300 Burns Bay Road, Lane Cove

Early Works Construction Noise and Vibration Management Plan (CNVMP)

Lane Cove Development No.1 Pty Ltd

Report Reference: 250528-1 – 300 Burns Bay Rd Lane Cove - CNVMP – R1

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PULSE WHITE NOISE ACOUSTICS Suite 601, L6, 32 Walker St, North Sydney NSW 2060
P 1800 4 PULSE (1800 478 573) **E** info@pwna.com.au **pwna.com.au** ABN 95 642 886 306

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PREPARED BY:

Pulse White Noise Acoustics Pty Ltd
ABN: 95 642 886 306
Address: Suite 601, Level 6, 32 Miller Street, North Sydney, 2060
Phone: 1800 4 PULSE

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1 INTRODUCTION

Pulse White Noise Acoustics has been engaged to undertake the acoustic assessment including the Construction Noise and Vibration Management Plan (CNVMP) for the proposed early works associated with the project located at 300 Burns Bay Road, Lane Cove.

The Early Works SSD application will cover the below scope of works:

- Site establishment
- Demolition of all existing structures and removal of trees
- Shoring and Bulk excavation works
- Extension and augmentation of services infrastructure

This report includes the CNVMP for the required construction activities on the site and required as part of the SSD application for the early works including the requirements of the NSW EPA *Interim Construction Noise Guideline*.

This report includes the noise and vibration mitigations and management controls for the operation of construction activities on the site to ensure impacts to surrounding receivers are minimised in accordance with the relevant requirements.

This report supports an Early works State Significant Development Application (SSDA) (SSD-100293708) being lodged with the Department of Planning, Housing and Infrastructure (DHPI) for the demolition of all existing buildings and structures, excavation, augmentation of existing services and ground works at 300 Burns Bay Road, Lane Cove (the site) to enable the proposed redevelopment of the site for a residential development sought separately under SSD- 87925706. The proponent for the SSDA is Lane Cove Developments No 1 Pty Ltd.

The proposal aims to:

- Facilitate the early works required for Ministerial declared HDA site under SSD-87925706, which will result in the construction of 225 dwellings.
- Enable the demolition, excavation and ground works to ensure the site is suitable for residential development of the site.
- Ensure the expedient delivery of the HDA application at the site (SSD-87925706), as per the requirements of the HDA approval pathway.

On 26 May 2025, the Housing Delivery Authority (HDA) recommended the proposed development for the purpose of residential flat building development including the construction of circa 225 dwellings at 300 Burns Bay Road, Lane Cove be declared a State Significant Development (SSD) under s4.36(3) of the Environmental Planning and Assessment Act 1979 (EP&A Act). The main works SSD (Ref. SSD-87925706) will be lodged imminently with DPHI, with exhibition anticipated to commence in March 2026. This Early Works SSD is intended to facilitate the delivery of the residential flat building development through the following proposed works:

- Site establishment works including:
    - Erection of site hoarding, fencing and signage;
    - Installation of site office and amenities.
- The demolition of all existing structures at the site comprising:
    - Office Building
    - Warehouse
    - Car Parking structure
- Removal of 32 trees on the site;
- Shoring and bulk excavation works to enable the excavation of basement levels; and
- Extension and augmentation of services and infrastructure as required.

2 DEVELOPMENT DESCRIPTION

The site is irregular in shape and is legally described as Lot 15 DP 1230609, and has a site area of 7,595m2. The site is located on the eastern side of the roundabout intersection between Burns Bay Road and Waterview Drive. Existing development on the site comprises an existing four (4) storey office building and warehouse, which is predominately sited on the eastern portion of the site.

An aerial of the site illustrated in Figure 1.

Figure 1 Site Aerial (highlighted in red) Source: Nearmap / Colliers Urban Planning

2.1 Overview of Proposed Development

This SSDA (Ref. SSD-100293708) seeks approval for early works associated with the delivery of the residential development of the site under SSD-87925706 at 300 Burns Bay Road, Lane Cove. This SSD comprises the following proposed development:

- Site establishment works including:
  - Erection of site hoarding, fencing and signage;
  - Installation of site office and amenities.
- The demolition of all existing structures at the site comprising:
  - Office Building
  - Warehouse
  - Car Parking structure
- Removal of 32 trees on the site;
- Shoring and bulk excavation works to enable the excavation of basement levels; and
- Extension and augmentation of services and infrastructure as required.

2.2 Secretary's Environmental Assessment Requirements

This report has been prepared to respond to the Secretary's Environmental Assessment Requirements (SEARS) dated 2 December 2025 for SSD-100293708. Specifically, this report has been prepared to respond to those SEARS outlined in Table 1 below.

