with ISO 17534.

ISO 9613-2 is an industry standard algorithm that is considered suitable for use in the prediction of noise from industrial sources where intervening objects provide acoustic shielding, such as at the subject site and surrounding area.

The ISO 9613-2 algorithm predicts continuous A-weighted sound pressure levels under noise-enhancing meteorological conditions favourable to downwind propagation, or equivalently, propagation under a well-developed, moderate, ground-based temperature inversion, such as those commonly occurring on clear calm nights.

Downwind propagation conditions include wind from source to receiver, with wind speeds of around 1 to 5 m/s, measured at a height of 3 to 11 m above the ground. These propagation conditions are considered consistent with the noise-enhancing weather conditions specified in *Fact Sheet D: Accounting for noise-enhancing weather conditions* of the NPfI.

ISO 9613-2 has been used extensively on industrial projects in Australia over several decades and has been accepted previously by NSW Department of Planning and Environment (now DPHI) in numerous environmental noise assessments.

The noise model includes ground topography, ground type (ground absorption modelled at 0.75 in undeveloped areas, 0.5 in suburban areas and 0.0 in industrial areas), buildings and representative worst-case noise sources from the proposal.

The potential impacts have been determined by comparing the predicted worst-case noise levels to the NPfI PNTLs in a 15-minute assessment period.

Noise levels have been assessed at the identified sensitive receivers with reference to the requirements of ‘Section 2.6 – Assessment Locations’ of the NPfI. This includes assessment of impacts at all floors of identified multi-storey buildings.

At the time of this assessment, the Huntingwood Data Centre (SSD – 19729084), located at 6 Honeman Close has not yet been approved. Hence, the assessment covers operational noise impacts at the nearest noise-sensitive receivers both with and without the shielding effects provided by the proposed data centre building. Where included in the noise model, the layout and height of the proposed data centre buildings have been referenced from architectural drawings published on the NSW Planning Portal Website.

4.2.1 Operational Noise Sources

The proposal is in the early design stages and the future tenants are currently unknown. Several assumptions have been made regarding the future tenants and likely sources of noise. These assumptions have been used to develop representative worst-case noise modelling scenarios that reflect the expected highest noise emissions that the proposal would likely emit.

The proposal is a speculative development with no tenants committed. The facility has been designed to accommodate typical warehouse and distribution centre uses and is not temperature controlled.

The proposal comprises of two warehouse buildings with associated ancillary offices, heavy vehicle access and hardstands, and light vehicle access and carparking. Vehicles would access the site from the Great Western Highway. Heavy vehicle deliveries would park in the

hardstand loading areas or recessed loading docks while they are loaded/unloaded, before exiting the site. Light vehicle carparking is provided at each warehouse which would generally be used by staff.

Internal noise sources would generally be minimal and associated with typical logistical, distribution, warehousing and office space activities. There would be no use of manufacturing equipment within the warehouse.

Roof mounted mechanical plant would be provided for each warehouse and the ancillary offices. The proposal would operate 24 hours a day.

The main sources of operational noise at the proposal are expected to include:

- On-site light and heavy vehicle movements
- Loading dock activities in hardstands
- Mechanical plant
- Off-site vehicle movements.

The location of all modelled noise sources is shown in **Figure 3**.

Figure 3 Noise Source Locations

A summary of the expected noise sources and worst-case assessment scenarios associated with the operation of the proposal is provided below.

On-Site Traffic

On-site vehicles have been modelled using the data provided by the project's traffic consultant in **Table 21**. The volumes are representative of the expected worst-case 15-minute period for the daytime, evening and night-time. The volumes conservatively assume that light and heavy vehicles concurrently access both warehouse tenancies during the peak 15-minute assessment period. In reality, vehicle access to the warehouse would be unlikely to occur concurrently, particularly during the night-time.

Heavy vehicle deliveries to the warehouses would be via a range of freight vehicles including medium trucks (ie rigid trucks) and heavy trucks (ie semi-trailers and b-doubles). **Table 21** includes a breakdown of the number of heavy and medium trucks expected to access both warehouses of the proposal.

Table 21 Vehicle Traffic Data – Peak 15-Minute Period

Vehicle Type	Location	Sound Power Level (dBA)	Vehicle Speed (km/h)	Number of Vehicles in Worst-case 15-minute Period[1]		
				Daytime (7am to 6pm)	Evening (6pm to 10pm)	Night-time (10pm to 7am)
Warehouse 1						
Medium trucks	Access routes	97[2]	20	6	4	4
	Hardstands		10			
Heavy trucks	Access routes	108[3]	20	4	3	3
	Hardstands		10			
Light vehicles	Carparks and access	90[4]	20	29	19	8
Warehouse 2						
Medium trucks	Access routes	97[2]	20	3	2	2
	Hardstands		10			
Heavy trucks	Access routes	108[3]	20	2	2	2
	Hardstands		10			
Light vehicles	Carparks and access	90[4]	20	11	8	13

Note 1: Total vehicles, include both inbound and outbound vehicles. Volumes are rounded up to whole numbers for display purposes.

Note 2: Sound power level for medium trucks based on measurement data. Based on 95 dBA for trucks at slow speed for 80% of the time and 100 dBA for trucks accelerating for 20% of the time.

Note 3: Sound power level for 'heavy trucks' is based on 106 dBA for trucks at slow speed for 80% of the time and 111 dBA for trucks accelerating for 20% of the time and is representative of trucks with three or more axles. Sound power level is taken from the Federal Highway Administration's Traffic Noise Model and is representative of trucks with three or more axles.

Note 4: Sound power level for light vehicles based on measurement data.

Hardstands and Loading Docks

Details of the hardstand and loading dock noise sources are shown in **Table 22**. Gas forklift movements (ie outside of the warehouses) have been modelled in the at-grade dock areas of the hardstands at a rate of one forklift per heavy vehicle, operating continuously during any one 15-minute period.

The various sources have been modelled in the hardstands (see **Figure 3**) based on the heavy vehicle movements in the worst-case 15-minute period provided in **Table 22**.

Table 22 Typical Loading Dock Noise Sources

Noise Source	Sound Power Level (dBA)[1]	Typical Duration of Use in Peak 15-minute Period
Truck Reversing Alarm	107[2,3]	30 seconds
Forklift Reversing Alarm[4]	102[2,3]	90 seconds
Air brakes	118	1 second
Roller door	94	60 seconds
Gas Forklift[4]	93	900 seconds
Garbage compactor	94	900 seconds

Note 1: Sound power levels based on measurement data, where appropriate.

Note 2: Sound power level based on the recommendation to use broadband and/or ambient sensing reversing alarms, see **Section 6.0**.

Note 3: Sound power level includes a -3 dB reduction due to alarms being discrete events.

Note 4: Plant/equipment assumed to be within internal areas of loading docks.

Internal Activities

The future tenants of the warehouse would likely be associated with typical warehousing and distribution uses. Internal noise-generating activities at the warehouse are expected to generally be minimal. A sound power level of 75 dBA has been applied at openings in the facades of the warehouse to cover potential break-out noise from general internal activities, based on observations of loading activities at similar warehouse facilities. Warehouse roller shutter doors are assumed to be open during loading dock activities.

The facade and roof construction of the warehouse would be metal sheeting (Colourbond or similar). The proposed warehouse construction is expected to be sufficient to minimise noise breakout through the facade and roof to a level that results in negligible external noise emissions.

Mechanical Plant

At this early stage of the proposal, the specific mechanical plant requirements for each warehouse have not been determined. Reasonable assumptions have been made for air-conditioning equipment and ancillary fans that would serve each of the office buildings as well as the extraction fans would be required on each warehouse roof.

External mechanical plant has been modelled with indicative SWL data for equipment typical to a development of this size, as shown in **Table 23**. The locations of the sources are shown in **Figure 3**.

Table 23 Mechanical Plant

Warehouse	Details including Sound Power Level (SWL) (dBA per item)	Location and Operational Hours
Air Conditioning (Condensers)		
Warehouse 1	Main Office: Six condensers (78 dBA each) Dock Office: Two condensers (78 dBA each)	Roof of the Main Office and at ground level adjacent to Dock Office Assumed operational hours are 7 am to 6 pm.
Warehouse 2	Main Office: Four condensers (78 dBA) Dock Office: Two condensers (78 dBA)	

Warehouse	Details including Sound Power Level (SWL) (dBA per item)	Location and Operational Hours
Warehouse Roof Extraction Fans		
Warehouse 1	Twelve fans with a cumulative SWL of 90 dBA	Roof of both warehouses All fans assumed operational 24/7.
Warehouse 2	Six fans with a cumulative SWL of 90 dBA	
Ancillary Fans (Main and Dock Office Buildings)		
Main Office and Dock Office	One exhaust fan per office building (78 dBA)	Roof of the Main Offices and Dock Offices Assumed operational hours are 7 am to 6 pm.
	One supply fan per office building (78 dBA)	

4.2.2 Corrections for Annoying Noise Characteristics

The potential annoying noise characteristics and modifying factor corrections relevant to the proposal are:

- **Tonality** – the only source identified with potential tonal characteristics is reversing alarms. However, when considering broadband reversing alarms have been recommended as a noise mitigation measure (see **Section 7.2**), it is unlikely that this noise source would result in tonal noise impacts and no corrections have been applied.
- **Low frequency noise** – previous measurements of sources similar to those operating at the proposal indicate that no sources are expected to result in low frequency noise impacts.
- **Intermittent noise** – the NPfI defines intermittent noise as noise heard at the receiver where the level suddenly drops or increases several times during the assessment period, with a noticeable change of at least 5 dB, for example, where equipment cycles on and off. The intermittent correction does not apply to short-term events that emerge above the general industrial noise level and is therefore not applicable to industrial or commercial sites that have vehicle or plant movements at night, including audible reversing alarms. No sources have been identified with potential intermittent characteristics.

4.2.3 Noise Sources with Potential for Sleep Disturbance

As the project is proposed to operate 24-hours a day, noise emissions during the night-time require assessment for potential sleep disturbance at the nearest residential receivers. The details of typical activities/equipment with the potential to cause sleep disturbance are shown in **Table 24**.

Table 24 Sleep Disturbance Noise Events – L_{Amax} Sound Power Levels

Noise Source	Sound Power Level L_{Amax} (dBA)
Accelerating trucks on estate roads, on-lot truck access and hardstands	111
Truck airbrakes in hardstands (recessed and at-grade docks)	118
Truck reversing alarm in hardstands (recessed and at-grade docks)	110
Forklift reversing alarm in hardstands (at-grade docks)	105
Roller doors	94
Light vehicle movements on estate roads, carparks and light-vehicle access	100

4.2.4 Off-site Road Traffic

Traffic associated with the proposal would enter and exit from the Great Western Highway via the proposed left-in/left-out intersection. The potential noise impacts from development-related traffic on public roads are expected to be negligible, as The Great Western Highway is a major arterial road with high existing traffic volumes. Further details are provided in **Section 5.3.3**

4.2.5 Prevailing Weather Conditions

Fact Sheet D of the NPfI requires noise assessments to consider the potential effects of noise-enhancing weather conditions, such as wind from the source to the receiver and/or temperature inversions.

Analysis of the prevailing weather conditions has been undertaken in accordance with the NPfI for a 10-year period from 2013 to 2022 to determine the prevailing wind and temperature inversion conditions at the site. Wind data was obtained from the Bureau of Meteorology automatic weather station at Horsley Park, and cloud cover data (to determine the occurrence of temperature inversions) from the Bureau of Meteorology automatic weather station at Bankstown Airport.

The weather data was analysed to determine the frequency of occurrence of wind speeds up to 3 m/s in each period. The NPfI states that where wind blows from the source to the receiver at speeds of up to 3 m/s for more than 30% of the daytime, evening or night-time in any season, then wind is considered to be a feature of the area. The results of the wind analysis are presented for the daytime, evening and night-time periods in **Table 25**, **Table 26**, and **Table 27** respectively. Periods where noise-enhancing wind was found to be present for more than 30% of the time are shown in **bold**.

Table 25 Occurrence of Noise-Enhancing Winds for Daytime Period

Season	Percentage of Occurrence of Noise-Enhancing Winds (0.5-3 m/s) (Winds Blowing From)							
	North	Northeast	East	Southeast	South	Southwest	West	Northwest
Summer	7.4%	19.0%	12.5%	13.4%	14.0%	10.6%	7.2%	10.2%
Autumn	5.6%	13.3%	8.7%	10.3%	14.1%	19.0%	17.7%	16.4%
Winter	6.2%	7.4%	3.8%	5.8%	9.2%	18.5%	23.1%	23.4%
Spring	7.4%	14.6%	8.7%	7.7%	8.5%	10.8%	12.2%	16.5%

Note 1: Noise-enhancing winds (0.5-3 m/s) were calculated per direction ±45 degrees during the daytime (7 am to 6 pm) for each season.

Table 26 Occurrence of Noise-Enhancing Winds for Evening Period

Season	Percentage of Occurrence of Noise-Enhancing Winds (0.5-3 m/s) (Winds Blowing From)							
	North	Northeast	East	Southeast	South	Southwest	West	Northwest
Summer	1.6%	13.3%	20.6%	16.4%	9.6%	3.6%	2.1%	2.4%
Autumn	1.9%	13.3%	19.6%	22.3%	22.2%	16.8%	10.5%	6.8%
Winter	4.0%	6.2%	8.8%	14.3%	20.6%	25.1%	21.4%	16.8%
Spring	2.5%	14.9%	20.2%	16.8%	11.4%	7.3%	7.5%	6.7%

Note 1: Noise-enhancing winds (0.5-3 m/s) were calculated per direction ±45 degrees during the daytime (6 pm to 10 pm) for each season.

Table 27 Occurrence of Noise-Enhancing Winds for Night-time Period

Season	Percentage of Occurrence of Noise-Enhancing Winds (0.5-3 m/s) (Winds Blowing From)							
	North	Northeast	East	Southeast	South	Southwest	West	Northwest
Summer	2.5%	11.0%	13.6%	19.6%	28.4%	22.8%	9.0%	4.1%
Autumn	1.3%	2.8%	2.5%	6.1%	21.2%	**35.7%**	24.0%	9.9%
Winter	3.9%	1.9%	0.3%	1.2%	10.0%	**33.0%**	**33.0%**	20.5%
Spring	3.8%	6.9%	7.0%	10.3%	20.7%	26.1%	17.2%	10.5%

Note 1: Noise-enhancing winds (0.5-3 m/s) were calculated per direction ±45 degrees during the daytime (10 pm to 7 am) for each season.

The analysis determined that standard weather conditions are prevalent in the study area during the daytime, evening and night-time periods, with noise-enhancing wind only during the night-time period.

The weather data was also analysed to estimate the frequency of occurrence of temperature inversions during the night-time in winter. This analysis used the Pasquill-Gifford stability classification scheme based on cloud cover as detailed in Fact Sheet D of the NPfI. The NPfI states that where the total of F and G category inversions occur for at least 30% of the total night-time during the winter, then temperature inversions are considered to be a feature of the area. The results of the stability class analysis are presented in **Table 28**.

Table 28 Occurrence of Stability Classification Distribution during the Night-time Period in Winter

Stability Class	Category Description	Frequency of Occurrence During Night-time in Winter
D	Neutral	3%
E	Slightly stable	10%
F	Moderately stable	17%
G	Extremely stable	31%
Sum Total: F+G	**Moderately to Extremely Stable**	**48%**

Note 1: Stability classes A (extremely unstable), B (moderately unstable) and C (slightly unstable) have not been shown as they are not relevant to the analysis of temperature inversions.

The above analysis shows that noise-enhancing temperature inversions are a feature of the area during the night-time in winter. Temperature inversions can occur under calm wind conditions (up to 0.5 m/s), and also under winds up to 2 m/s.

The noise prediction modelling uses ISO 9613-2 algorithms which include noise-enhancing weather conditions including downwind propagation, or equivalently, propagation under a well-developed moderate ground-based temperature inversion.

As such, the assessment has conservatively applied noise-enhancing weather conditions for all periods as per Option 1 of Fact Sheet D of the NPfI.

5.0 Noise and Vibration Assessment

5.1 Construction Noise

The predicted noise levels for the assessed construction scenarios are shown in **Table 30** which represents construction noise levels with generic mitigation measures (eg. portable noise barriers) applied to the noisiest equipment.

The predictions are representative of the highest noise levels that could potentially be experienced at the surrounding receivers when the works are at the closest point. For most construction activities, it is expected that the construction noise levels would frequently be lower than those predicted, as the noise levels presented are based on all items of equipment in each scenario being used concurrently in the various work areas.

The assessment shows the predicted impacts based on the exceedance of the NMLs, as per the categories in **Table 29**.

The assessment uses ‘realistic worst-case’ scenarios to determine the impacts from the noisiest 15-minute period that are likely to occur for each work scenario, as required by the ICNG.

Table 29 Exceedance Bands and Impact Colouring

Exceedance of NML	Subjective Classification[2]	Impact Colouring
No exceedance	Negligible	
1 to 10 dB	Low impact	
11 dB to 20 dB	Moderate impact	
21 dB to 30 dB	High impact	
Highly Noise Affected[1]	Highly Noise Affected	

Note 1: Greater than 75 dBA at residential receivers

Note 2: The subjective response would vary and depends on the period in which the impacts occur (ie people are generally more sensitive to impacts during the evening and night-time).

Table 30 Predicted Construction Noise Levels

NCA/ Receiver Type	NML (dBA)	Predicted $L_{Aeq(15minute)}$ Construction Noise Impact (dBA)[1]							
		W.01 Vegetation Clearing	W.02 Earthworks	W.03 Retaining walls	W.04 Piling	W.05 Construction of Roads	W.06 Signage and Line marking	W.07 Construction of Pads and Hardstands	W.08 Construction of Structures
NCA01/ Residential	65	46	47	46	45	44	35	41	42
NCA02/ Residential	64	59	61	58	58	62	53	54	55
NCA03/ Residential	52	56	59	55	54	58	49	50	51
Industrial	75	71	69	68	66	72	63	63	63
Commercial	70	79	80	67	63	77	68	63	60

The predicted construction noise levels above show the following:

- Noise levels during construction are expected to comply with the NMLs at the residential receivers in NCA01 and NCA02.
- Low impacts (i.e. exceedances of up to 10 dB) are predicted at the nearest residential receivers in NCA03 during work scenarios W.01 through to W.05 and at the nearest commercial receiver, TfNSW Driver Aid Services, during work scenarios W.01, W.02 and W.05.
- No moderate or high impacts (i.e. exceedances greater than 10 dB) are predicted at any receiver and no residential receivers are predicted to be highly noise affected (ie >75 dBA) during any of the construction work.
- It is noted that all work is expected to be completed during standard daytime construction hours.

The presented impacts would only be expected to occur when noisy work is being completed close to the most affected receivers. When work is in other areas of the site, or when less noise-intensive equipment is being used, the noise levels and impacts are expected to reduce accordingly.

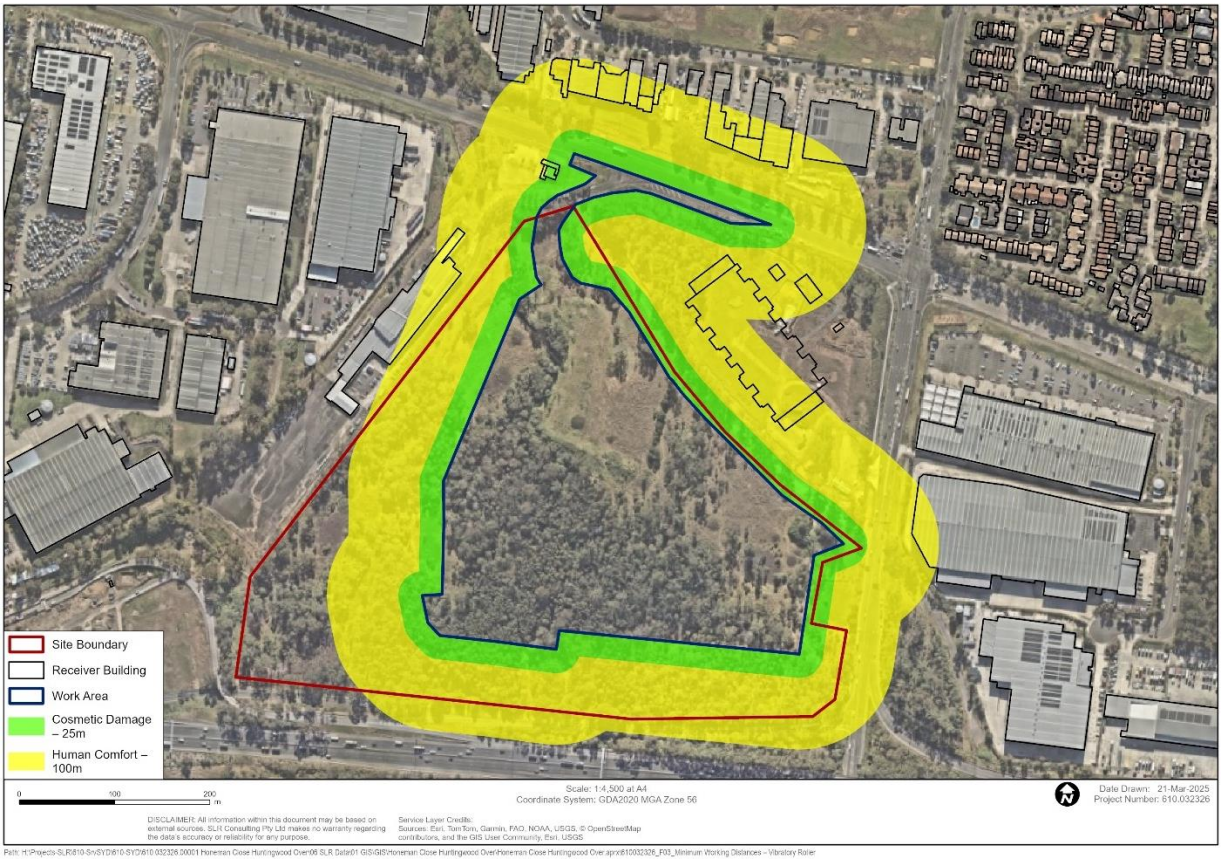
Feasible and reasonable construction noise mitigation measures should be applied where exceedances of the NMLs are predicted. Construction noise mitigation and management measures are discussed in **Section 7.1**.

5.2 Construction Vibration

The major potential sources of vibration from the proposed construction activities would likely be during W.02 – Earthworks, W.03 – Retaining Walls, W.05 – Construction of Roads and W.07 – Construction of Pads and Hardstands when Vibratory Rollers (18 tonne) are in use.

Vibration offset distances have been determined from the CNVG-R minimum working distances for cosmetic damage and human comfort (see **Table 11**) and the assessment is summarised in **Figure 4**.

Figure 4 Construction Vibration Minimum Working Distances – Vibratory Roller (18 tonne)



5.2.1 Cosmetic Damage Assessment

The above figure shows that the nearest commercial receiver, TfNSW Driver Aid Services, is likely to be within the cosmetic damage minimum working distance when vibratory rollers (18 tonne) are in use at the northern boundary of the project site. All other residential, industrial and commercial buildings surrounding the project site are sufficiently distant to be outside the minimum working distance and cosmetic damage impacts at these receivers are unlikely.

Offset distances from specific vibration intensive plant to the nearest receivers should be confirmed before commencing vibration intensive work during construction. Feasible and reasonable construction vibration mitigation measures should be applied where vibration intensive work is required within the minimum working distances (eg smaller, less vibration intensive equipment).

5.2.2 Human Comfort Vibration Assessment

The above figure shows that the nearest industrial and commercial buildings are likely to be within the human comfort minimum working distance when vibratory rollers (18 tonne) are in use to the western, northern and eastern boundaries of the project site. The occupants of these buildings may be able to perceive vibration impacts at times when vibratory rollers (18 tonne) are in use nearby. Where impacts are perceptible, they would likely only be apparent for relatively short durations when vibration-intensive equipment is in use.

All other residential and industrial buildings surrounding the project site are sufficiently distant to be outside the minimum working distance and human comfort impacts at these receivers are unlikely.

Feasible and reasonable construction vibration mitigation measures should be applied where vibration-intensive works are required within the minimum working distances. Construction vibration mitigation and management measures are discussed in **Section 7.1**.

5.2.3 Heritage Structures

The heritage item, Honeman Close, is a decommissioned road that lies along the north-eastern boundary of the site and is constructed at-grade. Its presence is unlikely to impose constraints on the proposed works in terms of vibration emissions of the proposed equipment.

5.2.4 Buried Pipework and Utilities

Sub-surface investigations by LTS Surveyors (drawing ref: 52290 001DT dated 12 July 2024) indicate the following assets are buried in the vicinity of the construction work areas:

- Sydney Water owned water supply pipelines
- Sydney Water owned sewer line
- Optical fibre lines (multiple owners)

The proposed construction work will be undertaken in accordance with the asset owner's guidelines to ensure there are no adverse vibration impacts to the utilities.

At this stage specific details relating to the construction works are unknown and an assessment of vibration impacts on these assts would need to be conducted when preparing the Construction Noise and Vibration Management Plan (CNVMP).

5.3 Operational Noise

5.3.1 Predicted Operational Noise Levels

A summary of the operational noise impacts at the noise-sensitive receivers surrounding the proposal with and without the proposed data centre buildings at 6 Honeman Close is shown in **Table 31**. Noise levels have been predicted to all floors of each receiver, with the worst-case predictions in each NCA presented.

Noise contour maps are shown in **Appendix D**. The predicted levels are compared to the PNTLs to determine the potential impact of the proposal.

Table 31 Operational Noise Assessment

NCA/ Receiver Type	Project Noise Trigger Level (PNTL) $L_{Aeq(15minute)}$ dBA			Predicted Noise Level $L_{Aeq(15minute)}$ dBA			Compliant
	Day	Evening	Night	Day	Evening	Night	
With Data Centre							
NCA01/ Residential	58	48	45	35	34	34	Yes
NCA02/ Residential	58	48	46	42	41	41	Yes
NCA03/ Residential	47	43	38	37	36	35	Yes
Industrial	68 (When in use)			55			Yes
Commercial	63 (When in use)			57			Yes
Without Data Centre							
NCA01/ Residential	58	48	45	35	34	34	Yes
NCA02/ Residential	58	48	46	46	45	44	Yes
NCA03/ Residential	47	43	38	40	39	38	Yes
Industrial	68 (When in use)			55			Yes
Commercial	63 (When in use)			57			Yes

The above assessment indicates the following:

- Noise from the operation of the proposal is predicted to comply with the PNTLs at all receivers both with and without the shielding provided by the data centre buildings.
- The predicted noise levels in NCA02 and NCA03 are up 4 dB lower with the inclusion of the data centre buildings as they would provide additional shielding to the receivers in these areas.

Further discussion regarding the feasible and reasonable mitigation that can be applied to the proposal is provided in **Section 7.2**.

5.3.2 Sleep Disturbance

The predicted night-time maximum noise levels at the nearest residential receivers with and without the proposed data centre buildings at 6 Honeman Close are shown in **Table 32**.

Table 32 Sleep Disturbance Assessment

NCA/ Receiver Type	Source	Sleep Disturbance Screening Level	Predicted L_{Amax} (dBA)		Below Screening Level
			With Data Centre	Without Data Centre	
NCA01/ Residential	Accelerating trucks	63	41	41	Yes
	Truck airbrakes		48	48	Yes
	Truck reversing alarms		40	40	Yes
	Forklift reversing alarms		35	35	Yes
	Roller doors		24	24	Yes
	Light vehicle movements		37	37	Yes
NCA02/ Residential	Accelerating trucks	60	51	52	Yes
	Truck airbrakes		56	56	Yes
	Truck reversing alarms		48	48	Yes
	Forklift reversing alarms		40	40	Yes
	Roller doors		32	32	Yes
	Light vehicle movements		51	54	Yes
NCA03/ Residential	Accelerating trucks	54	49	49	Yes
	Truck airbrakes		47	50	Yes
	Truck reversing alarms		39	42	Yes
	Forklift reversing alarms		32	33	Yes
	Roller doors		25	26	Yes
	Light vehicle movements		43	46	Yes

The above assessment indicates the following:

- Noise from the operation of the proposal is predicted to comply with the sleep disturbance screening level at all residential receivers both with and without the shielding provided by the data centre buildings.
- The predicted noise levels in NCA02 and NCA03 are up 4 dB lower with the inclusion of the data centre buildings as they would provide additional shielding to the receivers in these areas.

5.3.3 Operational Traffic Noise

Vehicles accessing the proposal site would travel on a new road that connects to the Great Western Highway via a proposed left-in/left-out intersection. As a result, all development-related traffic on the Great Western Highway would be directed westward.

The Great Western Highway is a major arterial road with high traffic volumes. According to records from a permanent TfNSW traffic counter near the intersection of the Great Western Highway and Reservoir Road (ID:7168), the four-year average westbound daily traffic count from 2020 to 2024 is 9,108 vehicles per day, 10% of which are heavy vehicles. Based on this data, the total existing bi-directional traffic volume is expected to be higher.

Data provided by the project's traffic consultant indicates that the expected daily traffic from the proposal is 1,433 vehicles, with 19% being heavy vehicles. In comparison to the westbound traffic data from the permanent counter, this represents a 16% increase in total daily traffic and a 28% increase in daily heavy vehicles travelling west on the Great Western Highway. Relative to the total existing traffic on this road, the increase in traffic due to the proposal is expected to be minimal. Consequently, the potential change in noise levels from development-related traffic on the Great Western Highway is expected to be below 2.0 dB.

At the time of this assessment, long-term bi-directional traffic survey data for the surrounding road network was unavailable. A more detailed noise impact assessment for development-related traffic on public roads will need to be conducted during the detailed design stage, once this data becomes available.

6.0 Cumulative Impacts

The NSW Government *Cumulative Impact Assessment Guidelines for State Significant Projects* requires that the potential combined effect of cumulative impacts on all nearby industrial developments to be considered when assessing potential noise impacts from state significant projects.

Cumulative impacts can be caused by the compounding effects of multiple projects in an area, and by the accumulation of effects from past, current and future activities as they arise.

6.1 Construction Noise

Cumulative construction noise impacts can occur where multiple work activities are being completed near to a particular receiver at the same time.

The construction work associated with the proposal has the possibility of interacting with the construction activities of the proposed Huntingwood Data Centre.

Should other projects be approved in the area there is potential for cumulative construction impacts if they are constructed at the same time as the proposal, however this would be addressed in their respective Construction Noise and Vibration Management Plans.

Since construction scenarios and equipment for projects in the area would generally require similar items of equipment to the proposal, concurrent construction work could theoretically increase the worst-case noise levels in this report by around 3 dB (ie a logarithmic adding of two sources of noise at the same level). The likelihood of worst-case noise levels at any individual receiver being generated by works on different projects at the same time is, however, considered low.

As such, cumulative construction impacts are not likely to significantly alter the predictions in this report and no specific mitigation is expected to be required.

The potential cumulative impacts from the proposal and other projects would continue to be considered as the project progresses when detailed construction planning is developed.

6.2 Operational Noise

The *Noise Policy for Industry* states that it aims to limit continuing increases in cumulative industrial noise through the application of amenity noise levels, which are applicable to all industrial noise sources in an area.

The policy accounts for potential cumulative impacts by lowering the criteria for each individual development to ensure that the ambient noise level within an area from all industrial noise sources combined remains below the recommended amenity noise levels, where feasible and reasonable. As such (as discussed in **Section 3.3.1**), the potential cumulative impacts from the proposal and other potential sources of industrial noise in the area are accounted for in the proposal-specific PNTLs and, therefore, do not require further consideration.

7.0 Mitigation and Management Measures

7.1 Construction Impacts

The impacts during the construction of the project are predicted to be typical of major construction works near sensitive receivers. No works outside of standard construction hours are currently proposed.

The use of standard mitigation measures to minimise the impacts is considered sufficient to control the majority of the impacts. Examples of measures that could be applied to the work are provided in the Transport for NSW *Construction Noise and Vibration Guideline* (see **Appendix E**).

A Construction Noise and Vibration Management Plan (CNVMP) would be prepared before any work begins. This would identify all potentially impacted receivers, assess the potential noise and vibration impacts from the proposal and provide details regarding how the impacts would be minimised through the use of all feasible and reasonable mitigation measures. The CNVMP would also contain procedures for handling complaints, should they occur, and detail any compliance monitoring requirements.

7.2 Operational Noise Impacts

While the predicted noise levels from the proposal comply with the PNTLs, a review of potential mitigation measures is provided below to ensure best management practice is adopted during the operation of the proposal to minimise noise emissions.

The typical hierarchy for mitigation and management of industrial noise sources is as follows:

- Reducing noise emissions at the source (ie noise source control)
- Reducing noise in transmission to the receiver (ie noise path control)
- Reducing noise at the receiver (ie at-receiver control).

A detailed assessment of all potential feasible and reasonable mitigation measures that could be applied to the proposal to minimise the impacts is summarised in **Table 33**.

It is noted that several assumptions have been made regarding the likely future sources of noise. The noise predictions in this report should be regarded as indicative for planning

purposes and are required to be confirmed at a later stage when detailed information is available.

Table 33 Operational Noise Mitigation Options

Ref.	Mitigation Option	Noise Impact/Benefit	Feasible and Reasonable to Apply
Source Control			
S1	Optimised site layout to minimise noise emissions from the site	Where possible, the site layout has been designed so that the warehouse building screens the noisier areas of the development (ie hardstands and truck routes) from the nearest receivers.	Yes - The loading areas and access route to Warehouse 1 are shielded by the buildings associated with the project. While these areas are not shielded for Warehouse 2, noise emissions from the proposal are predicted comply with the PNTLs, therefore the current layout is considered appropriate.
S2	Limit vehicle movements	A reduction in concurrent vehicle movements across the site by staggering delivery/pickup times and/or employee shift change times could reduce noise emissions. In practice, this would occur naturally across the estate due to operational requirements of the different tenants.	No – vehicle volumes used in this assessment are likely needed to meet tenant's requirements. Placing restrictions on allowable vehicle movements for the two tenancies is unlikely to be feasible and reasonable.
S3	Hardstand/external equipment use	Minimising the concurrent use of forklifts or other mobile plant outside the warehouse and/or limiting their use to the less sensitive day and evening periods. In practice, this would occur naturally across the estate due to operational requirements of the different tenants.	No – placing restrictions on allowable external use of forklifts and equipment for the two tenancies is unlikely to be feasible and reasonable.
S4	Quieter mobile plant and equipment	Use of quieter mobile plant and equipment options, such as electric forklifts instead of gas forklifts.	Yes – Where feasible and reasonable, quieter mobile plant and equipment options would be considered during detailed design. However, based on assumed equipment, noise emissions from the proposal are predicted comply with the PNTLs.
S5	Use broadband and/or ambient sensing alarms on trucks and forklifts where they are required to reverse during the night-time.	Reduce potential for annoying noise emissions during the night-time from forklifts and trucks.	Yes – encourage use of broadband and/or ambient sensing alarms on heavy vehicles and forklifts where they are required to reverse during the night-time.
S6	Appropriate specification and location of mechanical plant during detailed design.	If noise impacts from mechanical plant are identified during detailed design, quieter plant could be selected, or the plant could be relocated to a location screened from view of the nearest receivers, where appropriate.	Yes – the indicative mechanical plant units have been selected to minimise noise impacts from these sources. The noise impacts from all items of mechanical plant would be reviewed during detailed design stage to confirm unit selections and any mitigation requirements.

Ref.	Mitigation Option	Noise Impact/Benefit	Feasible and Reasonable to Apply
S7	Appropriate design of warehouses during detailed design.	Appropriate warehouse materials to minimise noise break-out from internal activities would be selected during detailed design. Where it is identified that noisier equipment is required to be used within the warehouse buildings than currently assumed (eg manufacturing equipment instead of standard warehousing and distribution equipment), facade and roof construction can use materials that provide a greater acoustic benefit.	Potentially – noise impacts from internal equipment would be investigated further during construction certificate stages if a potential tenant requires manufacturing plant or other noisy equipment.
S8	Roller doors kept closed when loading/unloading is not occurring to minimise noise breakout.	Use of roller doors to minimise internal noise breakout.	Yes – roller doors should be kept closed when not in use for loading/unloading trucks.
S9	Appropriate design of site layout to minimise the need for trucks to stop or brake outside of loading docks with line of sight to residential receivers.	Minimise noise emissions, particularly from truck airbrakes.	Noise emissions from the proposal are predicted comply with the PNTLs. Hence the current layout is considered appropriate.
S10	Production of an Operational Noise Management Plan.	This would detail the measures that could be used by the various tenants to minimise general noise emissions from the site. Reference can be made to the Best Management Practice (BMP) and Best Available Technology Economically Available (BATEA) measures listed in the NPfI (see **Appendix F)**.	Yes – An Operational Environmental Management Plan will be prepared which will detail any requirements to minimise noise emissions from the site.
Path Control			
P1	Noise barriers	Noise barriers could be used to reduce noise levels where plant or equipment are in line of sight of the nearest receivers.	Noise emissions from the proposal are predicted comply with the PNTLs without the inclusion of noise barriers.
Receiver Control			
R1	At-property treatments	n/a	n/a

8.0 Conclusion

SLR has been engaged to assess the potential construction and operational noise emissions from the proposed Honeman Close Warehouse Facility at Honeman Close, Huntingwood. The potential impacts from the proposal have been assessed against the relevant NSW policy / guidelines.

Construction noise levels generally comply with the noise management levels. Some exceedances are predicted at the nearest receivers during some works, however, this would only be expected to occur when noisy work is being completed close to the site boundary nearest to these receivers. Construction activities for the proposal would only be undertaken during standard daytime construction hours.

Vibration-intensive equipment has the potential to result in cosmetic damage and human comfort impacts when operated within the minimum working distances of the nearest receivers. Offset distances from specific vibration-intensive plant to the nearest receivers should be confirmed before commencing vibration-intensive works during construction.

Standard mitigation and management measures have been recommended to address the potential construction impacts. A Construction Noise and Vibration Management Plan (CNVMP) should also prepared before any work begins.

Operational noise levels are predicted to comply with the relevant noise goals at all nearby sensitive receivers. Potential mitigation measures have been evaluated to ensure best management practice is adopted during the operation of the proposal to minimise noise emissions. Based on the predicted levels and indicative mitigation measures, the proposal is considered appropriate from an acoustic standpoint.

Appendix A Acoustic Terminology

Honeman Close Warehouse Facility - SSD-79500208

Noise and Vibration Impact Assessment

Goodman Property Services (Aust) Pty Limited

SLR Project No.: 610.032326.00002

3 June 2025

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 2×10^{-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

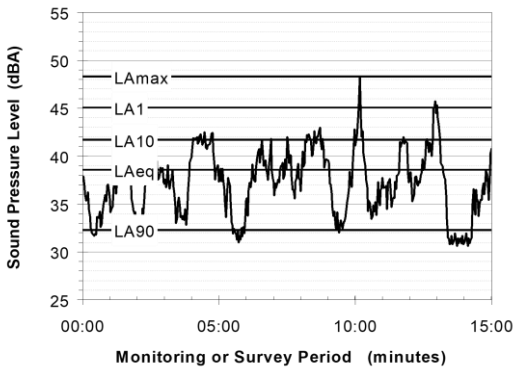
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 10^{-12} W.

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

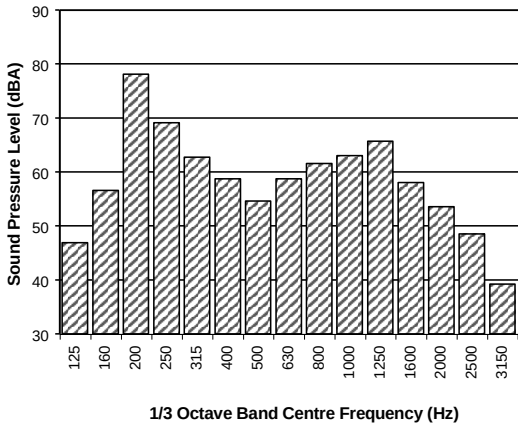
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal.

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

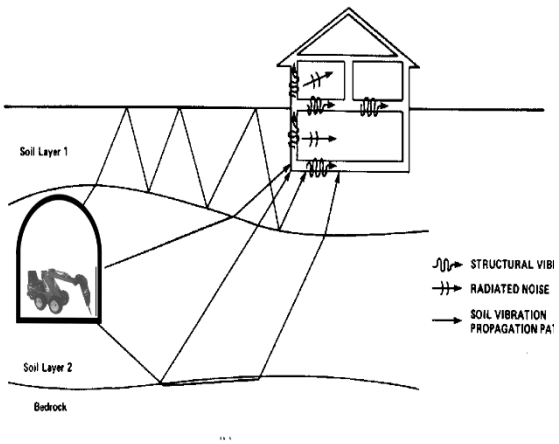
People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience 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 Summary

Honeman Close Warehouse Facility - SSD-79500208

Noise and Vibration Impact Assessment

Goodman Property Services (Aust) Pty Limited

SLR Project No.: 610.032326.00002

3 June 2025

Noise Monitoring Location	L01
Noise Monitoring Address	**10 Yallock Place, Prospect**

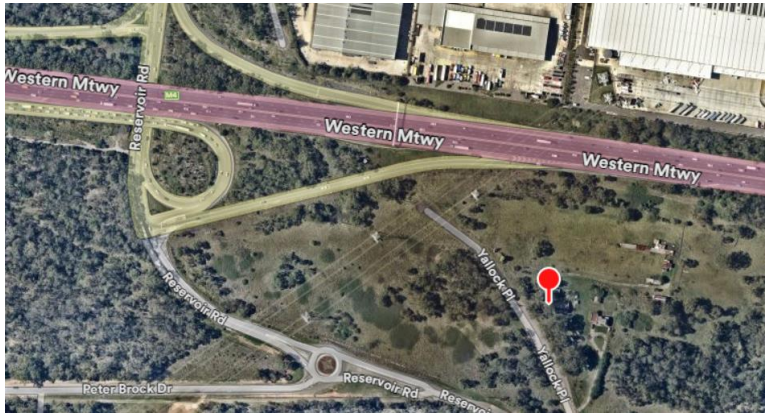
Logger Device Type: Brüel and Kjær 2250L, Logger Serial No: 3004636
Sound Level Meter Device Type: Brüel and Kjær 2250L, Sound Level Meter Serial No: 3005904

Ambient noise logger deployed at residential address 10 Yallock Pl, Prospect. Logger located with view of the M4 Western Motorway to the north and Reservoir Road to the south.

Attended noise measurements indicate the ambient noise environment at this location is dominated by road traffic noise from the M4 Western Motorway to the north. Road traffic noise from Reservoir Rd to the south and industrial operations to the north also contributes to the L_{Aeq} at this location.

Recorded Noise Levels (L_{Amax}):
04/05/2022: Light-vehicle traffic on Western Motorway: 55-61 dBA, heavy-vehicle traffic Western Motorway: 60-67 dBA, traffic on Reservoir Rd: 58-62 dBA, industry: 58-65 dBA

Map of Noise Monitoring Location



Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	L_{Aeq}	L_{A10}	L_{A1}
Daytime	55	59	60	63
Evening	55	59	60	62
Night-time	48	57	58	60

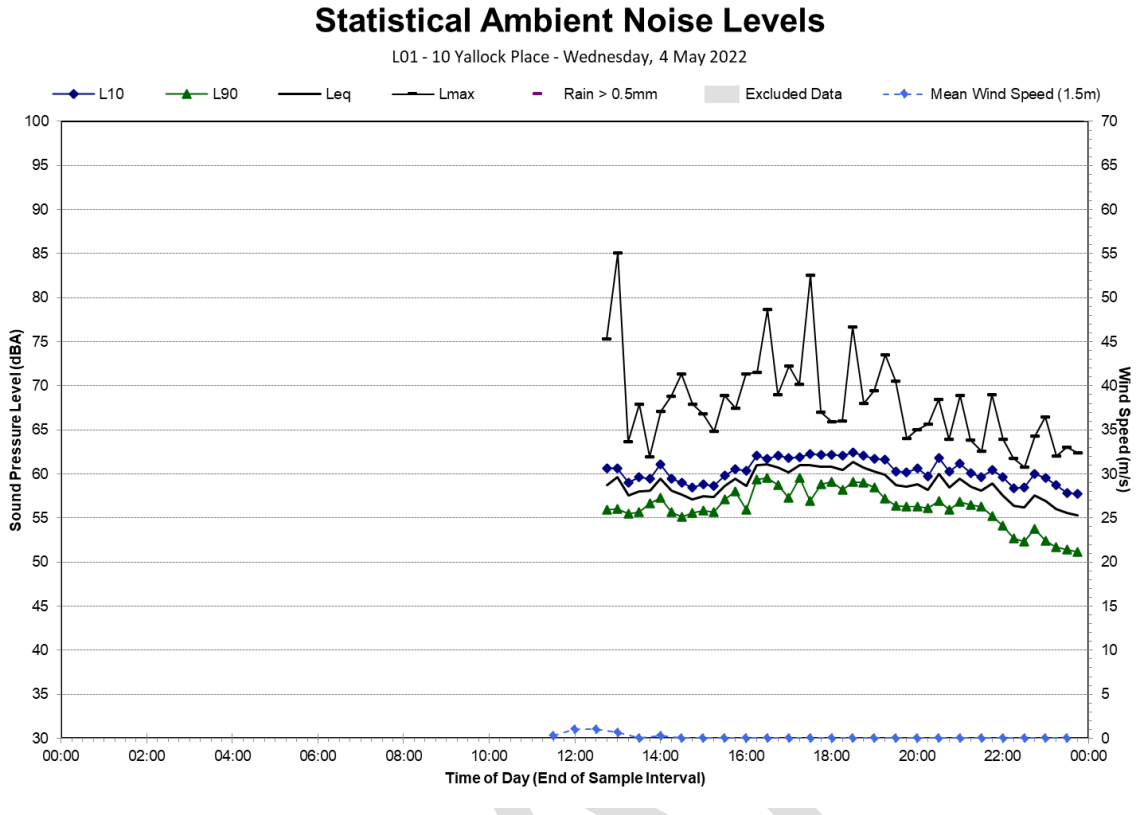
Ambient Noise Logging Results – RNP Defined Time Periods

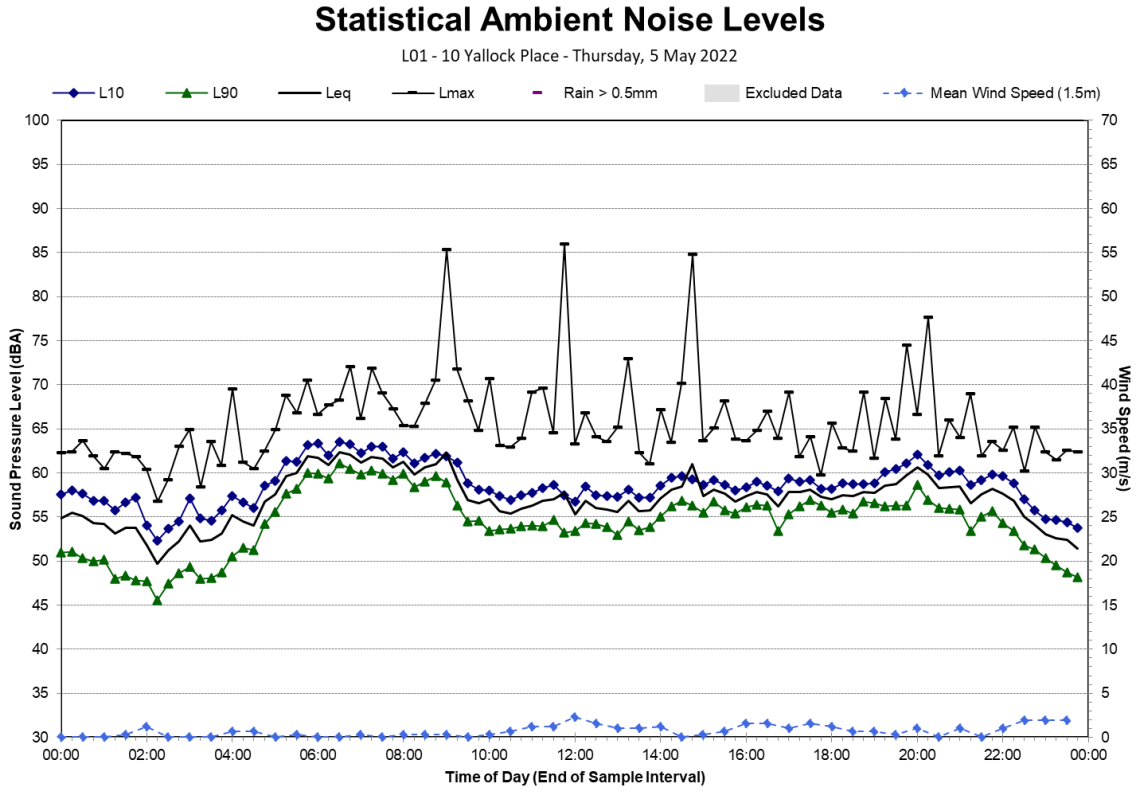
Monitoring Period	Noise Level (dBA)	
	$L_{Aeq(period)}$	$L_{Aeq(1hour)}$
Daytime (7am-10pm)	59	60
Night-time (10pm-7am)	57	60

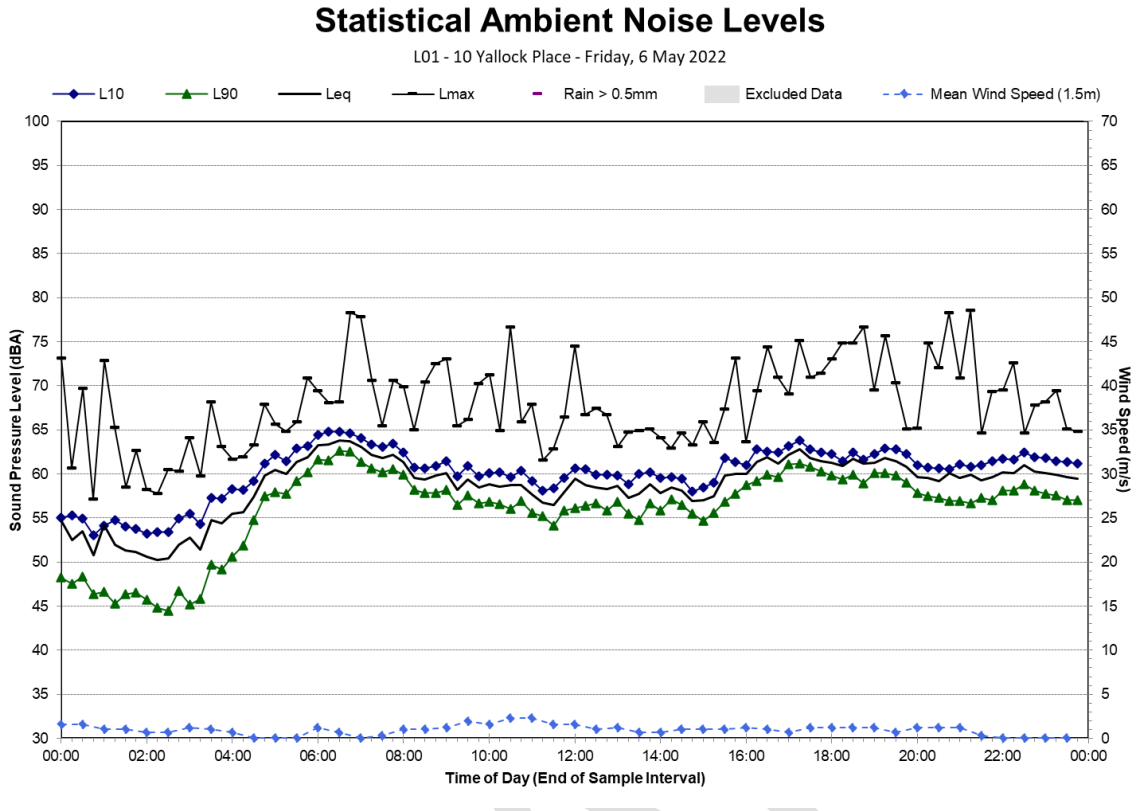
Attended Noise Measurement Results

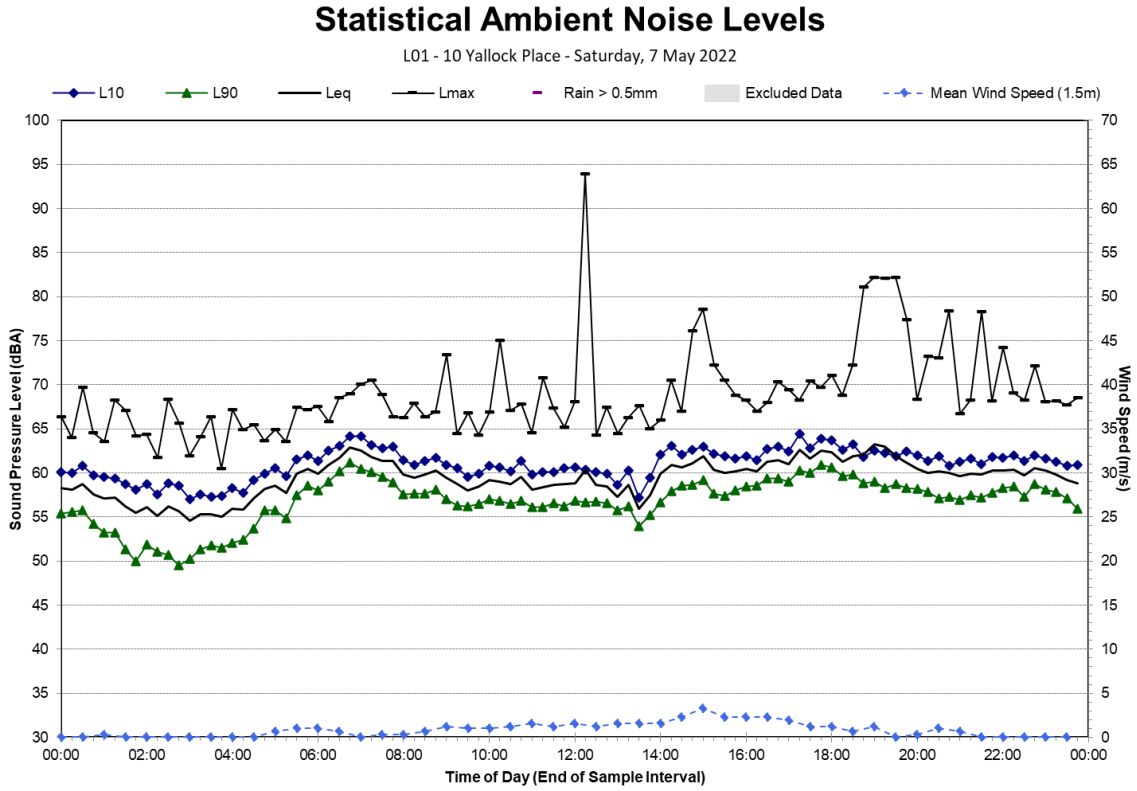
Date	Start Time	Measured Noise Level (dBA)		
		L_{A90}	L_{Aeq}	L_{Amax}
19/05/2022	12:31	57	60	66