Table 1 Secretary's Environmental Assessment Requirements relevant to this Report

SEARs	SEARs description	Report name and section
Noise and Vibration	*Provide a noise and vibration impact assessment prepared in accordance with the relevant NSW Environment Protection Authority (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.*	Noise and Vibration Impact Assessment • Applicable noise and vibration criteria – Section 5 and 6 • Construction Noise and Vibration Management – Section 8

It is noted that as the proposed includes works associated with construction activities as part of the early works on the site no assessment of operational noise or noise impacts into the site is required to be undertaken.

2.3 Relevant Guidelines and Referenced Documents

Acoustic criteria which have been adopted in this assessment include requirements from the local and state authorities and in the absence of any applicable criteria from these bodies, Australian and International Standards will be utilised.

Architectural drawings for the proposed development which have been used in our assessment, are prepared by *pbd architects* including those with project number 2424 and included as part of the project submission.

2.4 Nearby Sensitive Receivers and Noise Sources

The site is located at 300 Burns Bay Road, Lane Cove NSW 2066 and is legally described as Lot 15 DP1230609.

Situated within the Lane Cove Council (LCC) Local Government Area (LGA), the site is zoned R4 High Density Residential within the Lane Cove Local Environmental Plan 2009 (LCLEP). It has an area of 7,595 m2 and comprises an existing office building and warehouse extension on the eastern portion of the site. A single storey structure providing car parking occupies the western part of the site. Car parking is also provided at grade along the southern site boundary and a tennis court is located on the western part of the site.

The site has a sloping topography, with a high point at 22.15m (AHD) along the boundary with the properties to the north, sloping south to a low point of 18.83m (AHD) along the southern boundary, representing an approx. 3.5m level change across the site from north to south.

Vehicle and pedestrian access to the site is via Burns Bay Road. A right of carriageway extends along the western site boundary for driveway access to the neighbouring buildings at 292-298 Burns Bay Road.

The surrounding noise and vibration sensitive receivers to the site include the following:

Receiver 1: 290 BURNS BAY ROAD LANE COVE – Residential Receiver

Receiver 2: 280-288 BURNS BAY ROAD LANE COVE – Residential Receiver

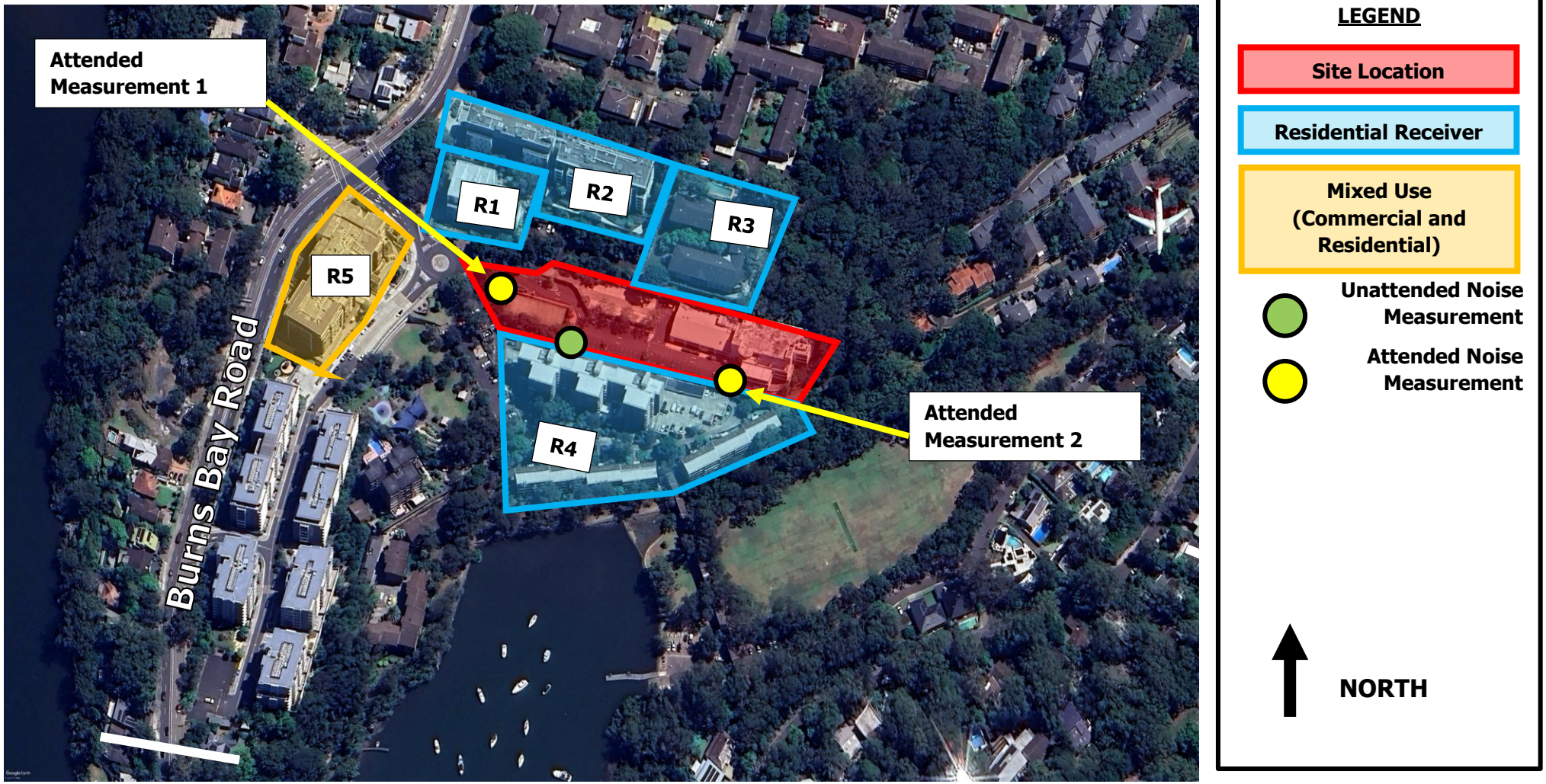
Receiver 3: 292-298 BURNS BAY ROAD LANE COVE – Residential Receiver