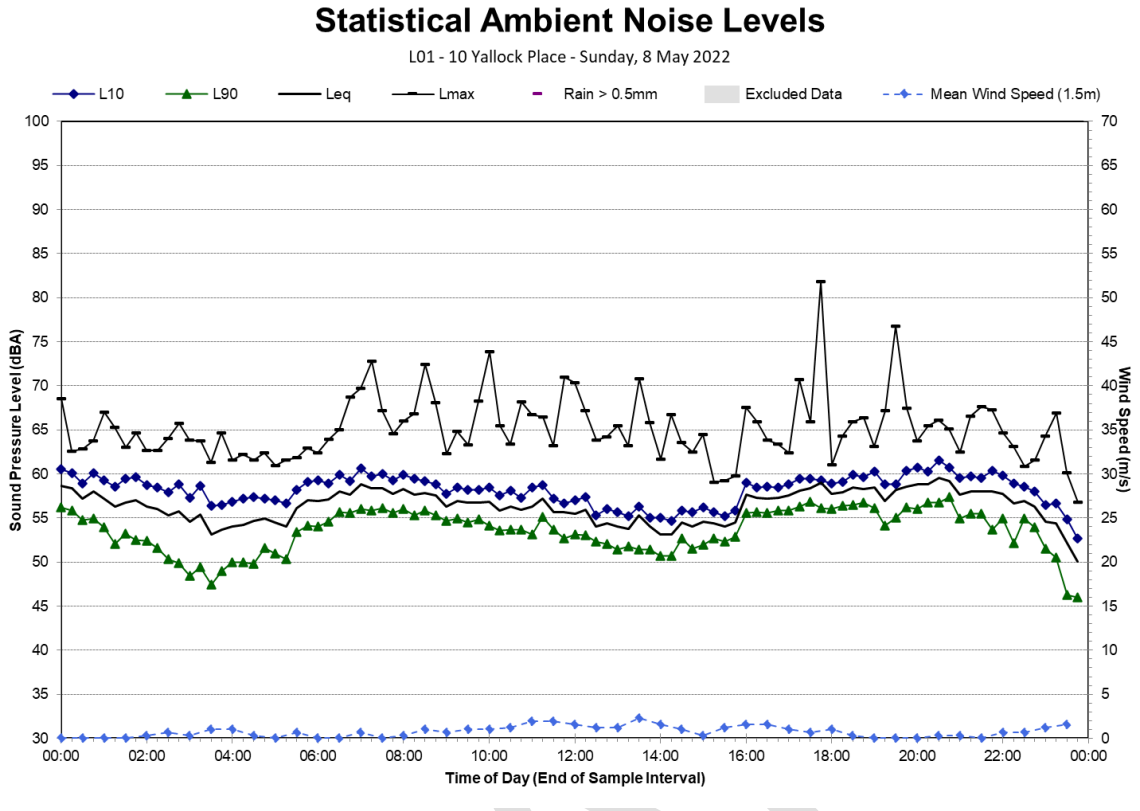
Photo of Noise Monitoring Location

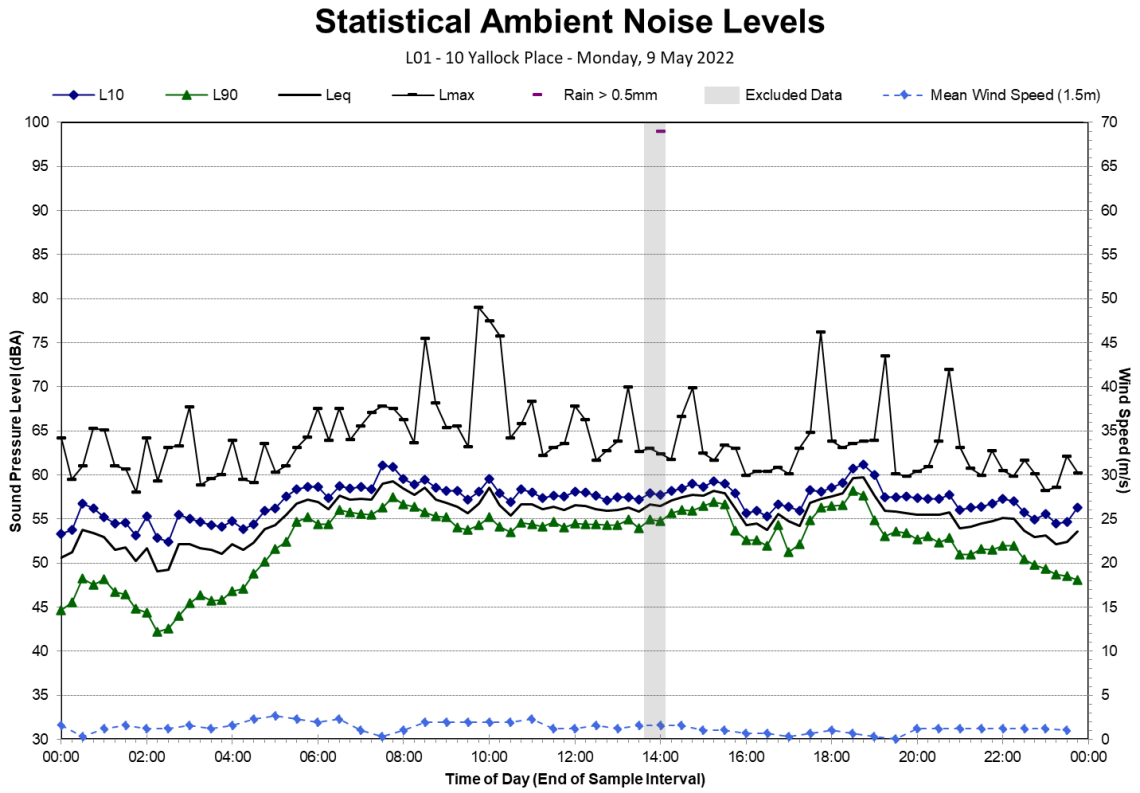

Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Wednesday, 4 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

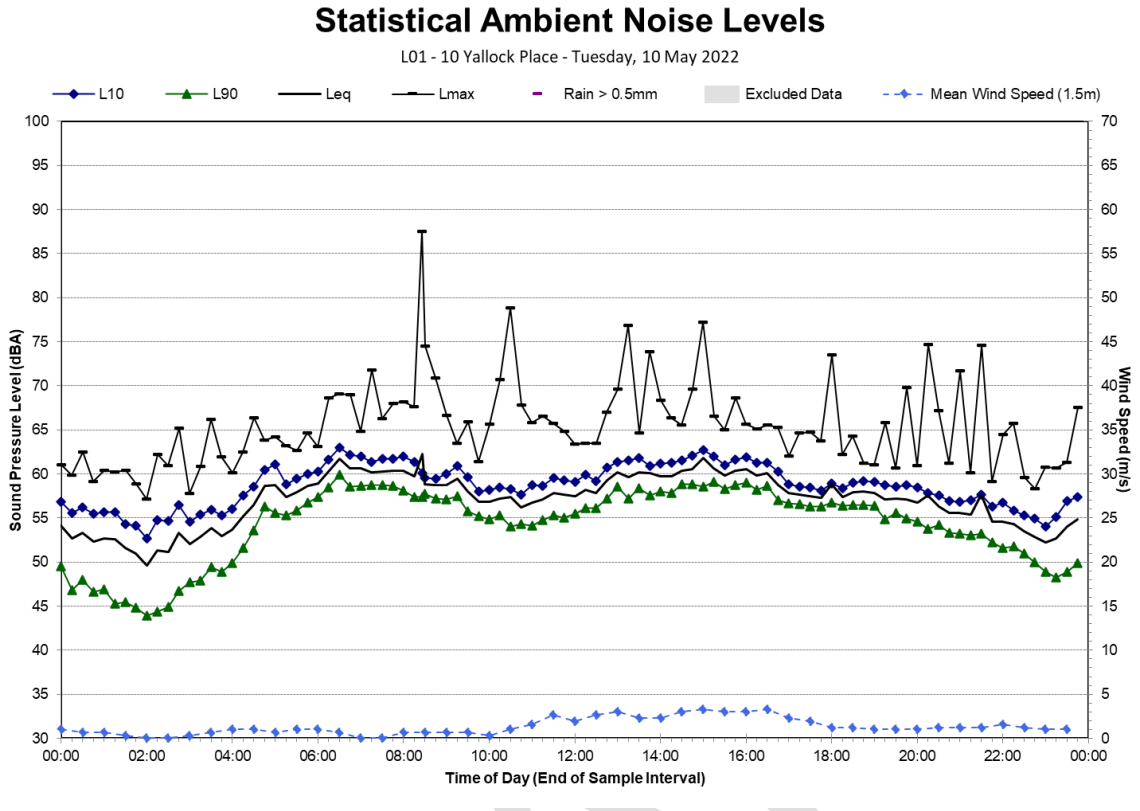

Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Thursday, 5 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

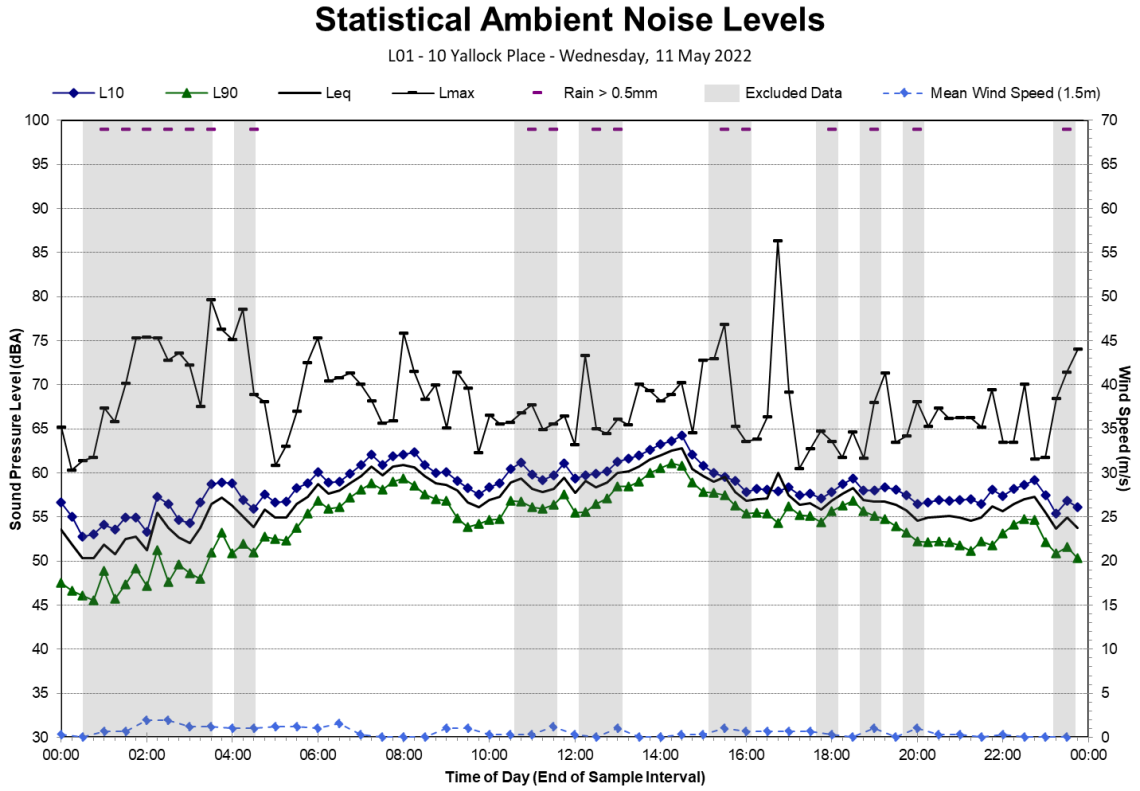

Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Friday, 6 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

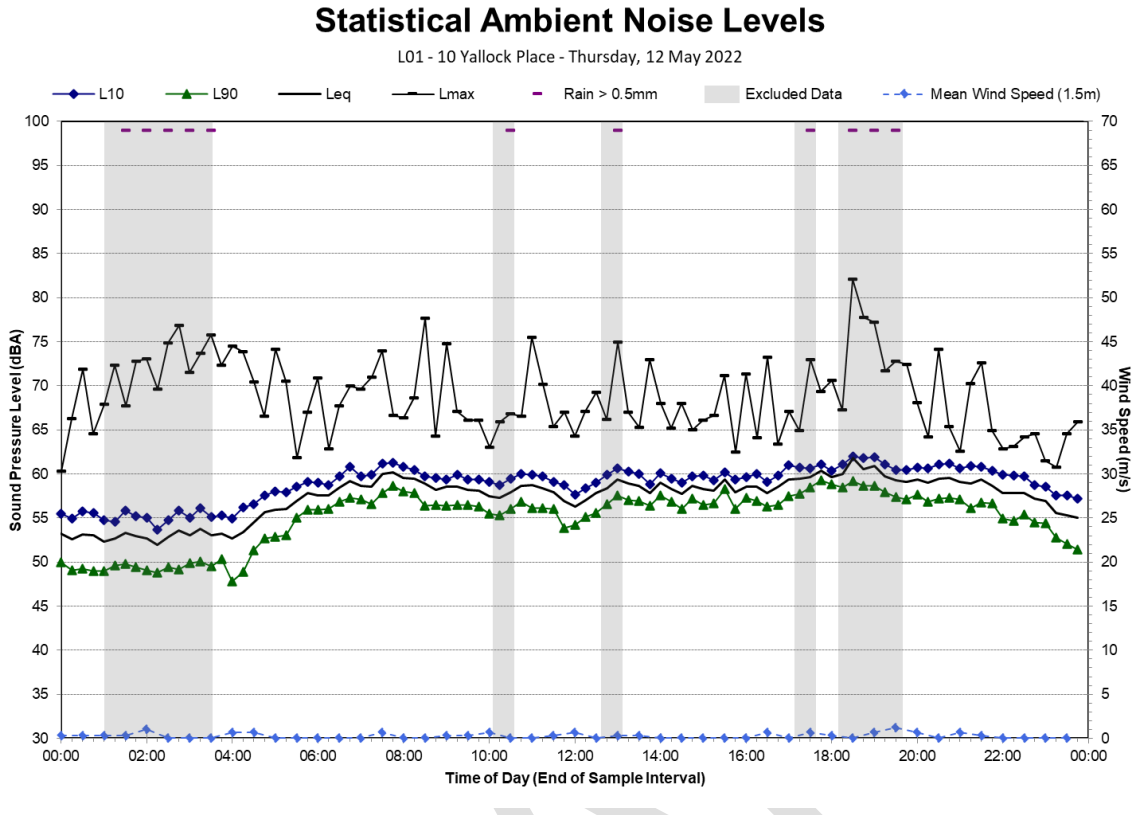

Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Saturday, 7 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

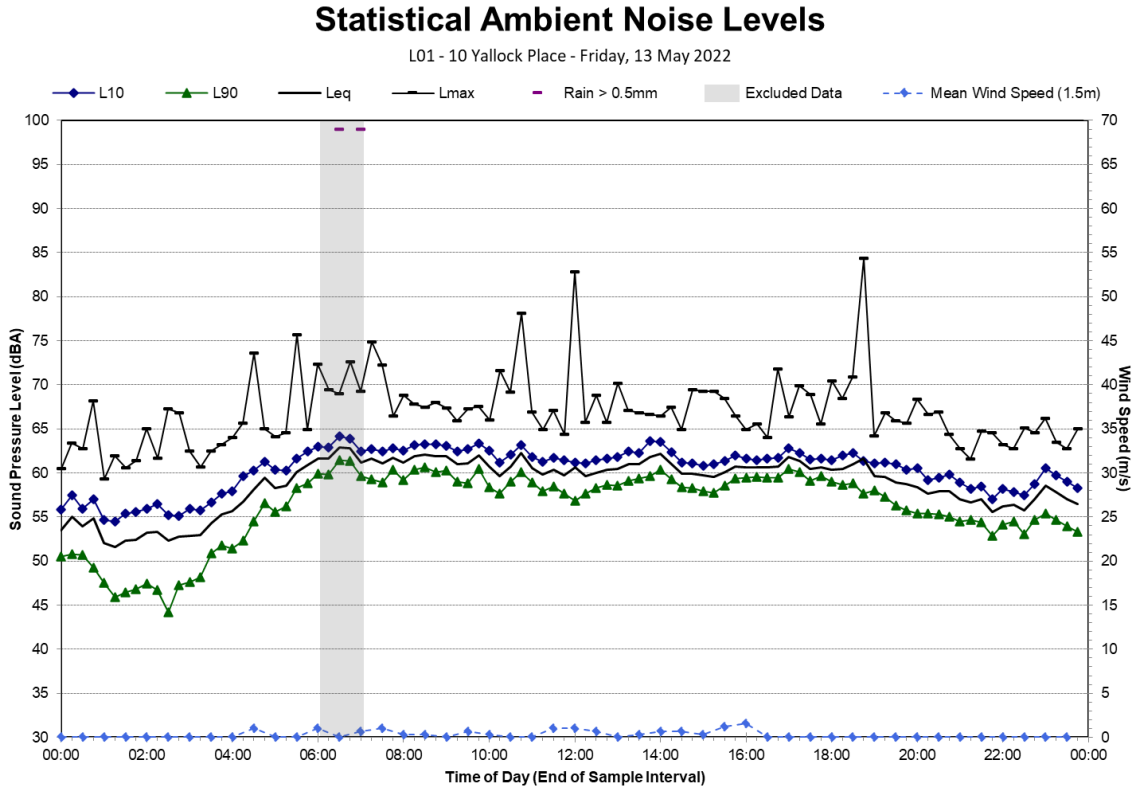

Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Sunday, 8 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

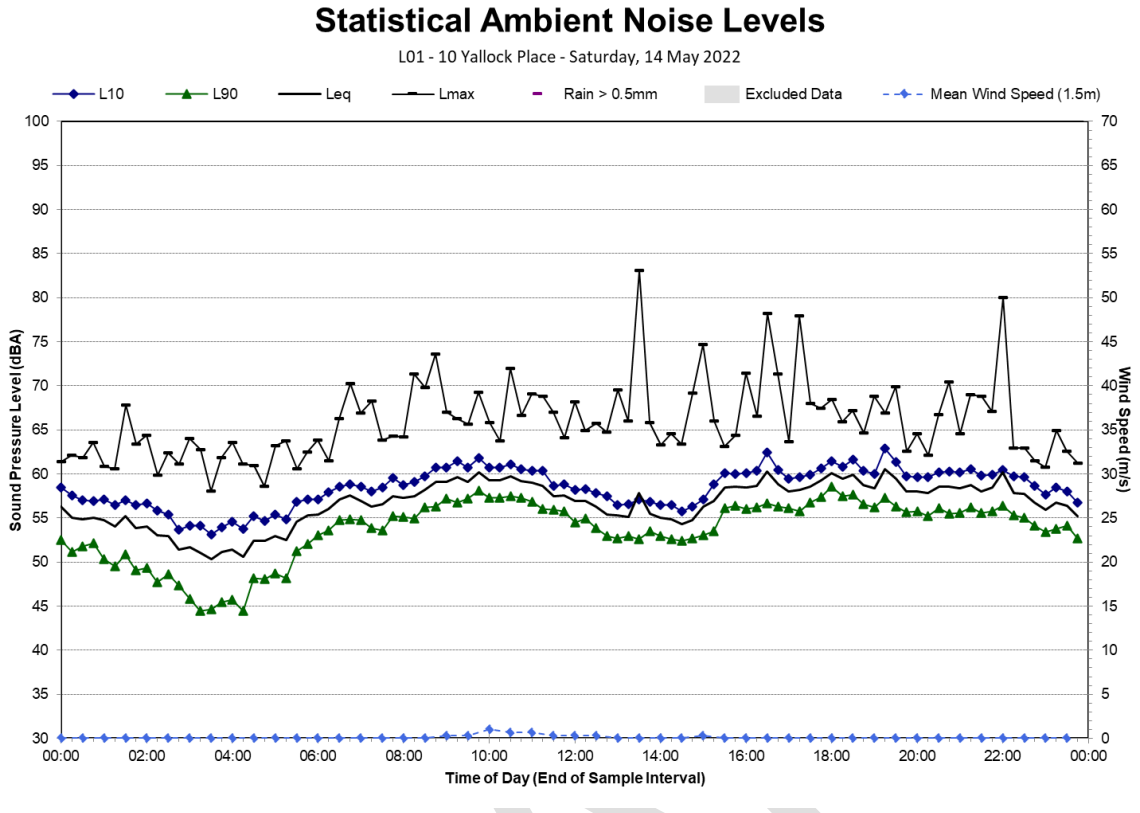

Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Monday, 9 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

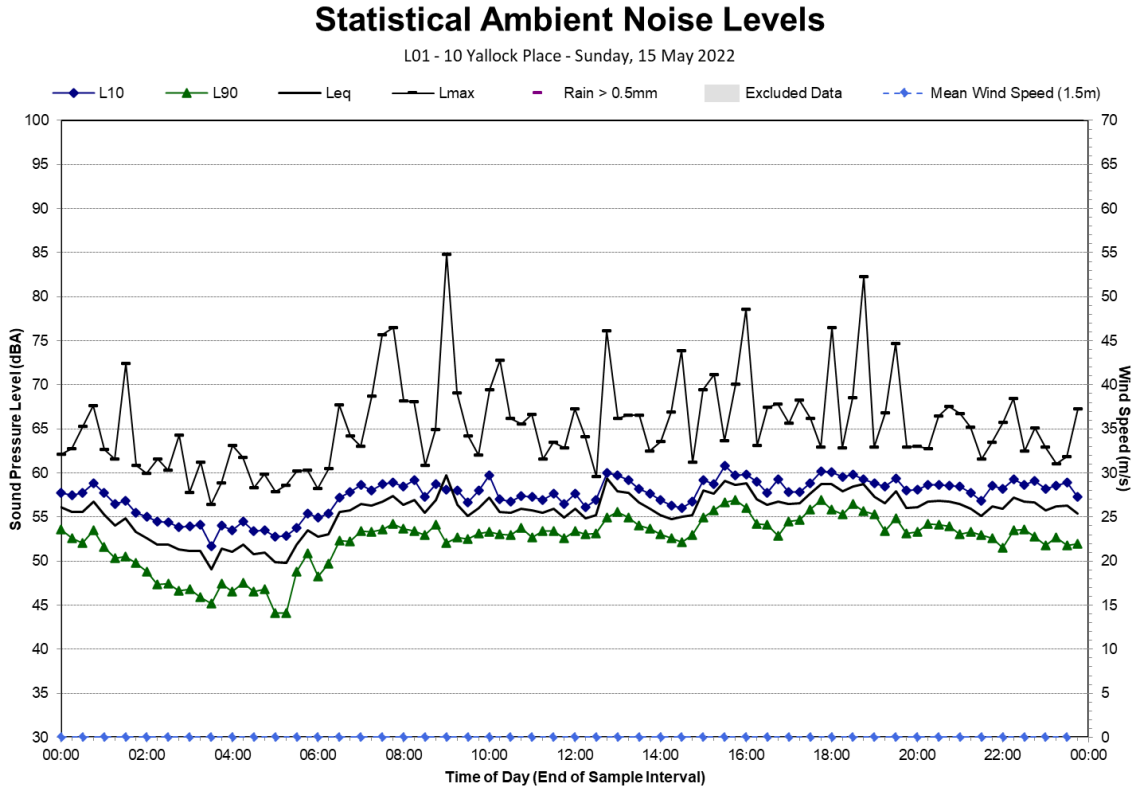

Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Tuesday, 10 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

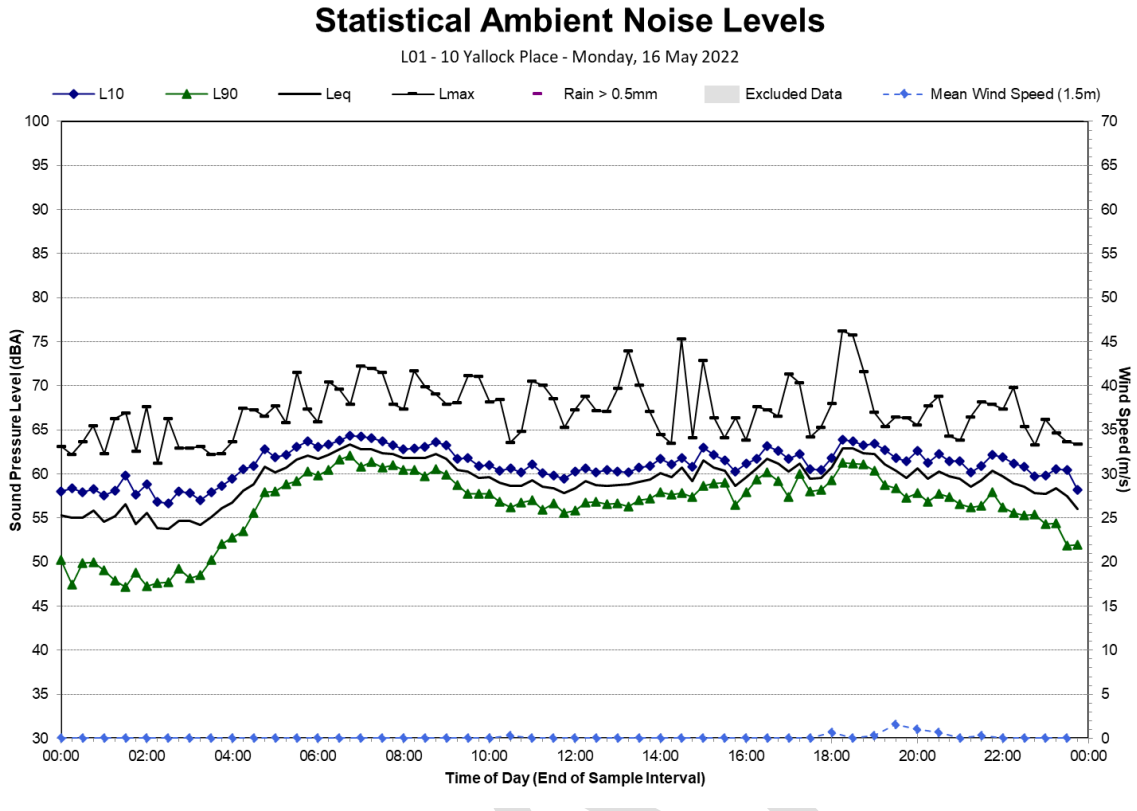

Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Wednesday, 11 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

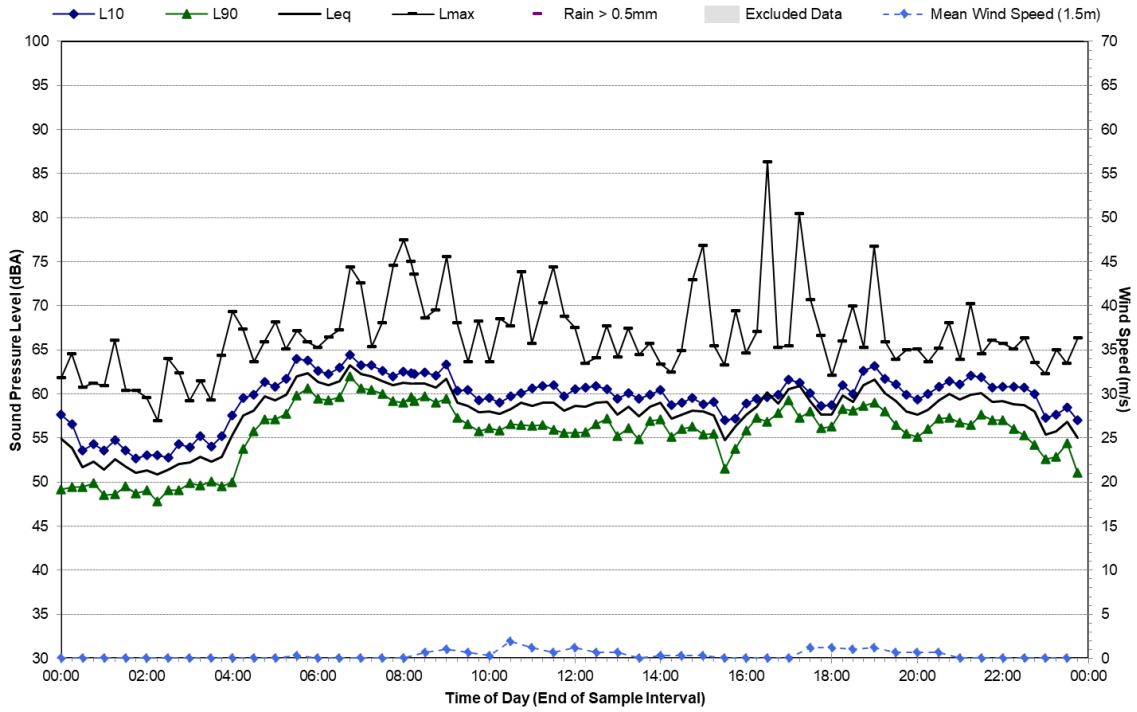

Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Thursday, 12 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

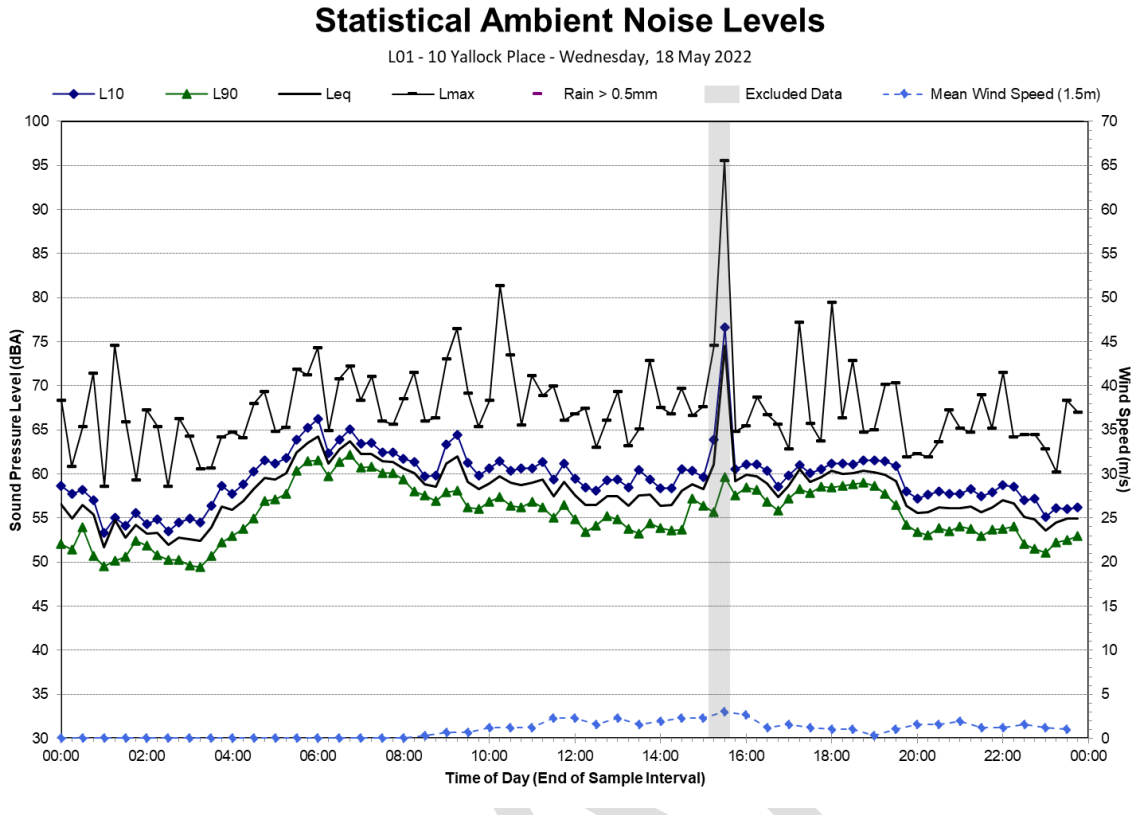

Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Friday, 13 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

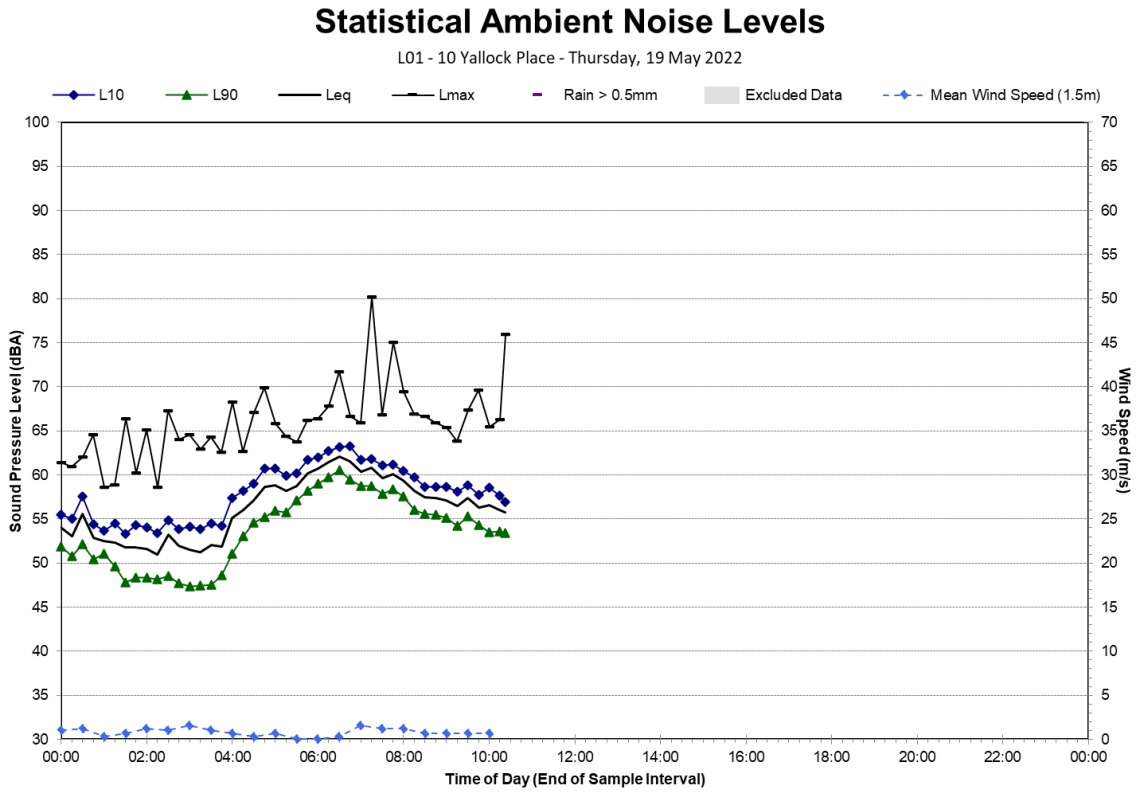

Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Saturday, 14 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Sunday, 15 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Monday, 16 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Tuesday, 17 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Wednesday, 18 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L01 - 10 Yallock Place - Thursday, 19 May 2022
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

Noise Monitoring Location	L02	Map of Noise Monitoring Location
Noise Monitoring Address	**59/179 Reservoir Road, Blacktown**	

Logger Device Type: Svantek 977, Logger Serial No: 98464
Sound Level Meter Device Type: Brüel and Kjær 2270, Sound Level Meter Serial No: 3008204

Ambient noise logger deployed at residential address 59/179 Reservoir Road, Blacktown. Logger located with view of Great Western Highway to the south and Reservoir Road to the west.

Attended noise measurements indicate the ambient noise environment at this location is dominated by road traffic noise from the Great Western Highway to the south.

Recorded Noise Levels (L_{Amax}):
02/12/2024: Traffic on Great Western Hwy: 51 – 70 dBA, birds: 70 – 73 dBA

Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	L_{Aeq}	L_{A10}	L_{A1}
Daytime	54	61	64	70
Evening	51	59	61	69
Night-time	45	58	59	66

Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period	Noise Level (dBA)		
	$L_{Aeq(period)}$		$L_{Aeq(period)}$
Daytime (7am-10pm)	61		62
Night-time (10pm-7am)	58		62

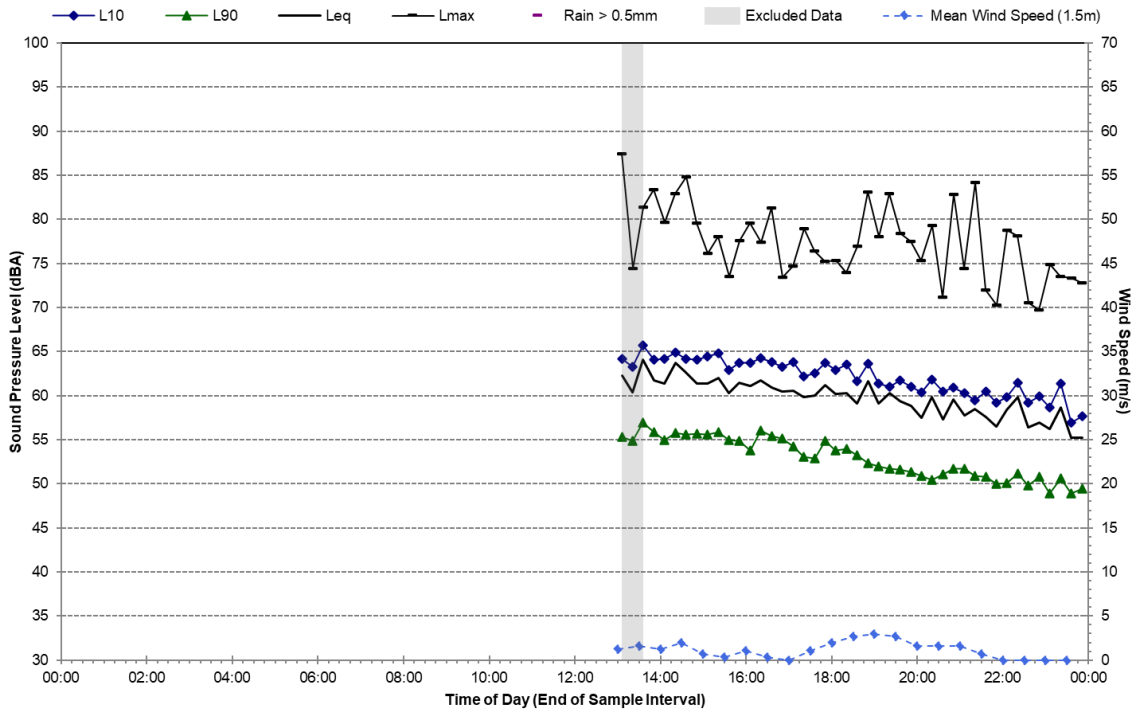
Attended Noise Measurement Results

Date	Start Time	Measured Noise Level (dBA)		
		L_{A90}	L_{Aeq}	L_{Amax}
02/12/2024	1:04:47 PM	54	59	73