Receiver 4: 300A-300B BURNS BAY ROAD LANE COVE – Residential Receiver

Receiver 5: 2 WATERVIEW DRIVE LANE COVE – Mixed-use Residential / commercial / Childcare centre

The site location is presented in Figure 1 below.

Figure 1 Site Location and Noise Measurement Locations



3 NOISE DESCRIPTORS & TERMINOLOGY

Environmental noise constantly varies in level with time. It is therefore necessary to measure environmental noise in terms of quantifiable time periods and statistical descriptors. Typically, environmental noise is measured over 15-minute periods and relevant statistical descriptors of the fluctuating noise are determined to quantify the measured level.

Noise (or sound) consists of minute fluctuations in atmospheric pressure capable of detection by human hearing. Noise levels are expressed in terms of decibels, abbreviated as dB or dB(A), the A indicating that the noise levels have been frequency weighted to approximate the characteristics of normal human hearing. Because noise is measured using a logarithmic scale, 'normal' arithmetic does not apply, e.g. adding two sources of sound of an equal value results in an increase of 3dB (i.e. 60 dBA + 60 dBA = 63 dBA). 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 – 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change roughly corresponds to a doubling or halving in loudness.

The most relevant environmental noise descriptors are the LAeq, LA01, LA10 and LA90 noise levels. The LAeq noise level represents the "equivalent energy average noise level". This parameter is derived by integrating the noise level measured over the measurement period and is equivalent to a level that would have been experienced had the fluctuating noise level remained constant during the measured time period.

The LA1, LA10 and LA90 levels are the levels exceeded for 1%, 10% and 90% of the sample period. These levels are sometimes thought of as the typical maximum noise level, the average repeatable maximum and average repeatable minimum noise levels, respectively.

Specific acoustic terminology is used in this assessment report. An explanation of common acoustic terms is included as Appendix A.

4 EXISTING ACOUSTIC ENVIRONMENT

This section of the report details the acoustic survey which has been undertaken at the site for the purpose of obtaining existing background noise levels, as well as noise levels incident on the future building façades.

4.1 Unattended Noise Monitoring

As part of this assessment an acoustic survey of the existing acoustic environment at the site and surrounding receivers was undertaken. The survey included long-term unattended noise logging between 26 September and 9 October 2024. Data affected by adverse meteorological conditions and by spurious and uncharacteristic events have been excluded from the results and also excluded from the data used to determine the noise emission criteria. Meteorological information has been obtained from the Sydney Observatory Hill (ID 066214).

Noise logging was undertaken at one location on the site using 1 x Rion NL-42 monitor with serial numbers 998081. Calibration of the noise logger was checked prior to and following the measurements. Drift in calibration did not exceed ±0.5 dB. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

The unattended noise monitor was located at 300 Burns Bay Road, Lane Cove (the project site), positioned along the southern boundary of the development site.

This monitor was used to determine the background noise to establish the maximum allowable noise for residential receivers.

The location of the noise logger is shown in Figure 1 above.