Photo of Noise Monitoring Location

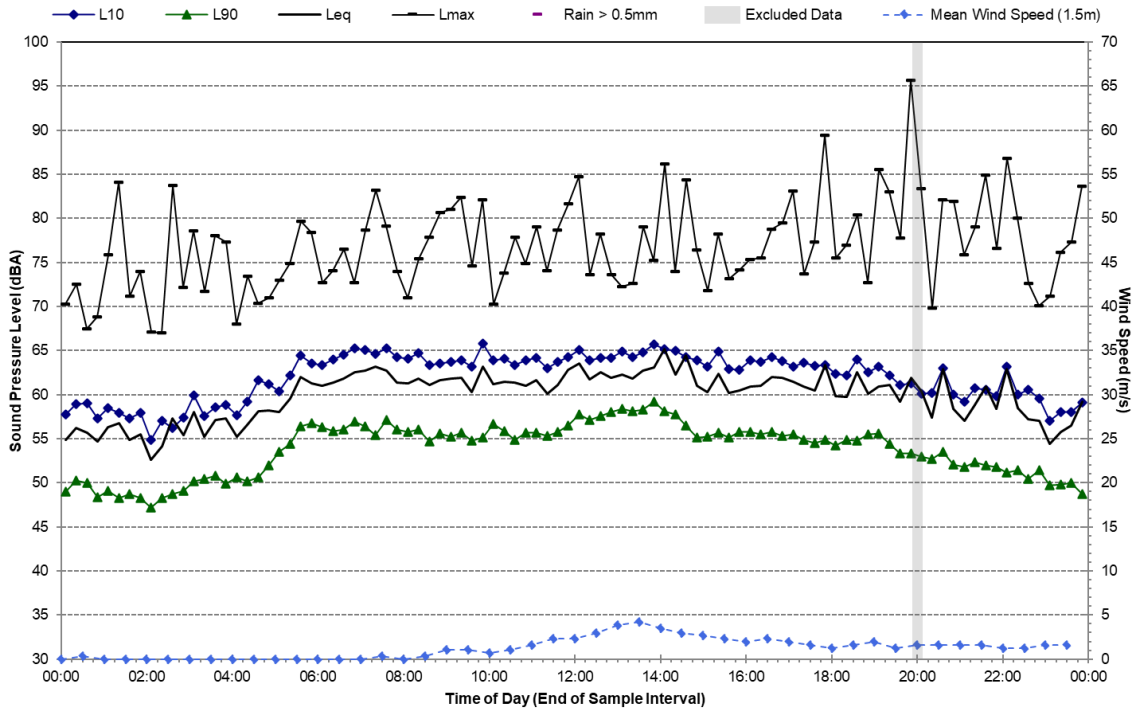
Statistical Ambient Noise Levels

L02 - 59/179 Reservoir Road, Blacktown - Monday, 2 December 2024



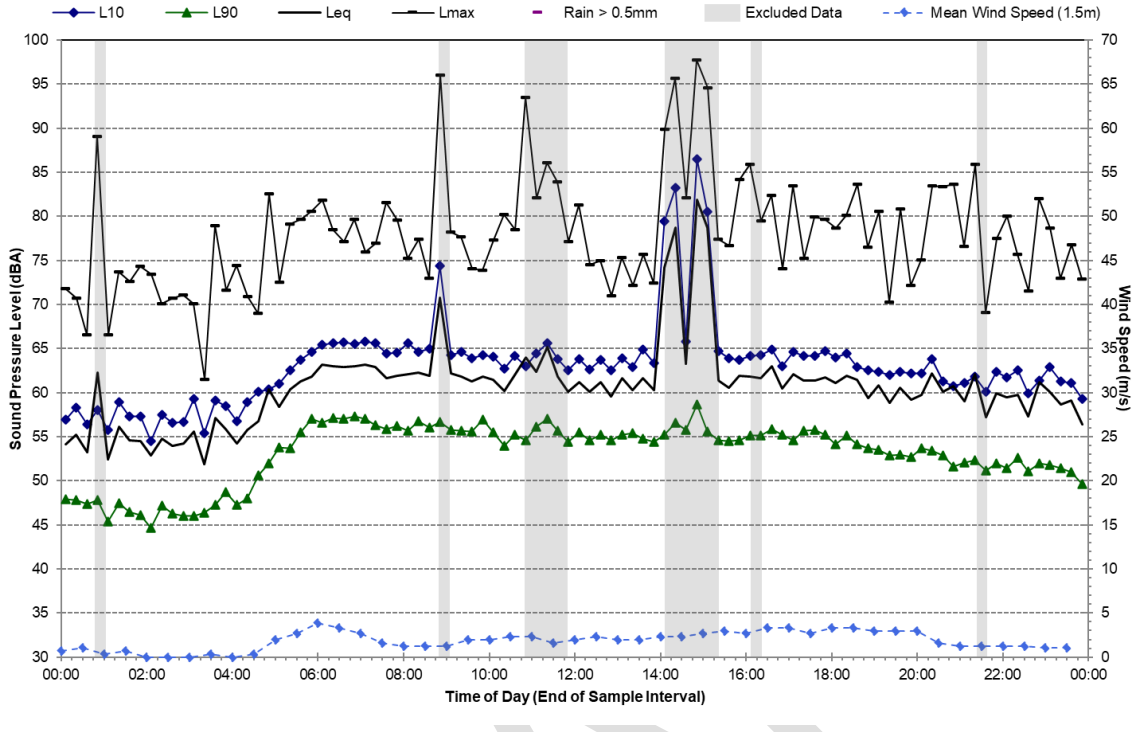
Statistical Ambient Noise Levels

L02 - 59/179 Reservoir Road, Blacktown - Tuesday, 3 December 2024



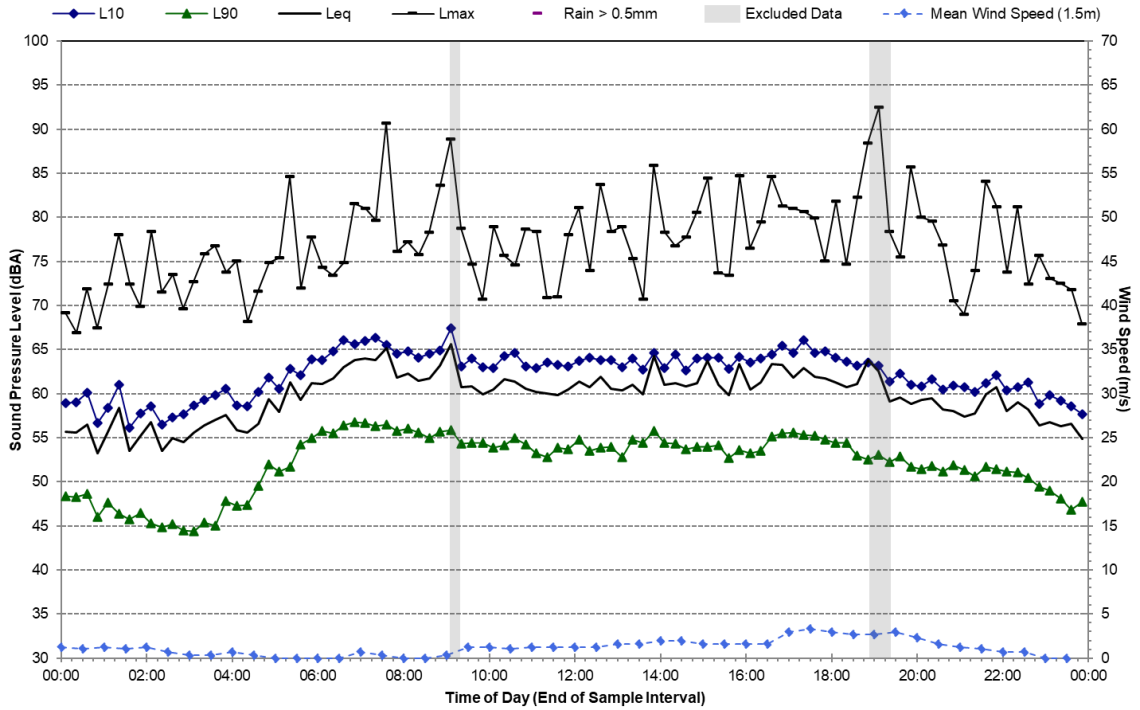
Statistical Ambient Noise Levels

L02 - 59/179 Reservoir Road, Blacktown - Wednesday, 4 December 2024



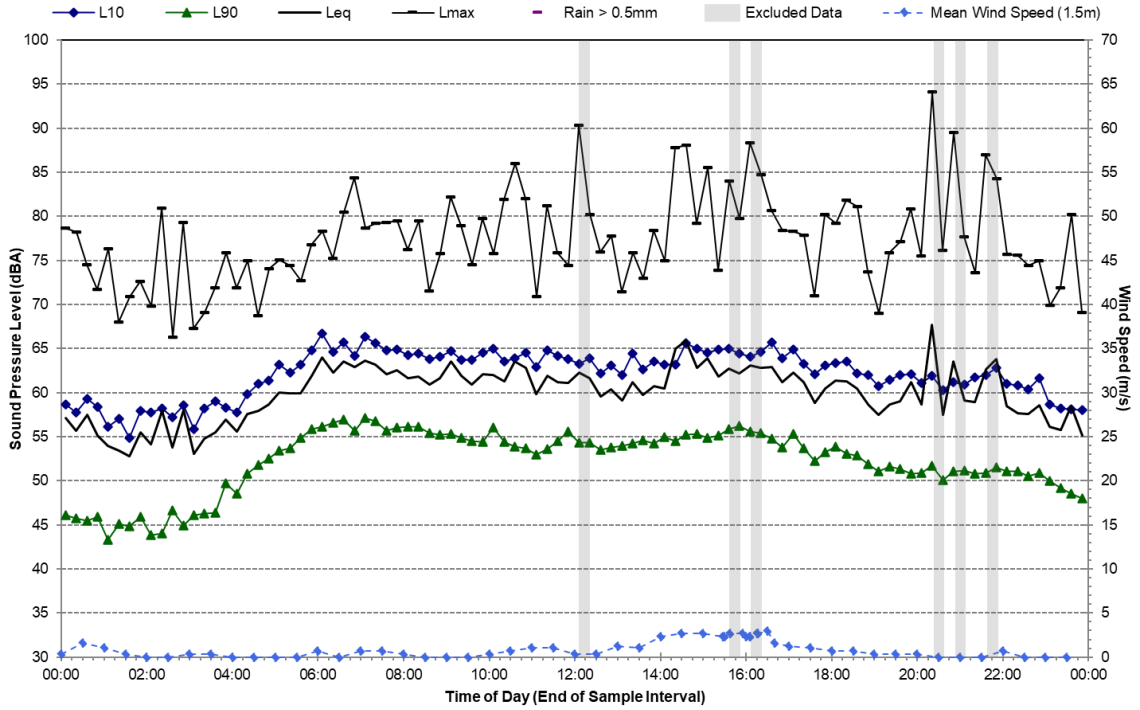
Statistical Ambient Noise Levels

L02 - 59/179 Reservoir Road, Blacktown - Thursday, 5 December 2024



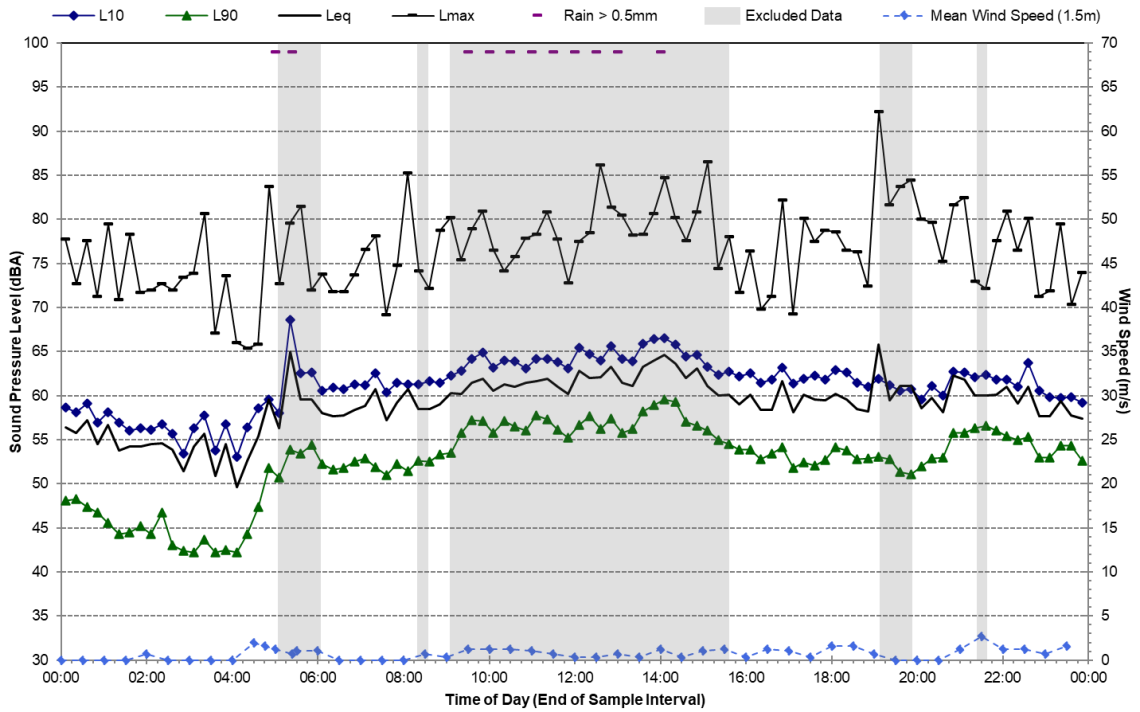
Statistical Ambient Noise Levels

L02 - 59/179 Reservoir Road, Blacktown - Friday, 6 December 2024



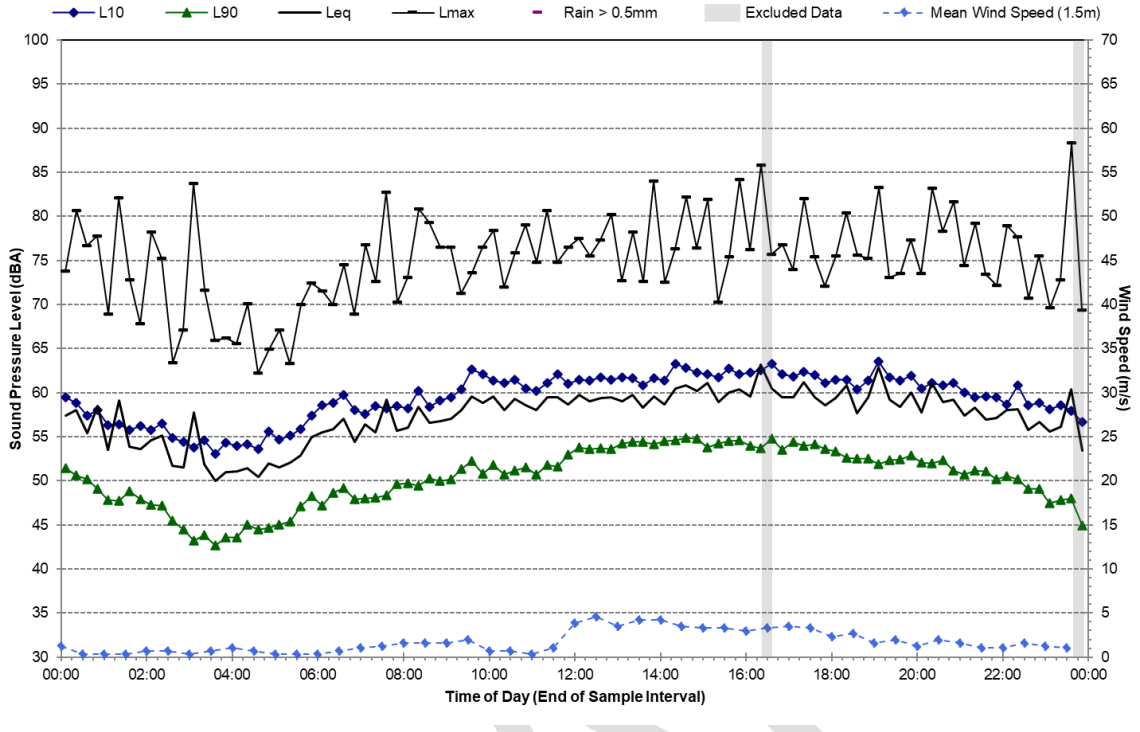
Statistical Ambient Noise Levels

L02 - 59/179 Reservoir Road, Blacktown - Saturday, 7 December 2024



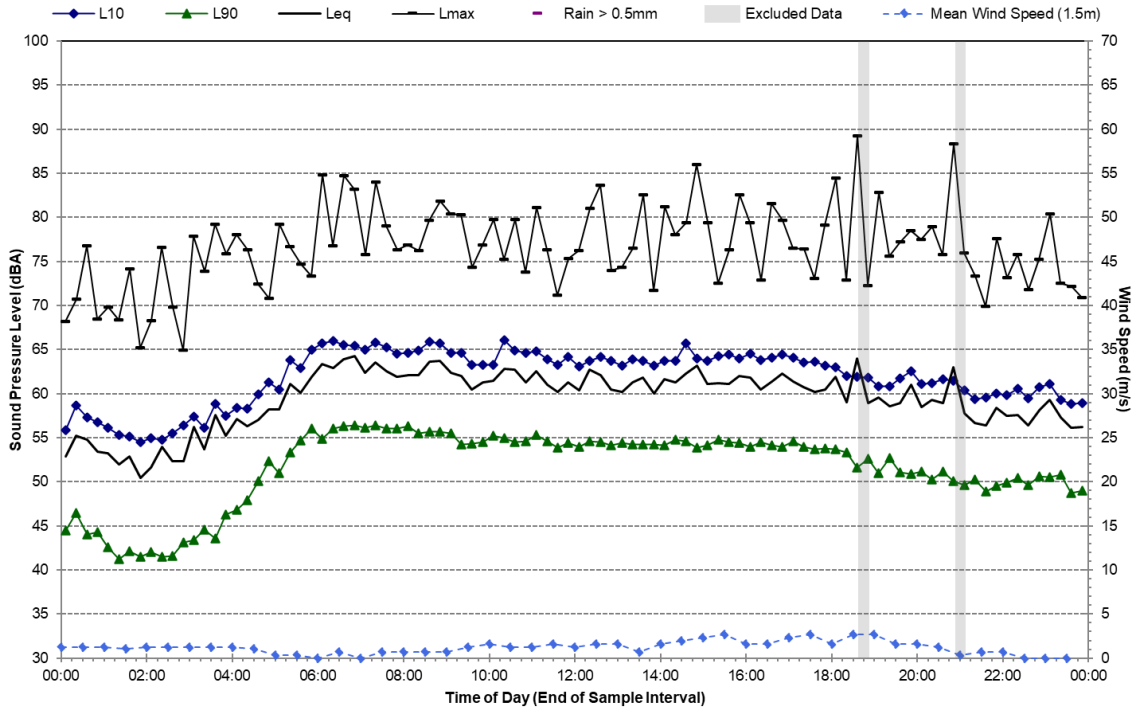
Statistical Ambient Noise Levels

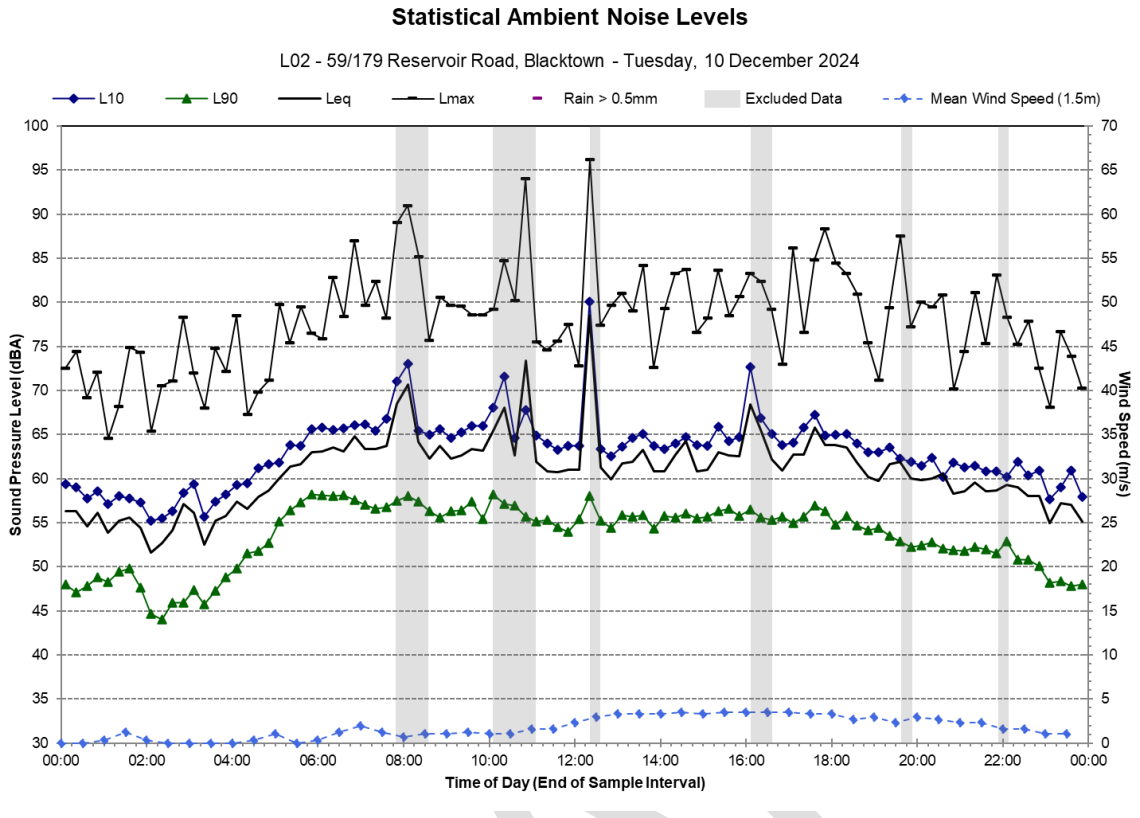
L02 - 59/179 Reservoir Road, Blacktown - Sunday, 8 December 2024

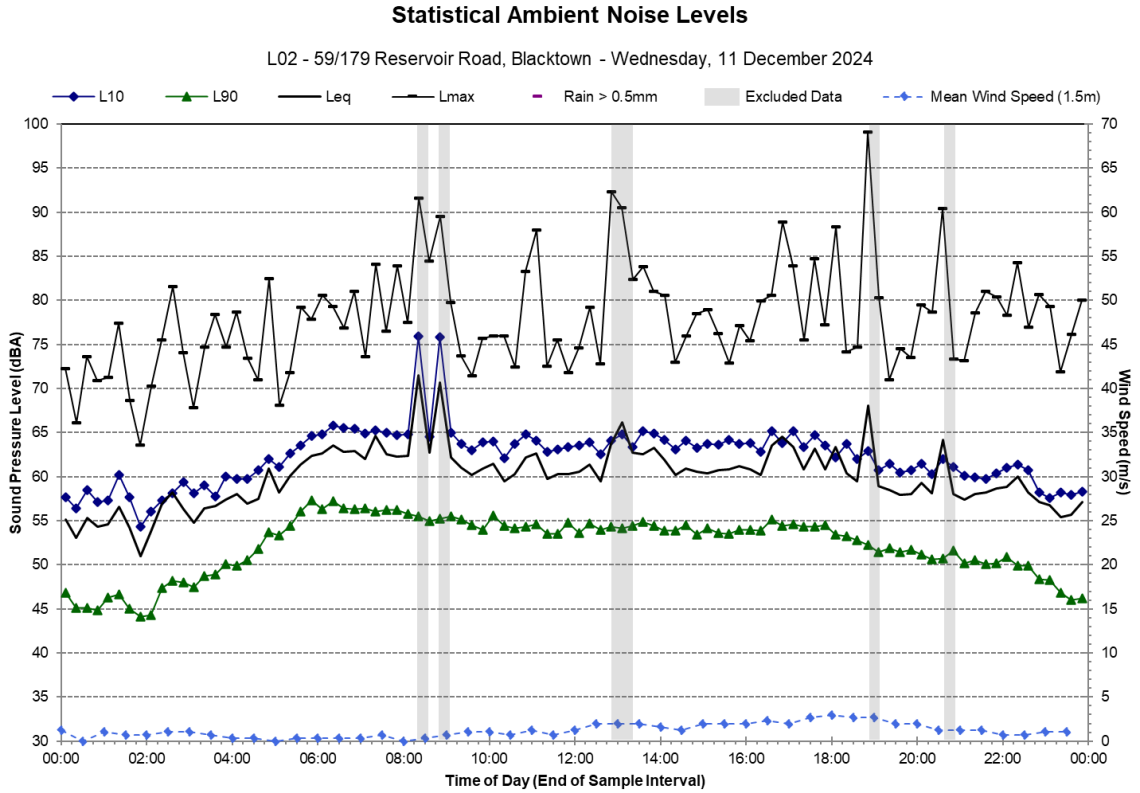


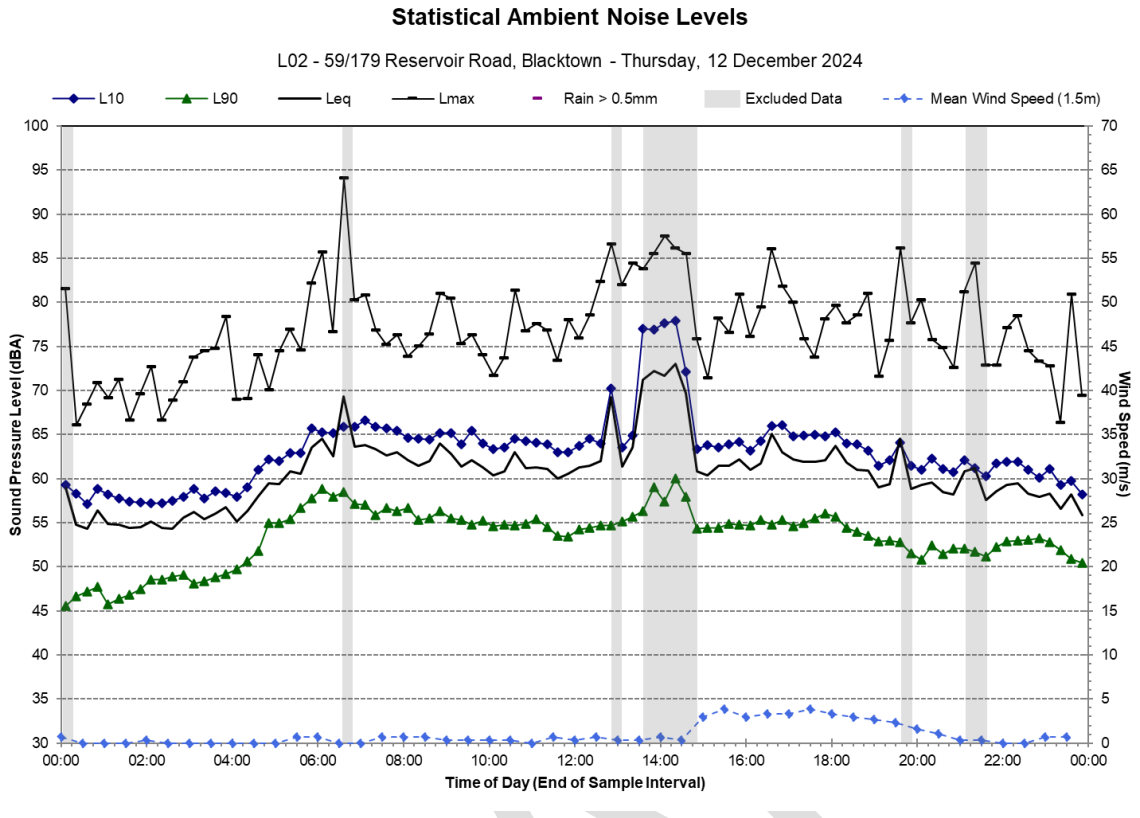
Statistical Ambient Noise Levels

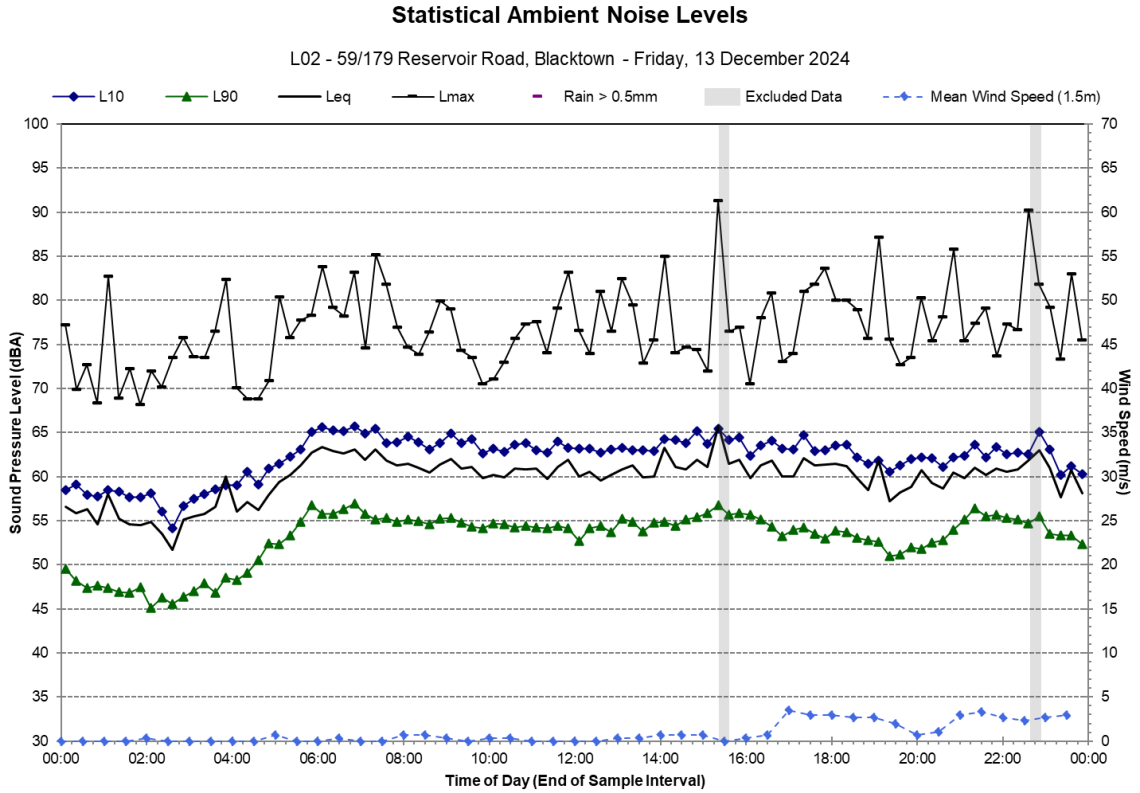
L02 - 59/179 Reservoir Road, Blacktown - Monday, 9 December 2024




Statistical Ambient Noise Levels
L02 - 59/179 Reservoir Road, Blacktown - Tuesday, 10 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

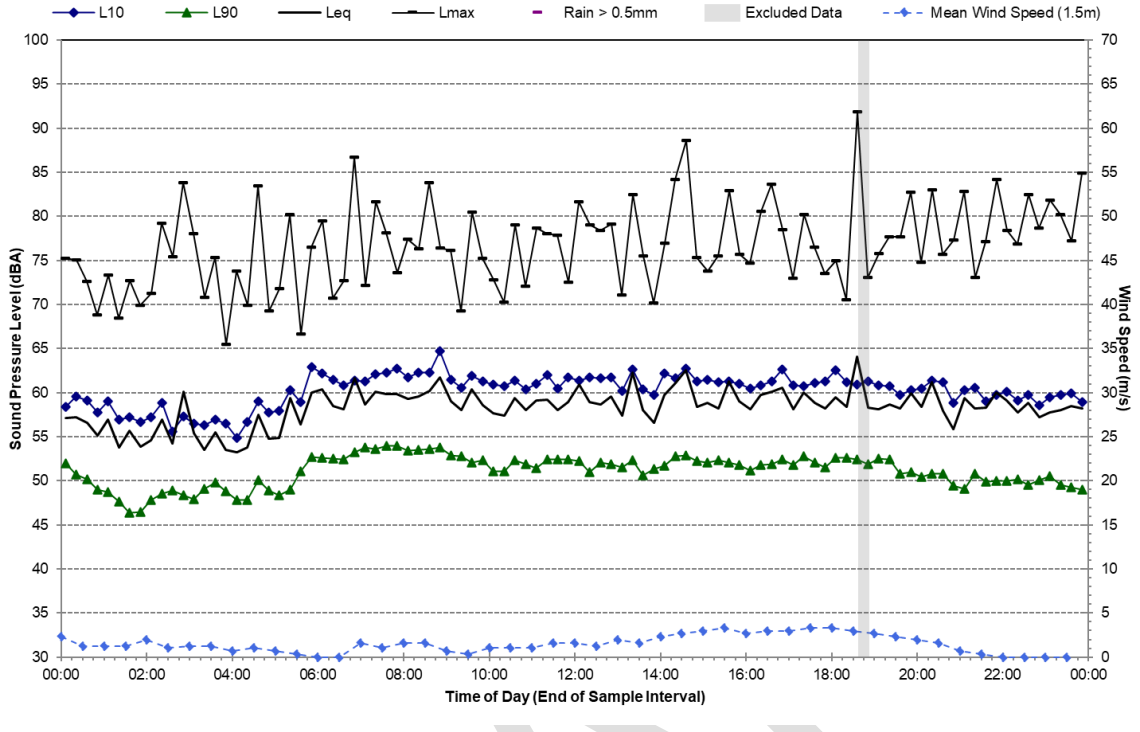

Statistical Ambient Noise Levels
L02 - 59/179 Reservoir Road, Blacktown - Wednesday, 11 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L02 - 59/179 Reservoir Road, Blacktown - Thursday, 12 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L02 - 59/179 Reservoir Road, Blacktown - Friday, 13 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

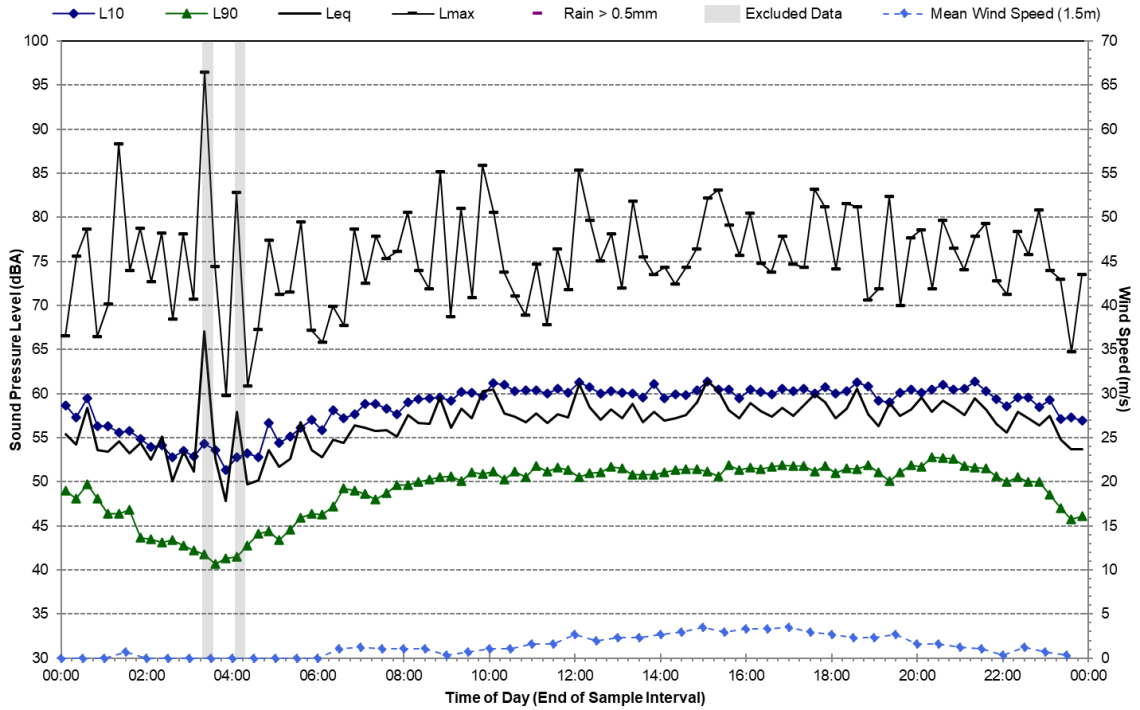
Statistical Ambient Noise Levels

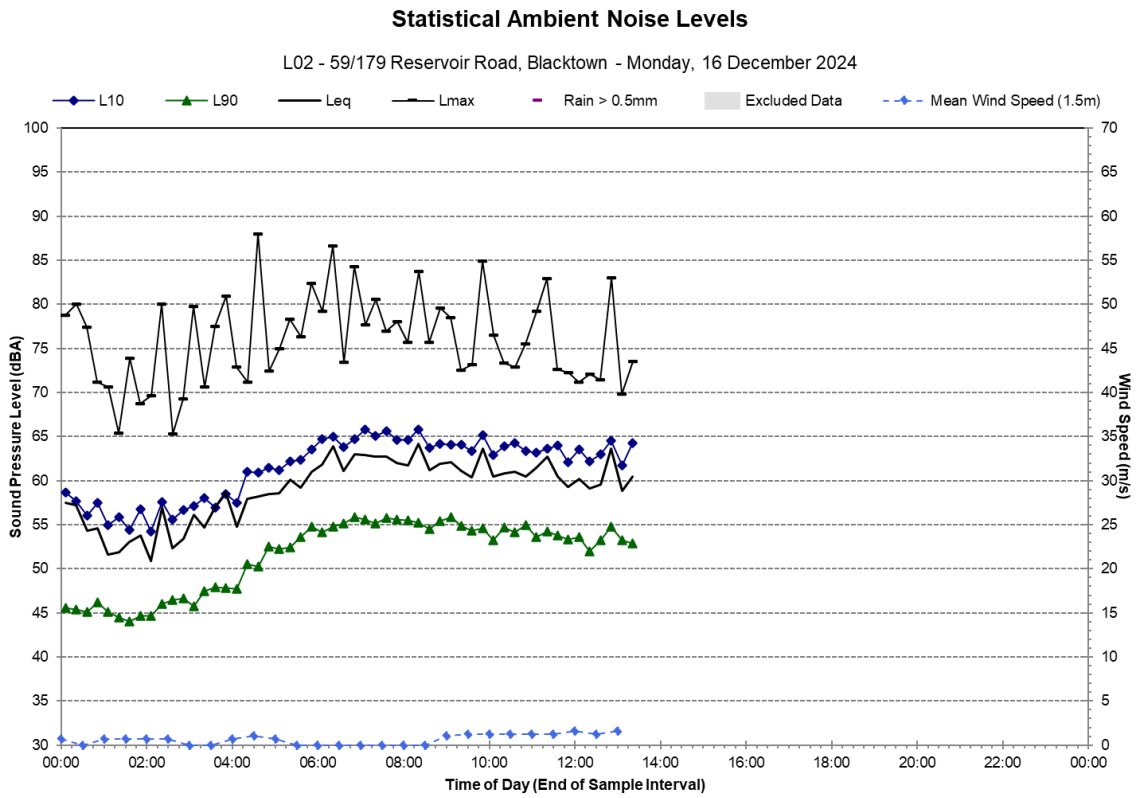
L02 - 59/179 Reservoir Road, Blacktown - Saturday, 14 December 2024



Statistical Ambient Noise Levels

L02 - 59/179 Reservoir Road, Blacktown - Sunday, 15 December 2024




Statistical Ambient Noise Levels
L02 - 59/179 Reservoir Road, Blacktown - Monday, 16 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
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

Noise Monitoring Location	L03	Map of Noise Monitoring Location
Noise Monitoring Address	**13 Clare Street, Blacktown**	

Logger Device Type: Svantek 977, Logger Serial No: 98492
Sound Level Meter Device Type: Brüel and Kjær 2270, Sound Level Meter Serial No: 3008204

Ambient noise logger deployed at residential address 13 Clare Street, Blacktown. Logger located with view of Claire Street to the south.

Attended noise measurements indicate the ambient noise environment at this location is dominated by local traffic and suburban noise.

Recorded Noise Levels (L_{Amax}):
02/12/2024: Distant traffic: 43 – 48 dBA, local traffic: 60 – 73 dBA, idling vehicle: 49 - 51 dBA, birds: 55 – 66 dBA,

Photo of Noise Monitoring Location

Ambient Noise Logging Results – ICNG Defined Time Periods

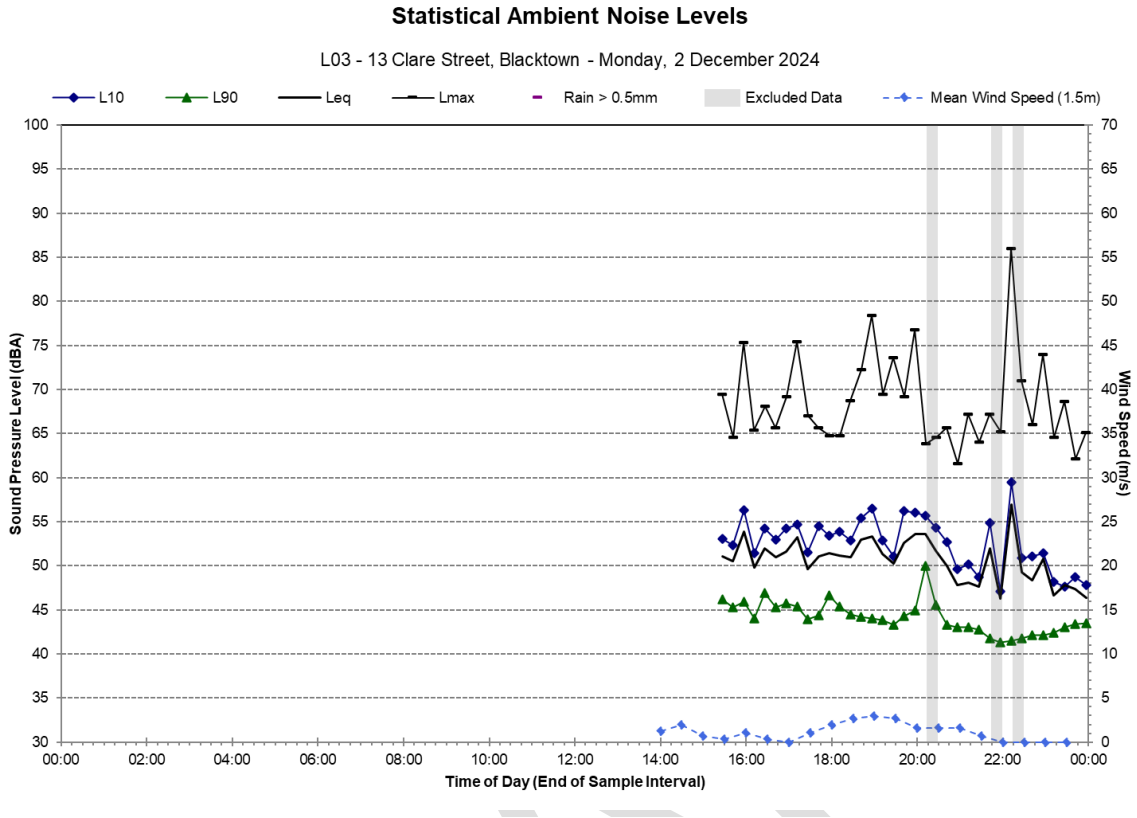
Monitoring Period	Noise Level (dBA)			
	RBL	L_{Aeq}	L_{A10}	L_{A1}
Daytime	42	52	54	62
Evening	43	51	53	61
Night-time	39	49	48	56

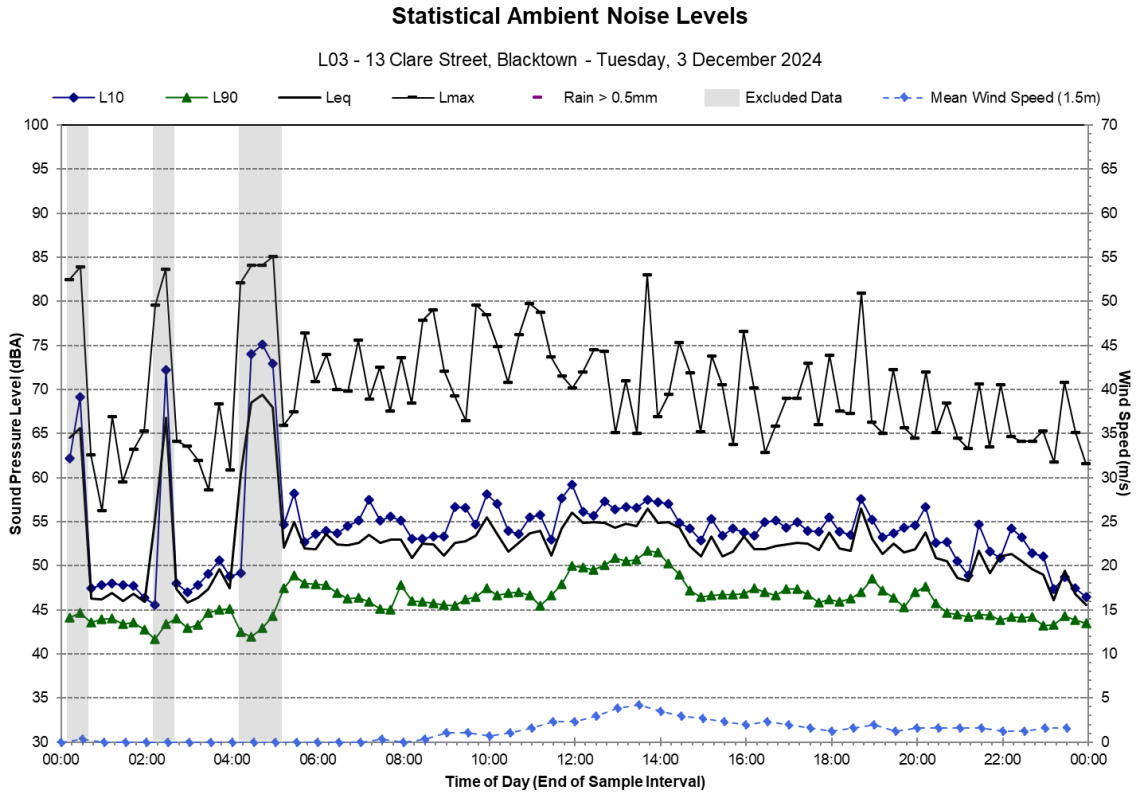
Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period	Noise Level (dBA)	
	$L_{Aeq(period)}$	$L_{Aeq(1hour)}$
Daytime (7am-10pm)	52	53
Night-time (10pm-7am)	49	52

Attended Noise Measurement Results

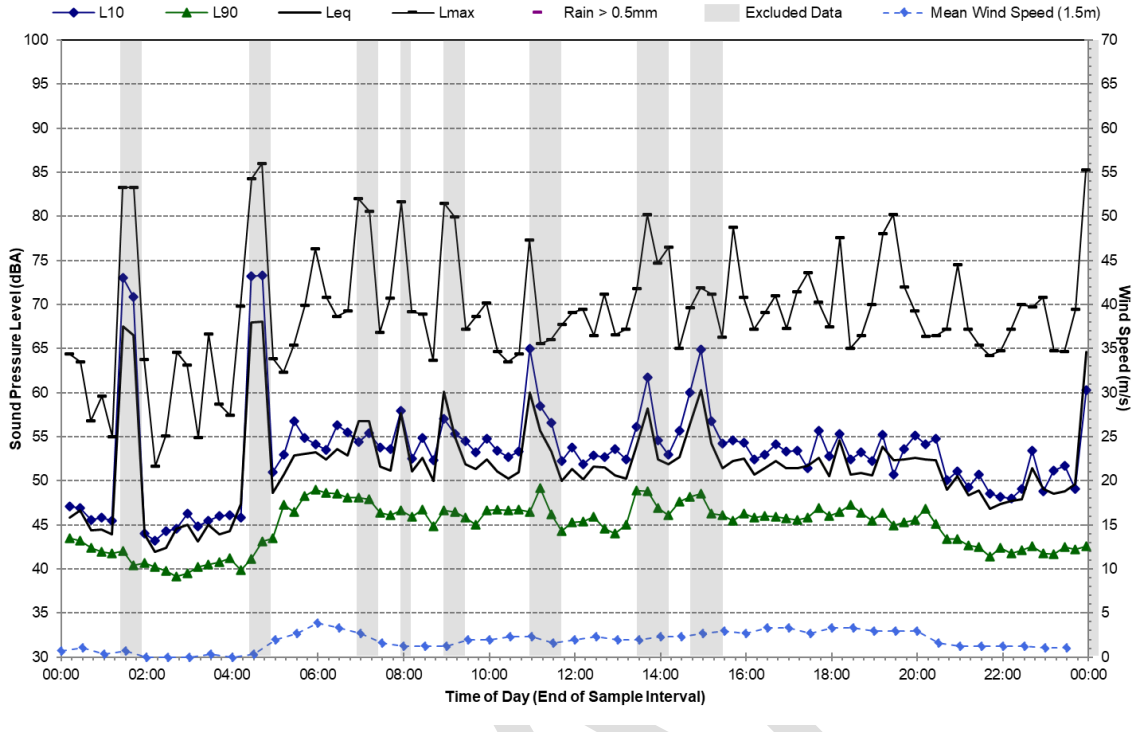
Date	Start Time	Measured Noise Level (dBA)		
		L_{A90}	L_{Aeq}	L_{Amax}
02/12/2024	2:39:20 PM	46	53	73


Statistical Ambient Noise Levels
L03 - 13 Clare Street, Blacktown - Monday, 2 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L03 - 13 Clare Street, Blacktown - Tuesday, 3 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

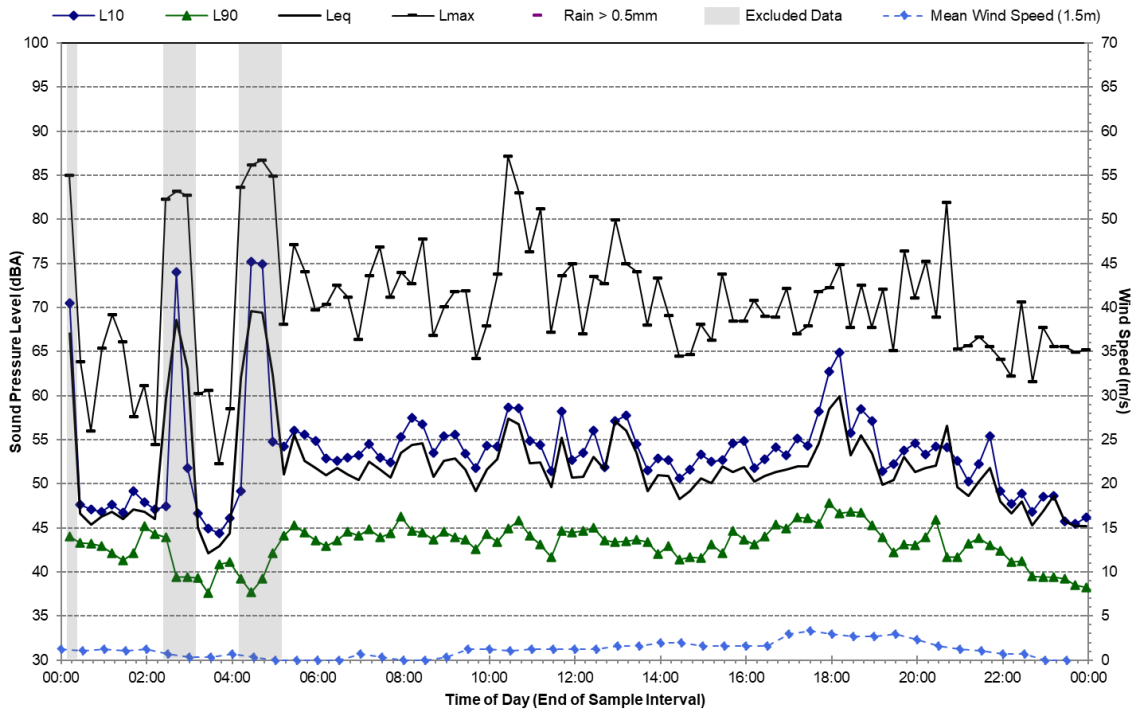
Statistical Ambient Noise Levels

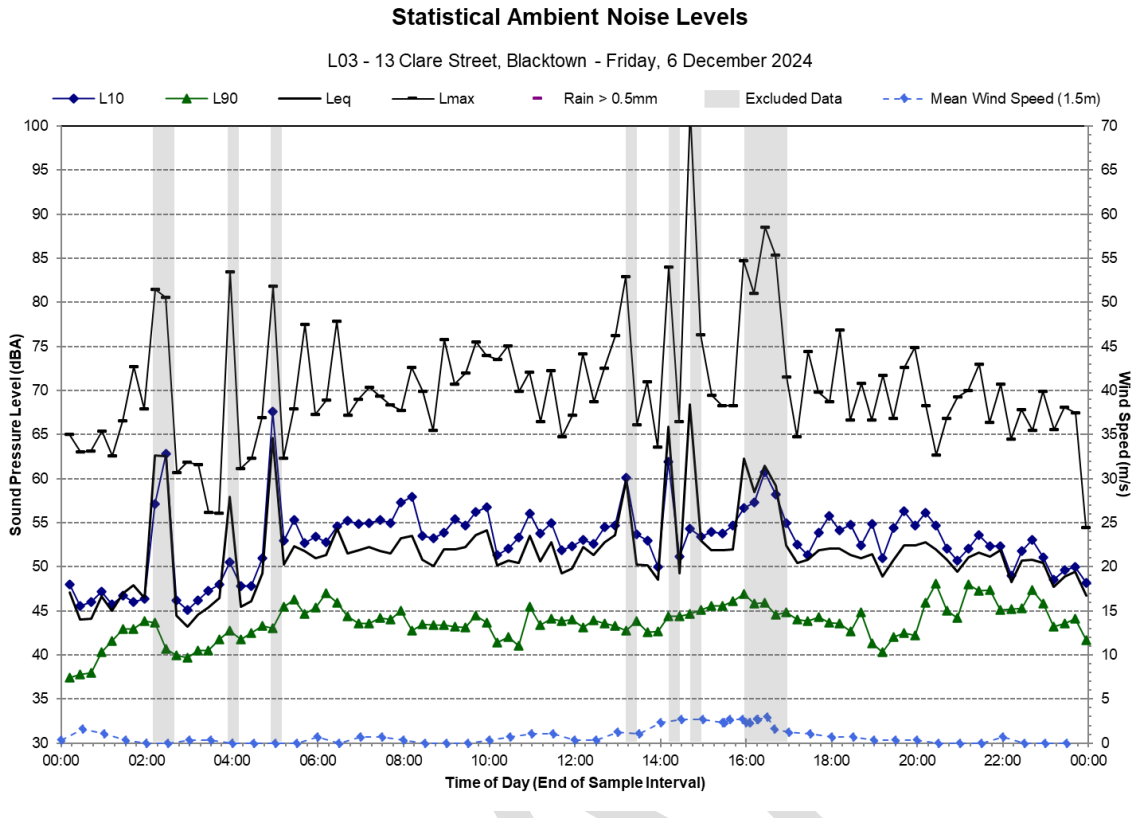
L03 - 13 Clare Street, Blacktown - Wednesday, 4 December 2024

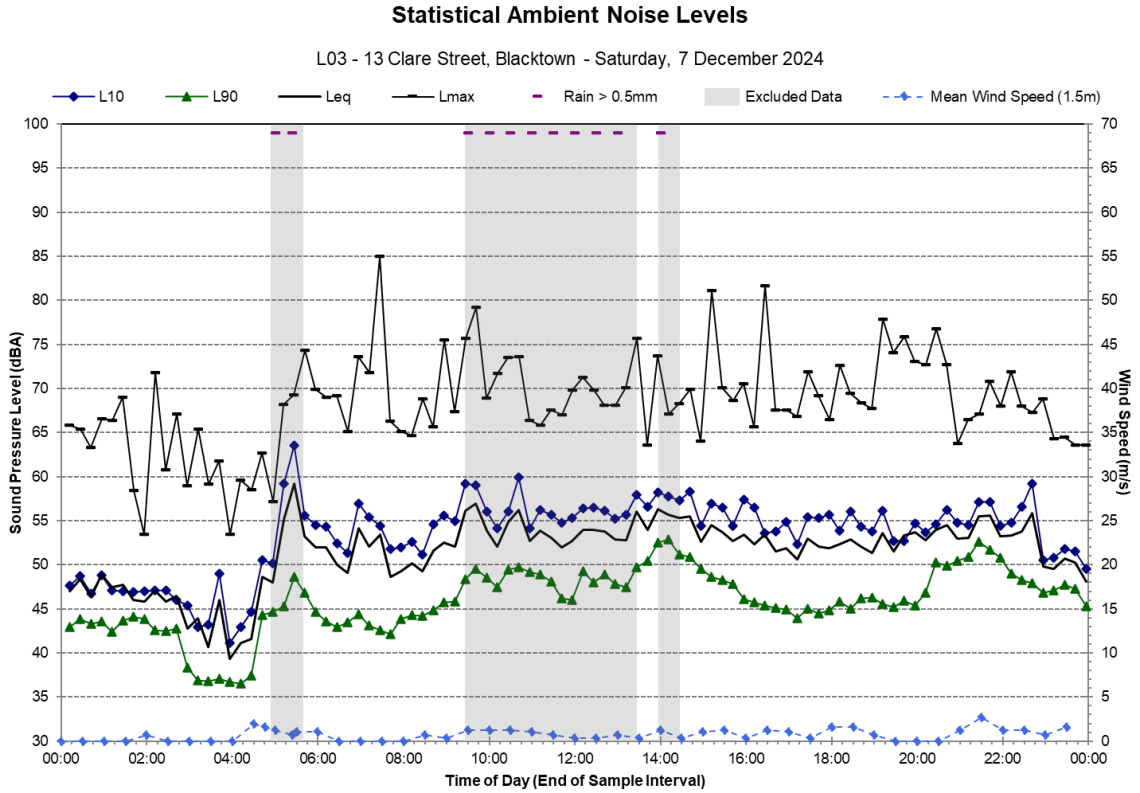


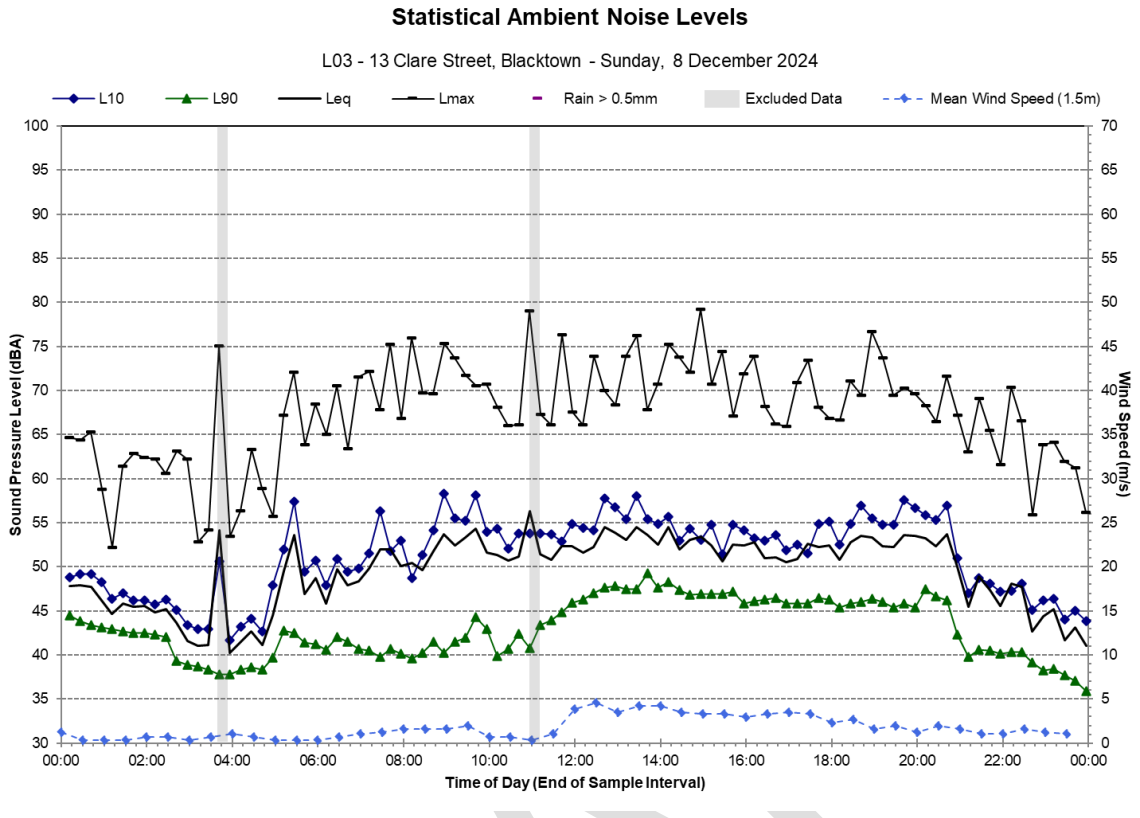
Statistical Ambient Noise Levels

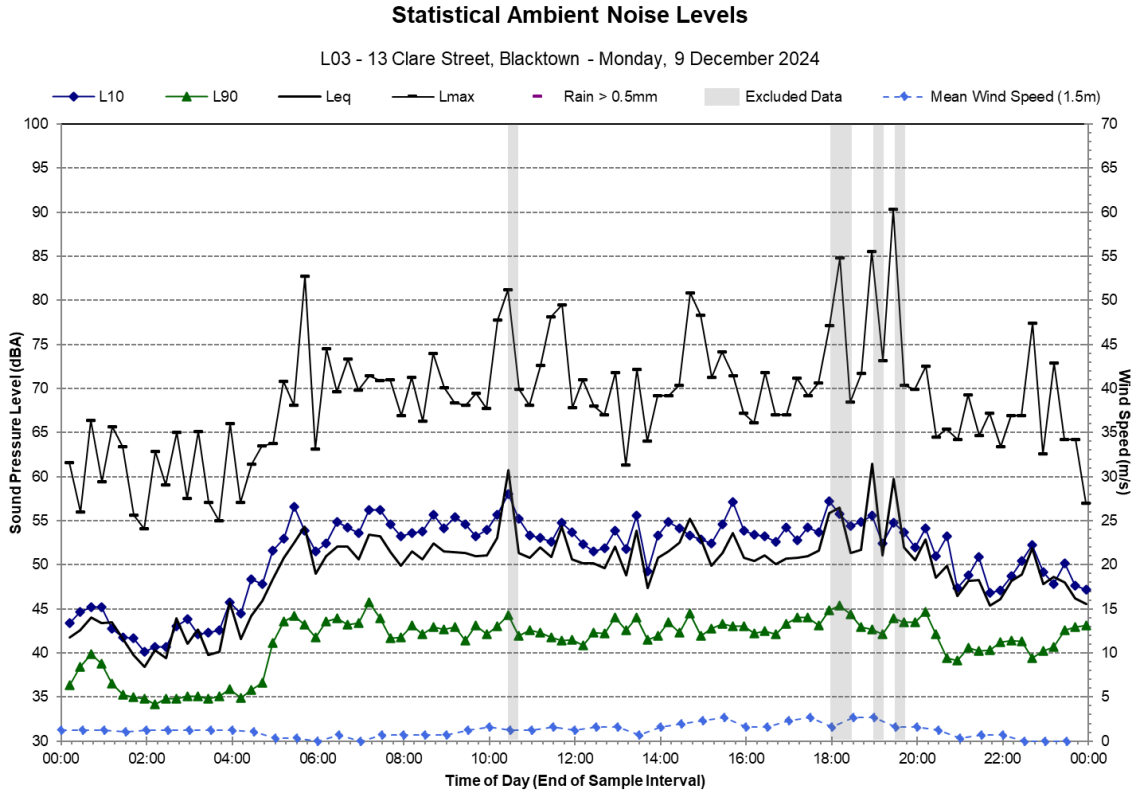
L03 - 13 Clare Street, Blacktown - Thursday, 5 December 2024




Statistical Ambient Noise Levels
L03 - 13 Clare Street, Blacktown - Friday, 6 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

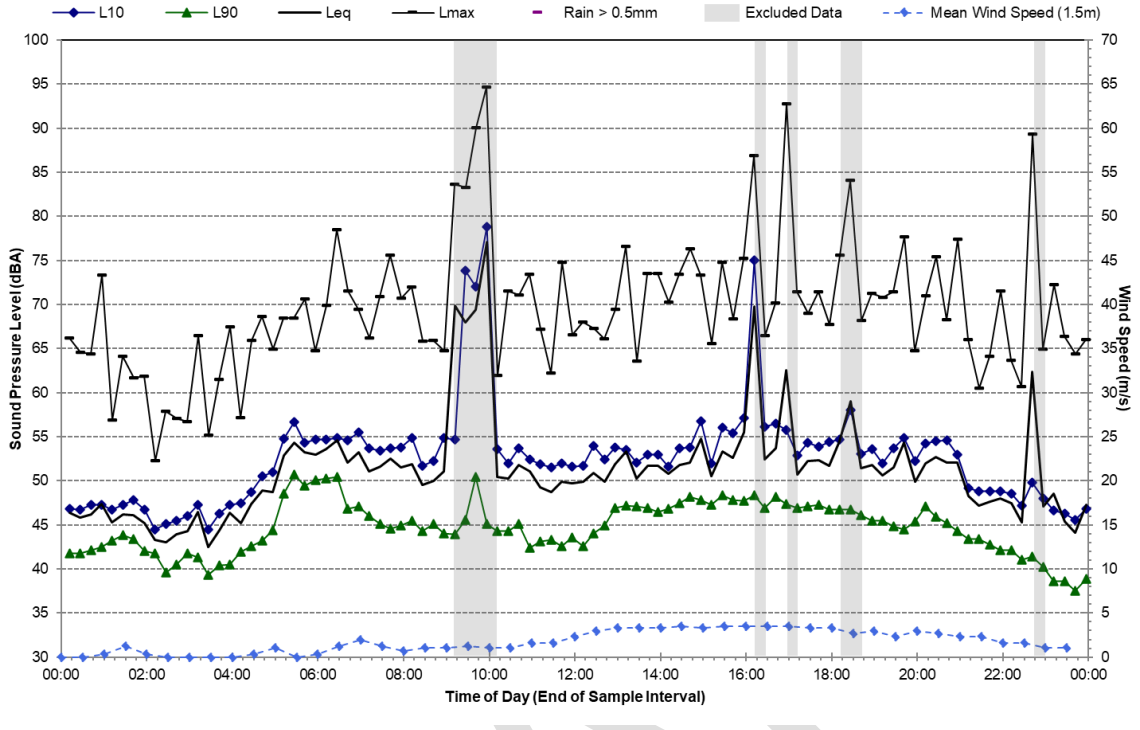

Statistical Ambient Noise Levels
L03 - 13 Clare Street, Blacktown - Saturday, 7 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L03 - 13 Clare Street, Blacktown - Sunday, 8 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L03 - 13 Clare Street, Blacktown - Monday, 9 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