Graphs presenting summaries of the measured daily noise data are attached to this report in Appendix B. The graphs present each 24-hour period and show the LA10, LAeq and LA90 noise levels for the corresponding 15-minute periods. This data has been filtered to remove periods affected by adverse weather conditions based on weather information.

4.1.1 Results in accordance with the NSW *EPA Noise Policy for Industry (NPI) 2017* (RBL's)

In order to assess the potential noise impacts of the development on nearby sensitive receivers the measured background noise data was processed in accordance with the Environmental Protection Authority (EPA) *Noise Policy for Industry* (NPI).

The Rating Background Noise Level (RBL) is the background noise level used for assessment purposes at the nearest potentially affected receiver. It is the 90th percentile of the daily background noise levels during each assessment period, being day, evening and night. RBL levels $L_{A90\ (15minute)}$ and L_{Aeq} noise levels are presented in Table 2.

Data affected by adverse meteorological conditions and by spurious and uncharacteristic events has been excluded from the results, and also excluded from the data used to determine the noise emission criteria.

Table 2 Measured Ambient Noise Levels corresponding to the NPI's Assessment Time Periods.

Measurement Location	Daytime[1] 7:00 am to 6:00 pm		Evening[1] 6:00 pm to 10:00 pm		Night-time[1] 10:00 pm to 7:00 am	
	L_{A90}[2] dB(A)	L_{Aeq}[3] dB(A)	L_{A90}[2] dB(A)	L_{Aeq}[3] dB(A)	L_{A90}[2] dB(A)	L_{Aeq}[3] dB(A)
Noise Logger 01 (see Figure 1)	43	55	42	54	36	50

Note 1 For Monday to Saturday, Daytime 7:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 7:00 am. On Sundays and Public Holidays, Daytime 8:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 8:00 am

Note 2 The L_{A90} noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.

Note 3 The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

4.2 Attended Noise Measurements

The survey included attended noise level measurements which were undertaken on 09 October 2024. Testing was conducted during a period when there was no inclement weather. This allowed the existing noise levels at the site to be quantified.

The attended noise measurements were conducted using a SVANTEK 958A sound level meter (serial number 69812). Calibration of the sound level meter was checked prior to and following the measurements using a Brüel & Kjær Type 4231 sound calibrator (serial number 3009148). The calibrator emitted a calibration tone of 94 dB at 1 kHz. The drift in calibration did not exceed ±0.5 dB. All equipment carries appropriate and current NATA (or manufacturer) calibration certificates.

The results of the attended acoustic survey are detailed in Table 3.

Table 3 Results of the Attended Noise Survey at the Site.

Measurement Location	Time of Measurement [1]	Measured Noise Level $L_{Aeq, 15min}$ dB(A) [2]	Comments
Attended Location 1: North-western corner of project site (refer to Figure 1)	11:00 – 11:30, 09 October 2024	62	Noise levels at the project site is dominated by Burns Bay Road traffic and general residential noises.
Attended Location 2: South-eastern corner of project site (refer to Figure 1)		52	Noise levels at the project site is dominated by Burns Bay Road traffic and general residential noises (e.g. cars manoeuvring carpark).

Note 1 The LAeq is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

5 CONSTRUCTION NOISE CRITERIA

This section of the report details the relevant construction noise criteria which is applicable to the site including the EPA's *Interim Construction Noise Guideline* (ICNG).

5.1 Interim Construction Noise Guideline

Noise criteria for construction activities are discussed in the *Interim Construction Noise Guideline* (ICNG). The ICNG also recommends procedures to address potential impacts of construction noise on residences and other sensitive land uses. The main objectives of the ICNG are summarised as follows:

- Promote a clear understanding of ways to identify and minimise noise from construction works;
- Focus on applying all "feasible" and "reasonable" work practices to minimise construction noise impacts;
- Encourage construction to be undertaken only during the recommended standard hours unless approval is given for works that cannot be undertaken during these hours;
- Streamline the assessment and approval stages and reduce time spent dealing with complaints at the project implementation stage; and
- Provide flexibility in selecting site-specific feasible and reasonable work practices in order to minimise noise impacts.

The ICNG contains a quantitative assessment method which is applicable to this project. Guidance levels are given for airborne noise at residences and other sensitive land uses.

The quantitative assessment method involves predicting noise levels at sensitive receivers and comparing them with the Noise Management Levels (NMLs). The NML affectation categories for receivers have been reproduced from the guideline and are listed in the table below.

Table 4 Noise Management Levels from Construction

Receiver Type	Time of Day	Noise Management Level $L_{Aeq(15minute)}$[1,2]	How to Apply
Residential	During approved working hours detained with the conditions of consent	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. 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 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 restricting the hours that the very noisy activities can occur, taking into account: 1. 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.

Receiver Type	Time of Day	Noise Management Level $L_{Aeq(15minute)}$[1,2]	How to Apply
			2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
	Outside recommended standard hours	Noise affected RBL + 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 practices have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.
Retail/ Commercial receivers (External)	When is use	$L_{Aeq\ (15\ min)}$ 70 dB(A)	During construction, the proponent should regularly update the occupants of the commercial and industrial premises regarding noise levels and hours of work.

Note 1 Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Note 2 The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the NSW Industrial Noise Policy (EPA 2000).

Table 5 Construction noise management levels – other receivers.

Land use	Location applied	Noise management level, $L_{Aeq,15min}$
Places of worship	Internal noise level	45 dB(A)
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level	65 dB(A)
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level	60 dB(A)
Community centres	Refer to the recommended "maximum" internal levels in AS2107 for specific uses	
Industrial premises	External noise level	75 dB(A)
Offices, retail outlets	External noise level	70 dB(A)
Classrooms at schools and other educational institutions	Internal noise level	45 dB(A)

Predicted construction noise levels are presented below for each of the surrounding receivers in accordance with the NSW EPA ICNG.

Note:

- Predicted noise levels presented below are given in a range, this includes the expected minimums as well as the maximums.

Based on the measured background noise levels summarised in Section 4, and the NMLs outlined above the construction noise criteria to be used in this assessment are listed in Table 6 below.

Table 6 NMLs as basis for the acoustic assessment.

Receiver Types	NML, dB $L_{Aeq(15minute)}$
	Standard Hours **Monday to Friday:** **7:00am to 6:00pm** Saturday: 8:00am to 1:00pm
Receiver 01 – Residential	**55** / *HNAL* = 75
Receiver 02 – Residential	**55** / *HNAL* = 75
Receiver 03 – Residential	**55** / *HNAL* = 75
Receiver 04 – Residential	**55** / *HNAL* = 75
Receiver 05 – Mixed-use Residential / commercial / Childcare centre	**55** / *HNAL* = 75 (residential) **70** / *HNAL* = 75 (commercial external) **55** / *HNAL* = 75 (childcare centre internal)
Note 1: The L_{Aeq} and L_{A90} levels from the daytime period have not been used to determine any noise level criteria due to the presence of construction noise occurring across the road.	

5.1.1 Construction Traffic Noise Criteria

For existing residences and other sensitive land uses affected by additional traffic on existing roads, the NSW *Road Noise Policy (RNP)* states that for noise associated with increased road traffic generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB during both day and night-time periods. An increase of 2 dB represents a minor impact that is considered barely perceptible to the average person.

6 VIBRATION CRITERIA

Effects of ground borne vibration on building may be segregated into the following three categories:

- Human comfort – Vibration in which the occupants or users of the building are inconvenienced or possibly disturbed.
- Effects on building contents – where vibration can cause damage to fixtures, fittings and other non-building related objects.
- Effects on building structures – where vibration can compromise the integrity of the building or structure itself.

6.1 Vibration Criteria - Human Comfort

Vibration effects relating specifically to the human comfort aspects of the project are provided by the EPAs Assessing vibration: a technical guideline. This type of impact can be further categorised and assessed using the appropriate criterion as follows:

- Continuous vibration – from uninterrupted sources.
- Impulsive vibration – up to three instances of sudden impact e.g., dropping heavy items, per monitoring period.
- Intermittent vibration – such as from drilling, compacting or activities that would result in continuous vibration if operated continuously.

Table 7 Continuous vibration acceleration criteria (m/s2) 1 Hz-80 Hz

Location	Assessment period	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Critical working areas (e.g. hospital operating theatres, precision laboratories)	Day or night-time	0.0050	0.010	0.10	0.20
Offices, schools, educational institutions and places of worship	Day or night-time	0.020	0.014	0.040	0.028
		0.04	0.029	0.080	0.058
Workshops	Day or night-time	0.04	0.029	0.080	0.058

Table 8 Impulsive vibration acceleration criteria (m/s2) 1 Hz-80 Hz

Location	Assessment period	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Critical working areas (e.g. hospital operating theatres, precision laboratories)	Day or night-time	0.0050	0.010	0.10	0.20
Offices, schools, educational institutions and places of worship	Day or night-time	0.64	0.46	1.28	0.92
Workshops	Day or night-time	0.64	0.46	1.28	0.92

Table 9 Intermittent vibration impacts criteria (m/s1.75) 1 Hz-80 Hz

Location	Daytime		Night-time	
	Preferred Values	Maximum Values	Preferred Values	Maximum Values
Critical working areas (e.g. hospital operating theatres, precision laboratories)	0.10	0.20	0.10	0.20
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