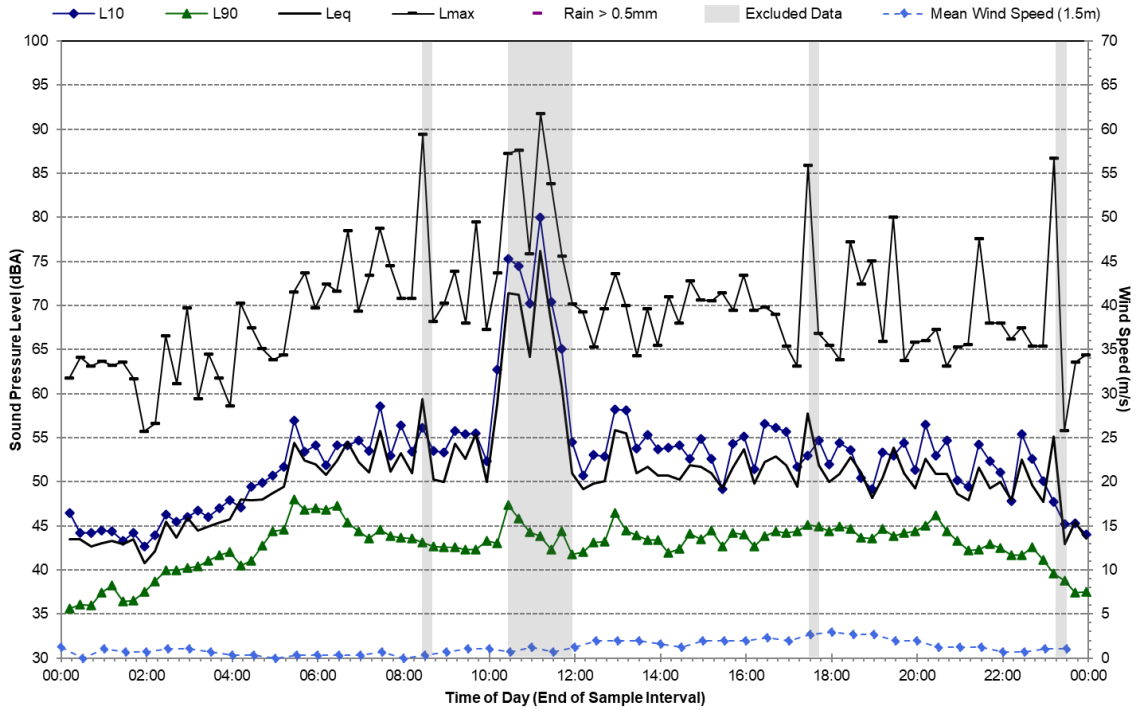
Statistical Ambient Noise Levels

L03 - 13 Clare Street, Blacktown - Tuesday, 10 December 2024



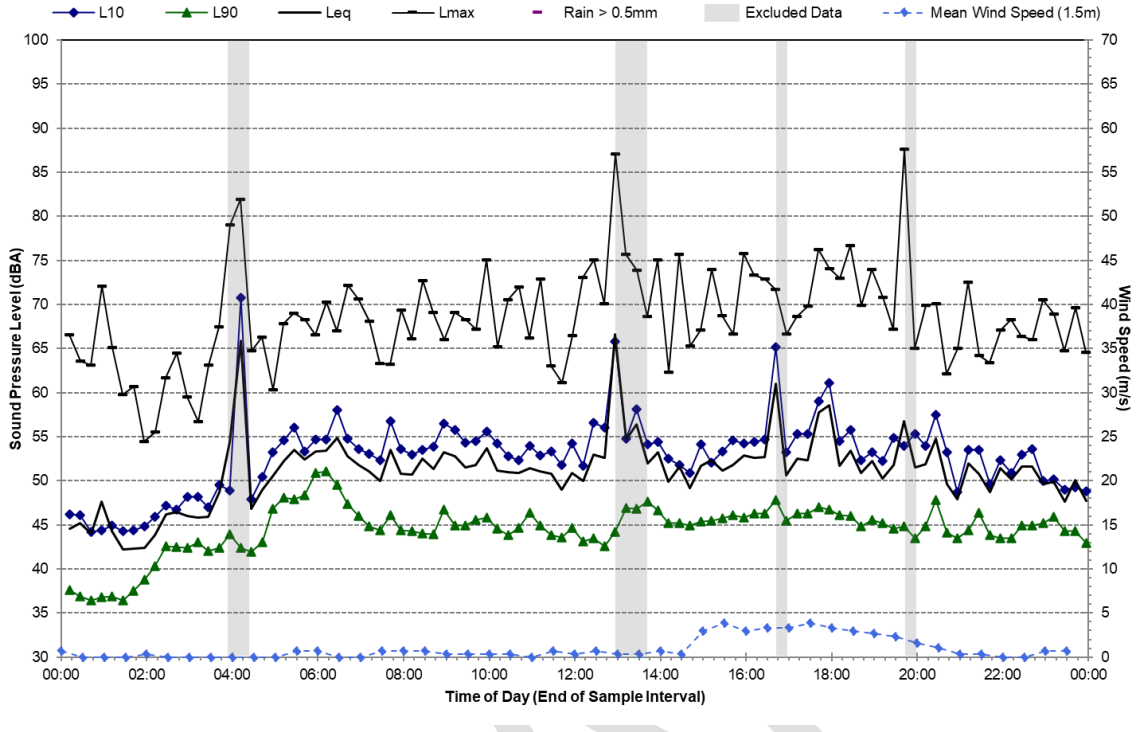
Statistical Ambient Noise Levels

L03 - 13 Clare Street, Blacktown - Wednesday, 11 December 2024



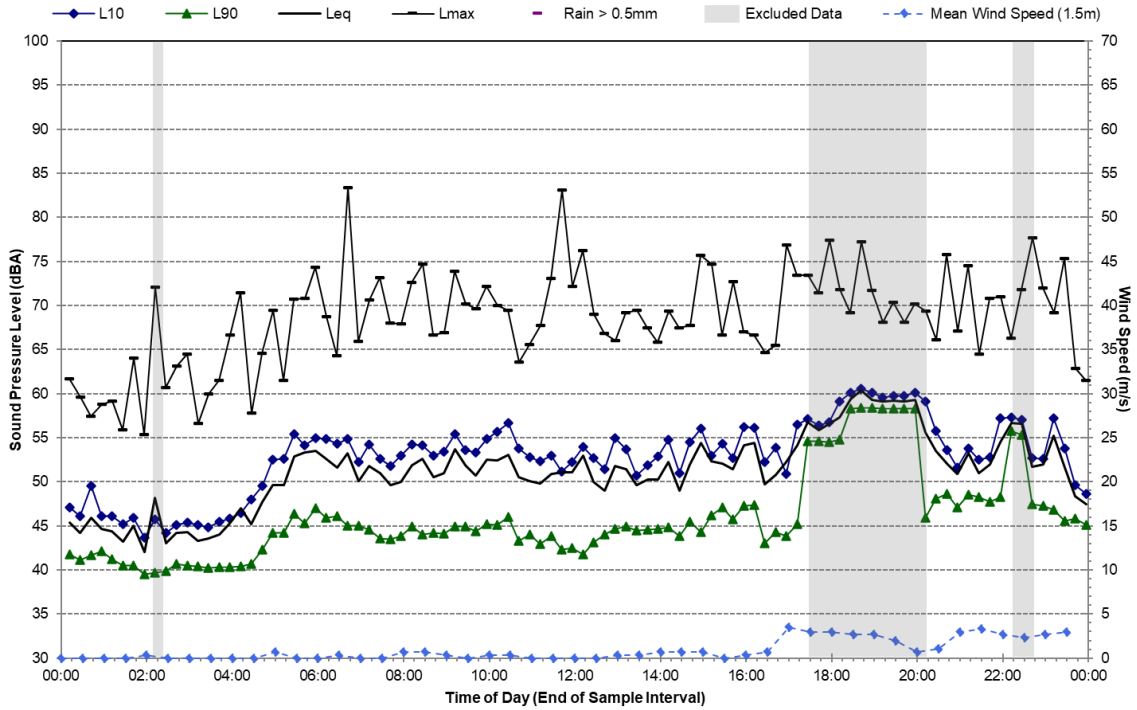
Statistical Ambient Noise Levels

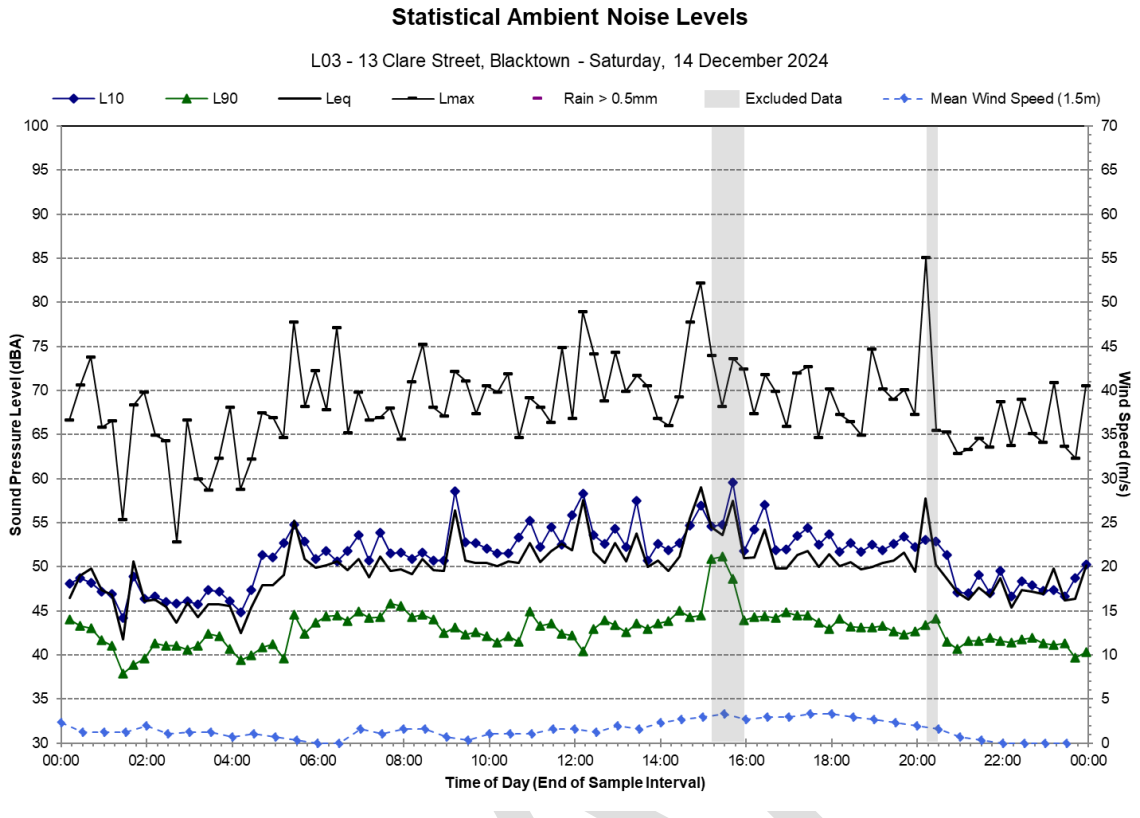
L03 - 13 Clare Street, Blacktown - Thursday, 12 December 2024

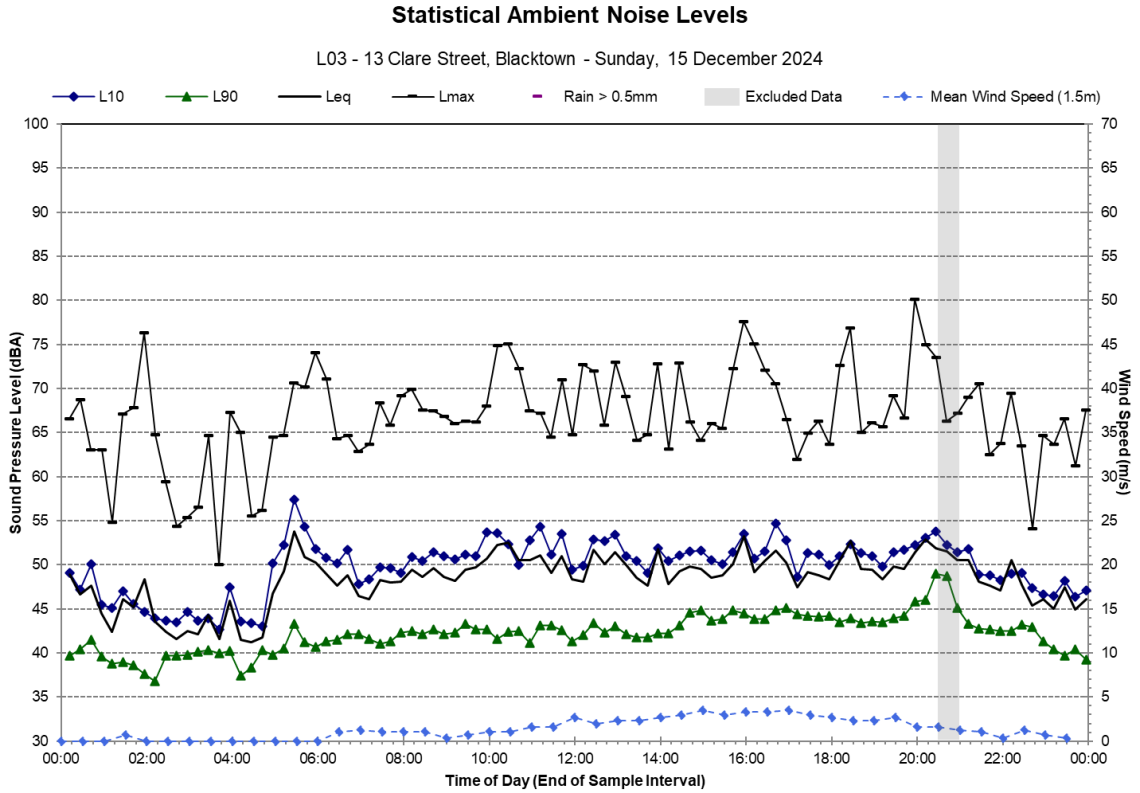


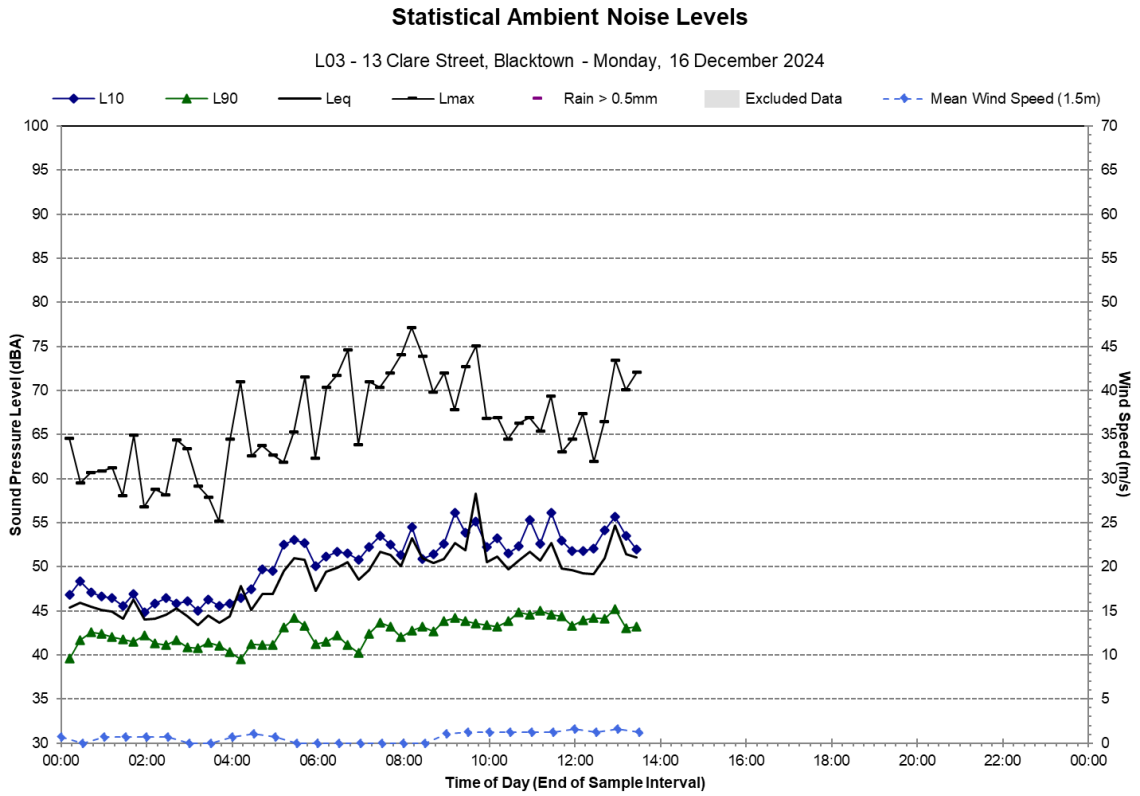
Statistical Ambient Noise Levels

L03 - 13 Clare Street, Blacktown - Friday, 13 December 2024




Statistical Ambient Noise Levels
L03 - 13 Clare Street, Blacktown - Saturday, 14 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L03 - 13 Clare Street, Blacktown - Sunday, 15 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
L03 - 13 Clare Street, Blacktown - Monday, 16 December 2024
L10
L90
Leq
Lmax
Rain > 0.5mm
Excluded Data
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
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

Appendix C Construction Noise Sources

Honeman Close Warehouse Facility - SSD-79500208

Noise and Vibration Impact Assessment

Goodman Property Services (Aust) Pty Limited

SLR Project No.: 610.032326.00002

3 June 2025

Equipment	Total SWL $L_{Aeq(15\ minute)}$	Bobcat (approx. 1 t)	Chainsaw[1]	Compactor	Concrete Mixer Truck	Concrete Pump	Concrete Vibrator[1]	Dozer (tracking) - equiv. CAT D9	Dump Truck	Elevated Working Platform	Excavator - Tracked (20 t)	Excavator - Tracked (30 t)	Front end loader 23t	Grader	Hand tools (electric)	Line Marking Plant	Mobile Crane (CNVG)	Paving Machine	Piling - Bored	Roller - Vibratory (12 t)[1]	Scraper 651	Tractor (Towing Trailer)	Truck - road truck/ truck & dog (30 t)	Tub Grinder[1]	Light Vehicle - 4WD	Water Cart (CNVG)
Sound Power Level[2]		110	114	106	109	106	113	116	110	98	105	110	112	113	102	108	113	114	111	109	113	107	108	116	103	107
Estimated on-time in any 15 minutes		15	5	15	7.5	7.5	15	15	15	15	7.5	7.5	7.5	15	15	15	15	15	7.5	15	15	15	5	15	15	15
Scenario																										
W.01 - Vegetation Clearing	118		X									X										X		X		
W.02 - Earthworks	121			X				X	X			X		X						X	X					X
W.03 - Retaining walls	118	X			X	X	X		X		X		X							X						X
W.04 - Piling	118				X	X	X					X					X		X				X			
W.05 – Construction of Roads	118													X				X		X			X		X	
W.06 - Signage and Line marking	109															X									X	
W.07 - Construction of Pads and Hardstands	113				X	X	X													X			X			
W.08 - Construction of Structures	115									X					X		X						X			

Note 1: Equipment classed as 'annoying' in the ICNG and considers a 5 dB correction.

Note 2: Sound power level data is taken from SLR measurement database, DEFRA noise database and TfNSW Construction and Vibration Guideline.

Appendix D Operational Noise Contours

Honeman Close Warehouse Facility - SSD-79500208

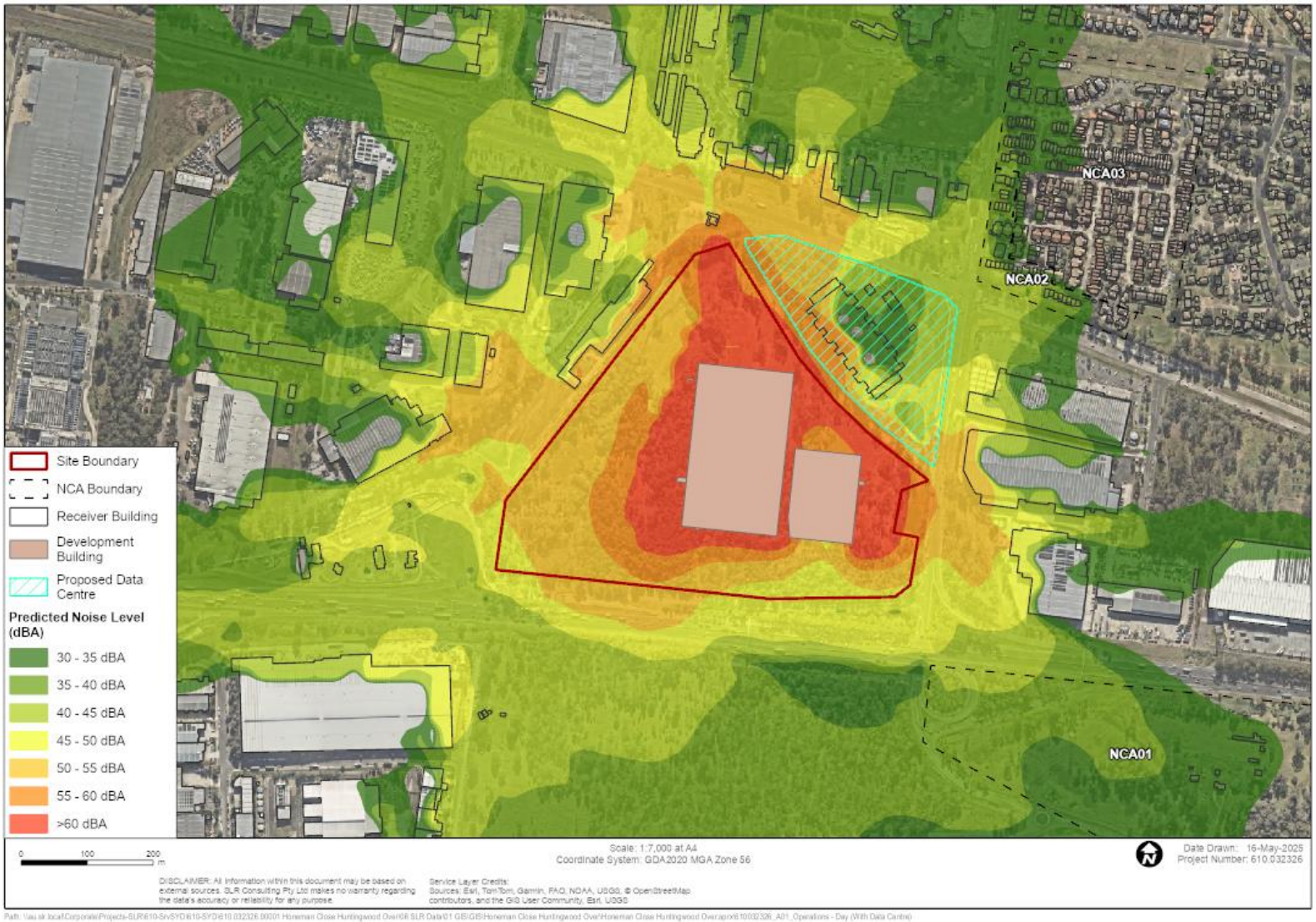
Noise and Vibration Impact Assessment

Goodman Property Services (Aust) Pty Limited

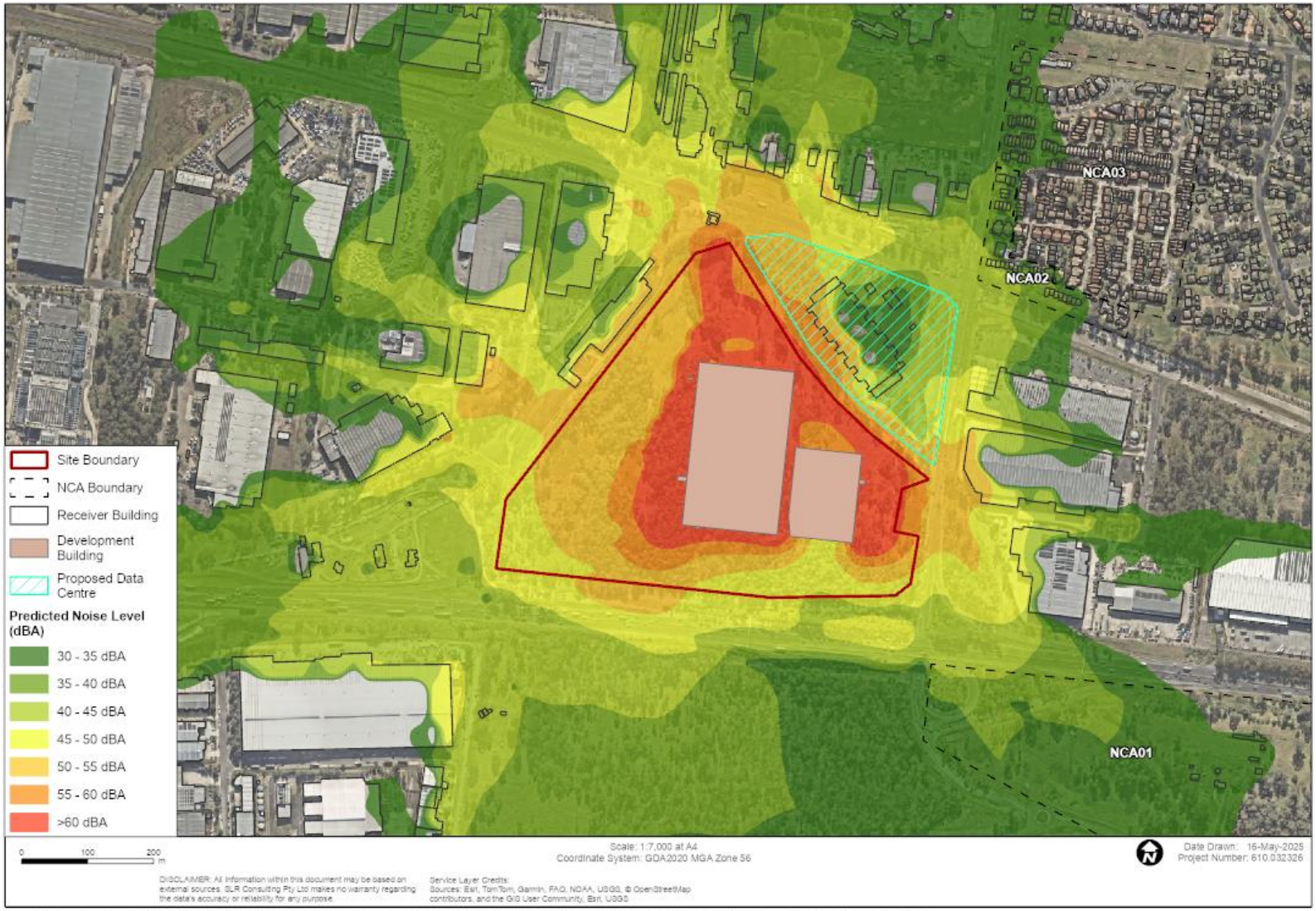
SLR Project No.: 610.032326.00002

3 June 2025

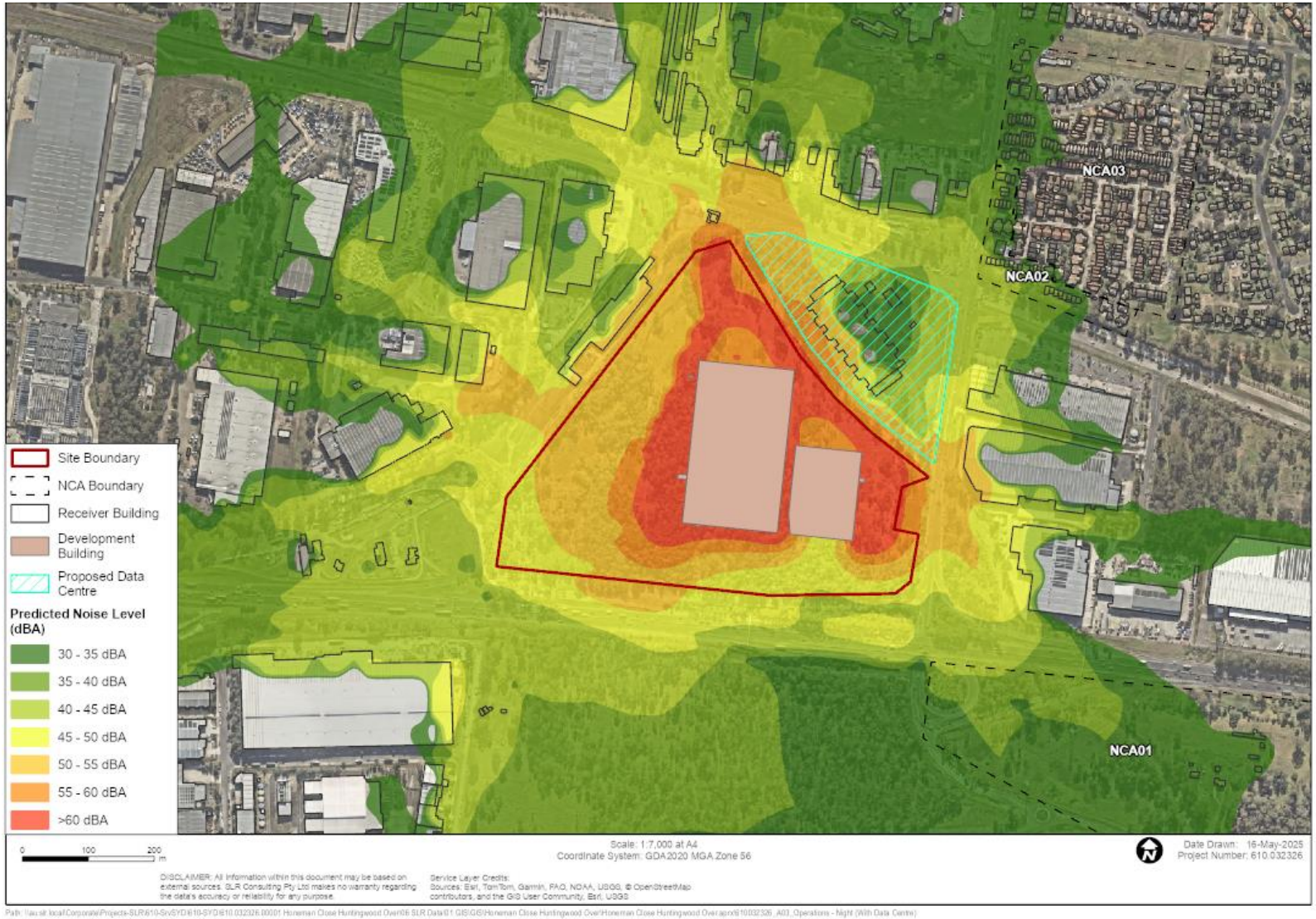
Site Operation – Day (With Data Centre)