6.2 Vibration Criteria – Building Contents and Structure

The vibration effects on the building itself are assessed against British Standard BS 7385: Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration" (BSI 1993)

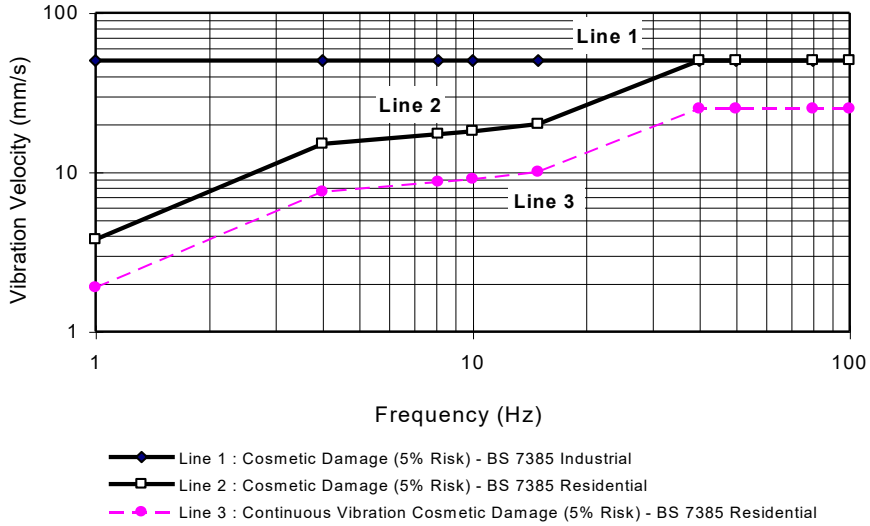
Table 10 Transient vibration criteria as per standard BS 7385 Part 2 - 1993

Line in Figure 2	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

Standard BS 7385 Part 2 – 1993 states that the values in Table 10 relate to transient vibration which does not cause resonant responses in buildings.

Where the dynamic loading caused by continuous vibration events is such that it results in dynamic magnification due to resonance (especially at the lower frequencies where lower guide values apply), then the values in Table 10 may need to be reduced by up to 50%.

Figure 2 BS 7385 Part 2 – 1993, graph of transient vibration values for cosmetic damage



In the lower frequency region where strains associated with a given vibration velocity magnitude are higher, the recommended values corresponding to Line 2 are reduced. Below a frequency of 4 Hz, where a high displacement is associated with the relatively low peak component particle velocity value, a maximum displacement of 0.6 mm (zero to peak) is recommended. This displacement is equivalent to a vibration velocity of 3.7 mm/s at 1 Hz.

The standard also states that minor damage is possible at vibration magnitudes which are greater than twice those given in Table 10, and major damage to a building structure may occur at values greater than four times the tabulated values.

Fatigue considerations are also addressed in the standard and it is concluded that unless the calculation indicates that the magnitude and number of load reversals is significant (in respect of the fatigue life of building materials) then the values in Table 10 should not be reduced for fatigue considerations.

6.3 Project Construction Vibration Criteria

Based on the review of the above relevant construction vibration standards, following vibration criteria have been established for the project construction vibration to adjacent receivers by adopting BS7385 part 2.

Project vibration criteria – 7 mm/s PPV for residential receivers

6.4 Construction Traffic Noise Criteria

For existing other sensitive land uses affected by additional traffic on existing roads, the NSW Road Noise Policy (RNP) states that for noise associated with increased road traffic generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB during both day and night-time periods. An increase of 2 dB represents a minor impact that is considered barely perceptible to the average person.

6.5 Vibration Assessment

In order to maintain compliance with the human comfort vibration criteria discussed in Section 6 it is recommended that the indicative safe distances listed in Table 11 should be maintained. These indicative safe distances should be validated at the start of construction works by undertaking measurements of vibration levels generated by construction and demolition equipment to be used on site.

Additionally, any vibration levels should be assessed in accordance with the criteria discussed in Section 6.3.

Table 11 Recommended indicative safe working distances for vibration intensive plant

Plant	Rating / Description	Safe Working Distances (m)	
		Cosmetic Damage (BS 7385: Part 2 DIN 4150: Part 3)	Human Comfort (AVTG)
Vibratory roller	< 50 kN (Typically 1 – 2 tonnes)	5	15 – 20
	< 100 kN (Typically 2 – 4 tonnes)	6	20
	< 200 kN (Typically 4 – 6 tonnes)	12	40
	< 300 kN (Typically 7 – 13 tonnes)	15	100
	> 300 kN (Typically more than 13 tonnes)	20	100
Small hydraulic hammer	300 kg, typically 5 – 12 tonnes excavator	2	7
Medium hydraulic hammer	900 kg, typically 12 – 18 tonnes excavator	7	23
Large hydraulic hammer	1600 kg, typically 18 – 34 tonnes excavator	22	73
Vibratory pile driver	Sheet piles	2 – 20	20
Jackhammer	Hand held	1	Avoid contact with structure and steel reinforcements

Given the substantial separation distance between the proposed site and the nearest sensitive receivers, vibration impacts at the identified sensitive receivers are expected to comply with the vibration criteria set out in Section 6 of this report.

7 CONSTRUCTION NOISE ASSESSMENT

This section of the report details the assessment of noise associated with the construction activities associated with the development. The assessment has been undertaken to assess the potential noise impacts from construction on surrounding receivers to the site.

The construction activities to be undertaken on the site include the ground works and construction of the site. The construction of the project does not include major demolition on the site.

7.1 Construction Noise

The assessment of construction noise impacts generated from the site has been undertaken in accordance with the requirements of the EPA Interim Construction Noise Guideline.

The EPA's Interim Construction Noise Guideline defines normal day time hours as the following:

2.2 Recommended standard hours

The recommended standard hours for construction work are shown in Table 1; however, they are not mandatory. There are some situations, as described below, where construction work may need to be undertaken outside of these hours. The likely noise impacts and the ability to undertake works during the recommended standard hours should be considered when scheduling work.

Table 1: Recommended standard hours for construction work

Work type	Recommended standard hours of work*
Normal construction	Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays
Blasting	Monday to Friday 9 am to 5 pm Saturday 9 am to 1 pm No blasting on Sundays or public holidays

* The relevant authority (consent, determining or regulatory) may impose more or less stringent construction hours.

7.1.1 Approved Hours of Work

Works on the site will be undertaken in accordance with the requirements of the project consent, including approved construction hours.

7.1.2 Construction Appliances

The construction appliances which will be used as part of the construction of the project are detailed in the table below. Construction noise impact has been assessed to the nearest identified receivers listed above. The predicted noise levels from the proposed construction appliances are shown in Table 13 and Table 18.

Table 12 Noise Level from Expected Demotion Appliances

Tasks	Equipment	Sound Power Levels (dBA re 1pW)	Aggregate Sound Power Level per Task (dBA re 1pW)
Early Works construction activities	Excavator	112	119
	Hydraulic Hammer	118	
	Piling Rig	110	
	Handheld jack hammer [1]	111	
	Dump truck [1]	104	
	Concrete saw [1]	114	
	Skid steer	110	
	Power hand tools	109	

Note 1: An assumed time correction has been applied, this being 5 minutes of operation in any 15-minute interval.

Table 13 Receiver 1 – Residential – Summary of preliminary predicted construction noise levels.

Phase	Activity	Aggregate Sound Power Level (dB(A) re 1pW)	Predicted Individual Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Predicted Combined Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Criteria dB(A) $L_{Aeq\ 15\ minutes}$	Summary of Result
Early Works construction activities	Excavator	119	61 to 70	66 to 75	**Standard Construction Hours:** **Monday to Friday** 7:00 am – 6:00 pm = 53 **Saturday** 8:00 am – 1:00 pm = 53 **Outside Standard Hours:** = 48 **Highly Noise Affected Level** Standard Construction Hours **75**	Works indicatively predicted to be non-compliant with the Noise Management Level (BG + 10 dB(A)) and above the Highly Noise Affected Level of 75 dB(A) during standard construction hours.
	Hydraulic Hammer		67 to 76			
	Piling Rig		59 to 68			
	Handheld jack hammer		55 to 64			
	Dump truck		48 to 57			
	Concrete saw		58 to 67			
	Skid steer		59 to 68			
	Power hand tools		58 to 67			

Table 14 Receiver 2 – Residential – Summary of preliminary predicted construction noise levels.

Phase	Activity	Aggregate Sound Power Level (dB(A) re 1pW)	Predicted Individual Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Predicted Combined Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Criteria dB(A) $L_{Aeq\ 15\ minutes}$	Summary of Result
Early Works construction activities	Excavator	119	62 to 74	67 to 79	**Standard Construction Hours:** **Monday to Friday** 7:00 am – 6:00 pm = 53 **Saturday** 8:00 am – 1:00 pm = 53 **Outside Standard Hours:** = 48 **Highly Noise Affected Level** Standard Construction Hours **75**	Works indicatively predicted to be non-compliant with the Noise Management Level (BG + 10 dB(A)) and above the Highly Noise Affected Level of 75 dB(A) during standard construction hours.
	Hydraulic Hammer		68 to 80			
	Piling Rig		60 to 72			
	Handheld jack hammer		57 to 69			
	Dump truck		50 to 62			
	Concrete saw		60 to 72			
	Skid steer		60 to 72			
	Power hand tools		59 to 71			

Table 15 Receiver 3 – Residential – Summary of preliminary predicted construction noise levels.