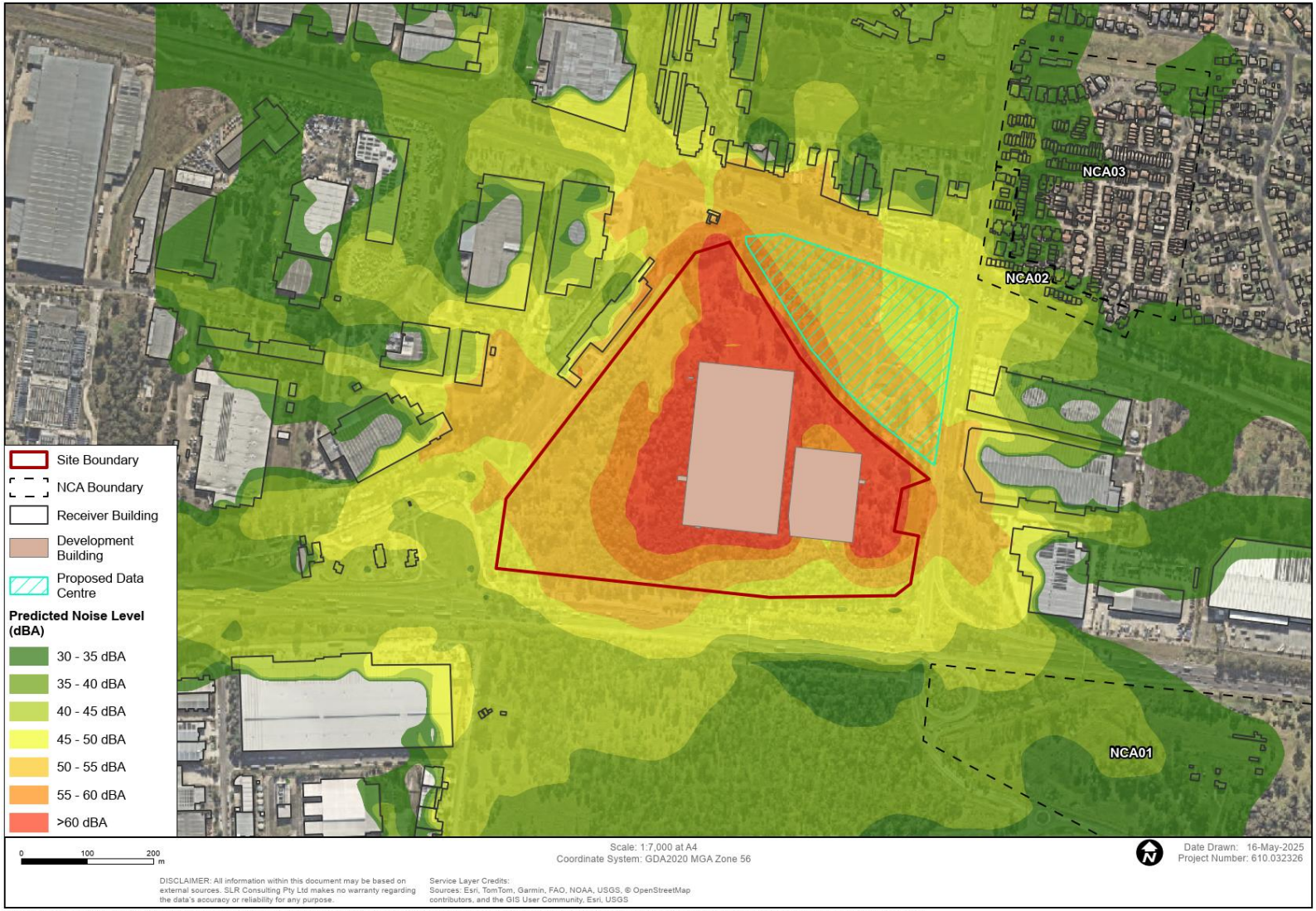
Site Operation – Evening (With Data Centre)



Site Operation – Night (With Data Centre)

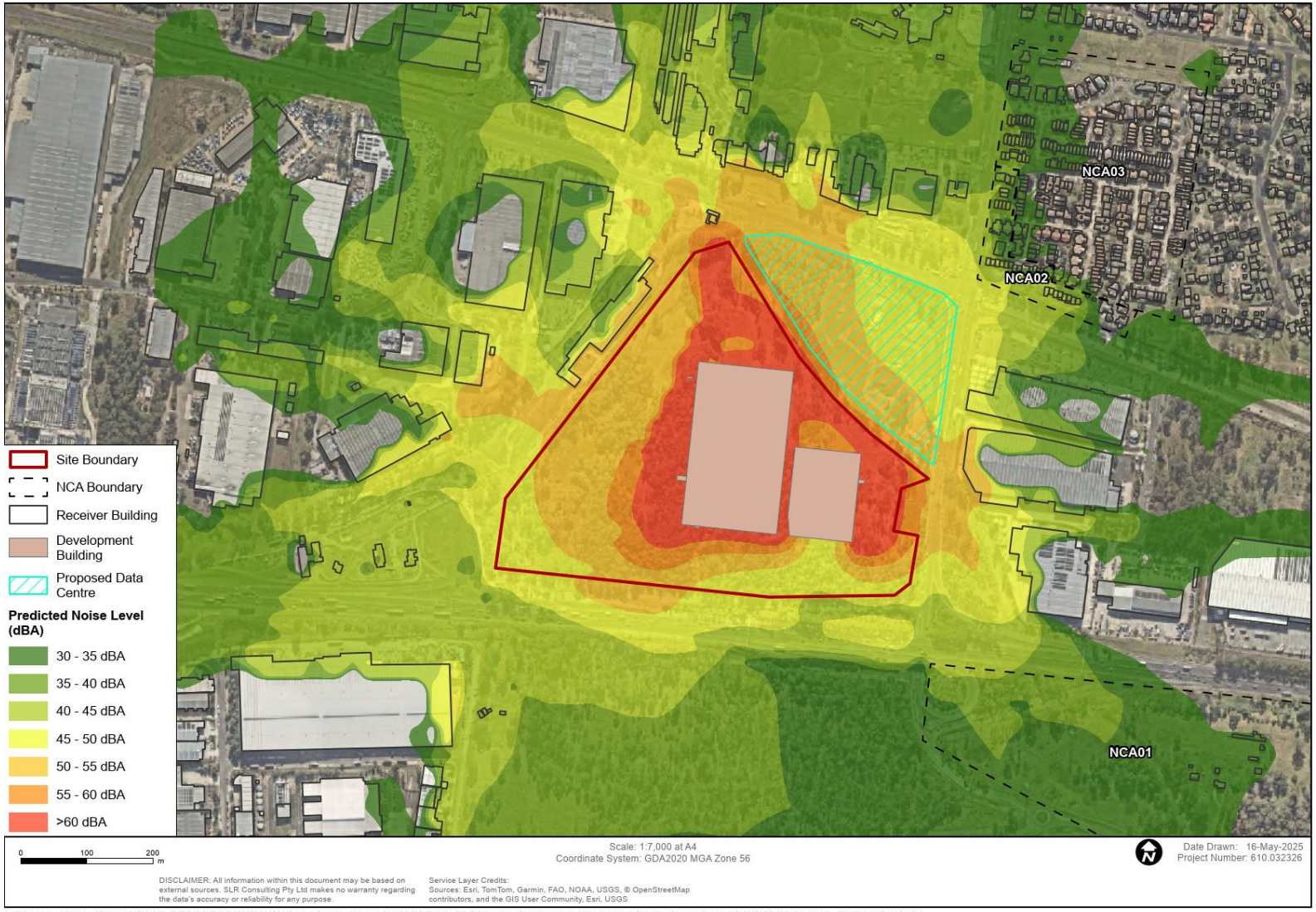


Site Operation – Day (Without Data Centre)

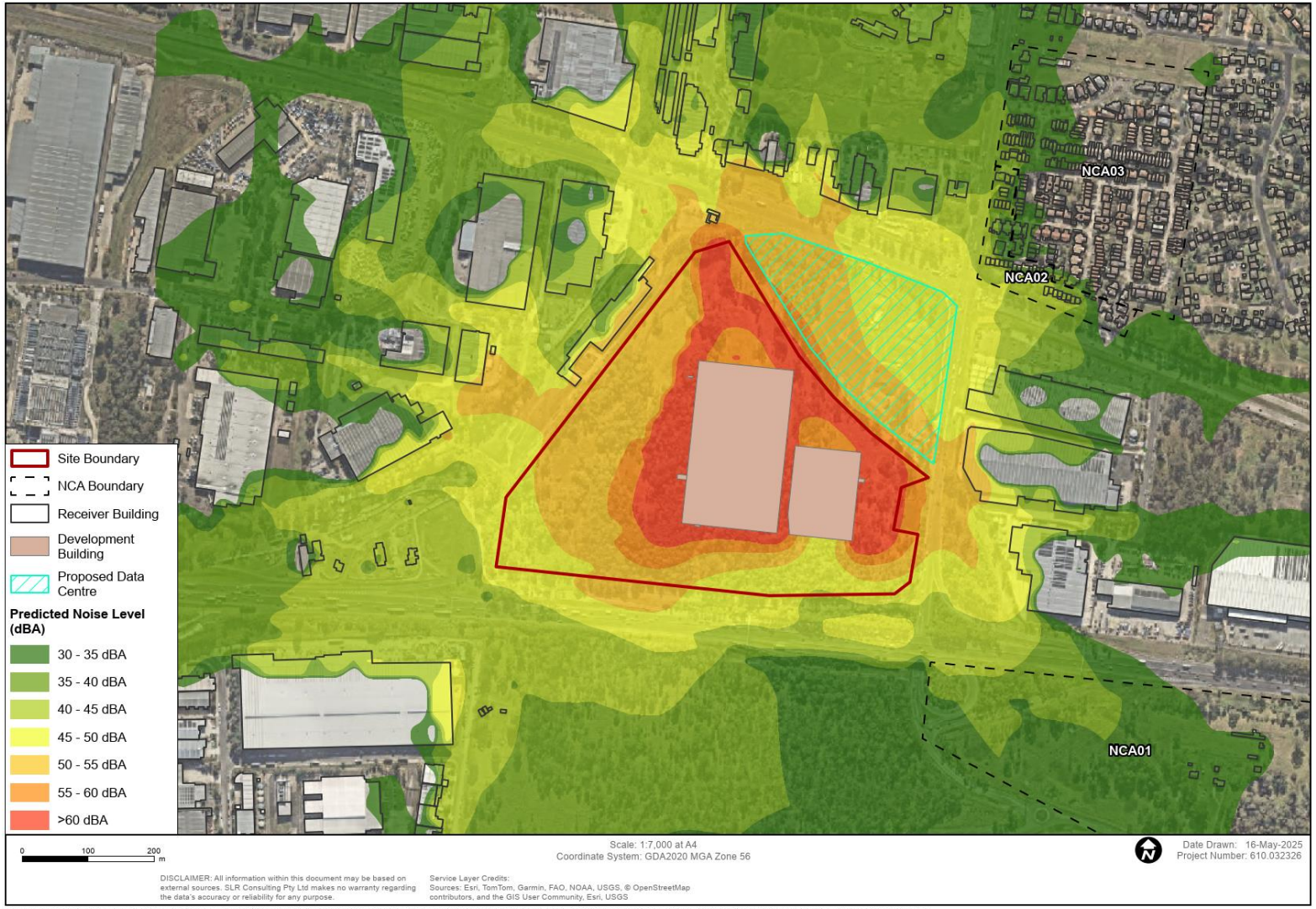


Path: \\au.slr.local\Corporate\Projects-SLR\610-SrvSYD\610-SYD\610.032326.00001 Honeman Close Huntingwood Over\06 SLR Data\01 GIS\GIS\Honeman Close Huntingwood Over\Honeman Close Huntingwood Over.aprx\610032326_A04_Operations - Day (Without Data Centre)

Site Operation – Evening (Without Data Centre)



Site Operation – Night (Without Data Centre)



Path: \\au.slr.local\Corporate\Projects-SLR\610-Srv\SYD\610-SYD\610.032326.00001 Honeman Close Huntingwood Over\06 SLR Data\01 GIS\GIS\Honeman Close Huntingwood Over\Honeman Close Huntingwood Over.aprx\610032326_A06_Operations – Night (Without Data Centre)

Appendix E CNVG Mitigation Measures

Honeman Close Warehouse Facility - SSD-79500208

Noise and Vibration Impact Assessment

Goodman Property Services (Aust) Pty Limited

SLR Project No.: 610.032326.00002

3 June 2025

CNVG Standard Mitigation and Management Measures

Action Required	Applies To	Details
Management measures		
Implementation of any project specific mitigation measures required.	Airborne noise	Implementation of any project specific mitigation measures required.
Implement community consultation or notification measures.	Airborne noise Ground-borne noise & vibration	Notification detailing work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night-time period, any operational noise benefits from the works (where applicable) and contact telephone number. Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required. Please contact Communication and Stakeholder Engagement for guidance. Website (If required) Contact telephone number for community Email distribution list (if required) Community drop-in session (if required by approval conditions).
Site inductions	Airborne noise Ground-borne noise & vibration	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • all project specific and relevant standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures • site opening/closing times (including deliveries) • environmental incident procedures.
Behavioural practices	Airborne noise	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors.
Verification	Airborne noise Ground-borne noise & vibration	Where specified under Appendix C of the CNVG a noise verification program is to be carried out for the duration of the works in accordance with the Construction Noise and Vibration Management Plan and any approval and licence conditions.
Attended vibration measurements	Ground-borne vibration	Where required attended vibration measurements should be undertaken at the commencement of vibration generating activities to confirm that vibration levels are within the acceptable range to prevent cosmetic building damage.
Update Construction Environmental Management Plans	Airborne noise Ground-borne noise & vibration	The CEMP must be regularly updated to account for changes in noise and vibration management issues and strategies.
Building condition surveys	Vibration Blasting	Undertake building dilapidation surveys on all buildings located within the buffer zone prior to commencement of activities with the potential to cause property damage

Action Required	Applies To	Details
Source controls		
Construction hours and scheduling	Airborne noise Ground-borne noise & vibration	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.
Construction respite period during normal hours and out-of-hours work	Ground-borne noise & vibration Airborne noise	See Appendix C of the CNVG for more details on the following respite measures: • Respite Offers (RO) • Respite Period 1 (R1) • Respite Period 2 (R2) • Duration Respite (DR)
Equipment selection.	Airborne noise Ground-borne noise & vibration	Use quieter and less vibration emitting construction methods where feasible and reasonable. For example, when piling is required, bored piles rather than impact-driven piles will minimise noise and vibration impacts. Similarly, diaphragm wall construction techniques, in lieu of sheet piling, will have significant noise and vibration benefits. Ensure plant including the silencer is well maintained.
Plant noise levels.	Airborne-noise	The noise levels of plant and equipment must have operating Sound Power or Sound Pressure Levels compliant with the criteria in Appendix H of the CNVG. Implement a noise monitoring audit program to ensure equipment remains within the more stringent of the manufacturers specifications or Appendix H of the CNVG.
Rental plant and equipment.	Airborne-noise	The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on site unless compliant with the criteria in Table 2 of the CNVG.
Use and siting of plant.	Airborne-noise	The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers. Only have necessary equipment on site.
Plan worksites and activities to minimise noise and vibration.	Airborne noise Ground-borne vibration	Locate compounds away from sensitive receivers and discourage access from local roads. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible. Very noise activities should be scheduled for normal working hours. If the work cannot be undertaken during the day, it should be completed before 11:00pm. Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters. If programmed night work is postponed the work should be re-programmed and the approaches in this guideline apply again.
Reduced equipment power	Airborne noise Ground-borne vibration	Use only the necessary size and power.

Action Required	Applies To	Details
Non-tonal and ambient sensitive reversing alarms	Airborne noise	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work. Consider the use of ambient sensitive alarms that adjust output relative to the ambient noise level.
Minimise disturbance arising from delivery of goods to construction sites.	Airborne noise	Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible. Avoid or minimise these out of hours movements where possible.
Engine compression brakes	Construction vehicles	Limit the use of engine compression brakes at night and in residential areas. Ensure vehicles are fitted with a maintained Original Equipment Manufacturer exhaust silencer or a silencer that complies with the National Transport Commission's 'In-service test procedure' and standard.
Path controls		
Shield stationary noise sources such as pumps, compressors, fans etc.	Airborne noise	Stationary noise sources should be enclosed or shielded where feasible and reasonable whilst ensuring that the occupational health and safety of workers is maintained. Appendix D of AS 2436:2010 lists materials suitable for shielding.
Shield sensitive receivers from noisy activities.	Airborne noise	Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant.
Receptor control		
Structural surveys and vibration monitoring	Ground-borne vibration	Pre-construction surveys of the structural integrity of vibration sensitive buildings may be warranted. At locations where there are high-risk receptors, vibration monitoring should be conducted during the activities causing vibration.
See Appendix C of the CNVG for additional measures	Airborne noise Ground-borne vibration	In some instances, additional mitigation measures may be required.

Appendix F NPfI Mitigation Measures

Honeman Close Warehouse Facility - SSD-79500208

Noise and Vibration Impact Assessment

Goodman Property Services (Aust) Pty Limited

SLR Project No.: 610.032326.00002

3 June 2025

Best Management Practice (BMP)

Best management practice (BMP) is the application of particular operational procedures that minimise noise while retaining productive efficiency.

Where applied, these measures and practices are often documented in a noise management plan so that operational practices and undertakings are clearly understood and applied at all levels of an industrial operation. Application of BMP can include the following types of practice:

- Using the quietest plant that can do the job
- Scheduling the use of noisy equipment at the least-sensitive time of day
- Not operating, or reducing operations at night
- Siting noisy equipment behind structures that act as barriers, or at the greatest distance from the noise-sensitive area or orienting the equipment so that noise emissions are directed away from any sensitive areas, to achieve the maximum attenuation of noise
- Where there are several noisy pieces of equipment, scheduling operations so they are used separately rather than concurrently
- Keeping equipment well-maintained and operating it in a proper and efficient manner
- Using ‘quiet’ practices when operating equipment, for example, positioning idling trucks in appropriate areas
- Running staff-education programs and regular tool box talks on the effects of noise and the use of quiet work practices.

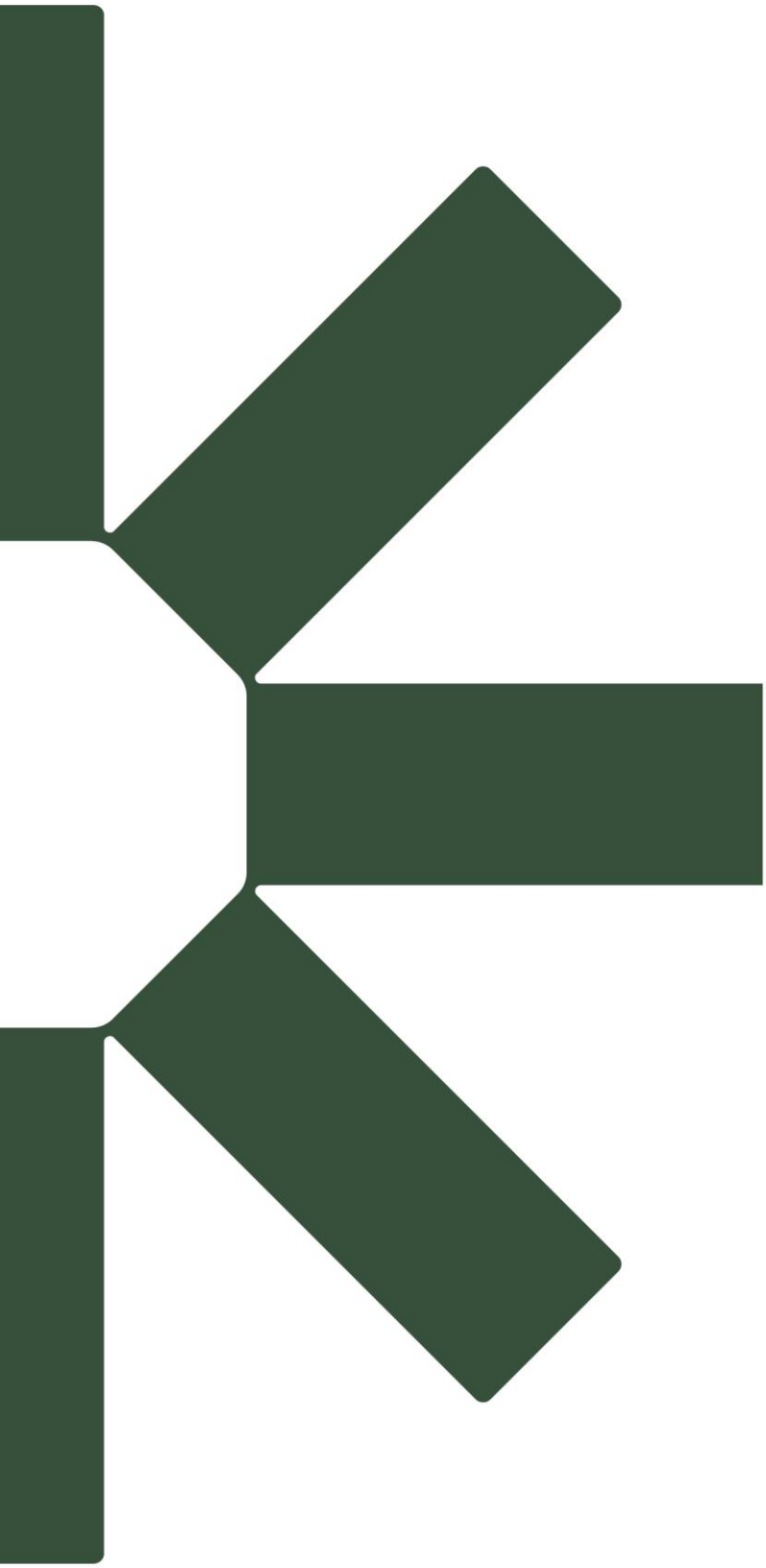
Best Available Technology Economically Achievable (BATEA)

With ‘Best available technology economically achievable’ (BATEA), equipment, plant and machinery that produce noise incorporate the most advanced and affordable technology to minimise noise output. Affordability is not necessarily determined by the price of the technology alone. Increased productivity may also result from using more advanced equipment, offsetting the initial outlay, for example, using ‘quieter’ equipment that can be operated over extended hours. Old or badly-designed equipment can often be a major source of noise.

Where BMP fails to achieve the required noise reduction by itself, the BATEA approach should then be considered. Examples of uses of BATEA include:

- Considering alternatives to tonal reversing alarms (where work health and safety is appropriately considered)
- Using equipment with efficient muffler design
- Using quieter engines, such as electric instead of internal combustion
- Fitting and maintaining noise reduction packages on plant and equipment
- Using efficient enclosures for noise sources
- Damping or lining metal trays or bins
- Active noise control.

For many industries there are a wide range of factors that can restrict the feasibility and reasonableness of applying BMP or BATEA measures on a particular site. Work health and safety considerations must also be taken into account as well as any other regulatory and process requirements.



Making Sustainability Happen