Phase	Activity	Aggregate Sound Power Level (dB(A) re 1pW)	Predicted Individual Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Predicted Combined Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Criteria dB(A) $L_{Aeq\ 15\ minutes}$	Summary of Result
Early Works construction activities	Excavator	119	66 to 84	71 to 89	**Standard Construction Hours:** **Monday to Friday** 7:00 am – 6:00 pm = 53 **Saturday** 8:00 am – 1:00 pm = 53 **Outside Standard Hours:** = 48 **Highly Noise Affected Level** Standard Construction Hours **75**	Works indicatively predicted to be non-compliant with the Noise Management Level (BG + 10 dB(A)) and above the Highly Noise Affected Level of 75 dB(A) during standard construction hours.
	Hydraulic Hammer		72 to 90			
	Piling Rig		64 to 82			
	Handheld jack hammer		61 to 78			
	Dump truck		54 to 71			
	Concrete saw		64 to 81			
	Skid steer		64 to 82			
	Power hand tools		63 to 81			

Table 16 Receiver 4 – Residential – Summary of preliminary predicted construction noise levels.

Phase	Activity	Aggregate Sound Power Level (dB(A) re 1pW)	Predicted Individual Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Predicted Combined Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Criteria dB(A) $L_{Aeq\ 15\ minutes}$	Summary of Result
Early Works construction activities	Excavator	119	63 to 78	68 to 83	**Standard Construction Hours:** **Monday to Friday** 7:00 am – 6:00 pm = 53 **Saturday** 8:00 am – 1:00 pm = 53 **Outside Standard Hours:** = 48 **Highly Noise Affected Level** Standard Construction Hours **75**	Works indicatively predicted to be non-compliant with the Noise Management Level (BG + 10 dB(A)) and above the Highly Noise Affected Level of 75 dB(A) during standard construction hours.
	Hydraulic Hammer		69 to 84			
	Piling Rig		61 to 76			
	Handheld jack hammer		57 to 72			
	Dump truck		50 to 65			
	Concrete saw		60 to 75			
	Skid steer		61 to 76			
	Power hand tools		60 to 75			

Table 17 Receiver 5 – Commercial – Summary of preliminary predicted construction noise levels.

Phase	Activity	Aggregate Sound Power Level (dB(A) re 1pW)	Predicted Individual Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Predicted Combined Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Criteria dB(A) $L_{Aeq\ 15\ minutes}$	Summary of Result
Early Works construction activities	Excavator	119	59 to 64	64 to 69	**All days** When in use = 70	Works indicatively predicted to be compliant with the Noise Management Level for commercial receivers.
	Hydraulic Hammer		65 to 70			
	Piling Rig		57 to 62			
	Handheld jack hammer		53 to 58			
	Dump truck		46 to 51			
	Concrete saw		56 to 61			
	Skid steer		57 to 62			
	Power hand tools		56 to 61			

Table 18 Receiver 5 – Childcare Centre – Summary of preliminary predicted construction noise levels.

Phase	Activity	Aggregate Sound Power Level (dB(A) re 1pW)	Predicted Individual Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Predicted Combined Noise Level at Receiver dB(A) $L_{Aeq\ 15\ minutes}$	Criteria dB(A) $L_{Aeq\ 15\ minutes}$	Summary of Result
Early Works construction activities	Excavator	119	49 to 54	54 to 59	**All days** When in use = 55 external noise level. (converted from a 45 dB(A) internal noise criteria with a 10 dB reduction)	Works indicatively predicted to have the potential to exceed the 45 dB(A) internal noise level (55 dB(A) external) limit for works which are undertaken in close proximity to the receiver.
	Hydraulic Hammer		55 to 60			
	Piling Rig		47 to 52			
	Handheld jack hammer		43 to 48			
	Dump truck		36 to 41			
	Concrete saw		46 to 51			
	Skid steer		47 to 52			
	Power hand tools		46 to 51			

7.2 Construction Traffic Noise Assessment

It is proposed that the construction traffic would access the site via Loftus Crescent.

From the criteria discussed in Section 5.1.1, it is noted that vehicle numbers on surrounding roads would need to increase by around 60% from existing traffic flows, for a 2 dB increase in road traffic noise to occur. As noted previously, a 2 dB increase in road traffic noise is not considered to be noticeable.

Based on the likely number of vehicles projected over each of the phases, it is concluded that noise impacts from construction traffic is unlikely to have an impact at the nearest affected properties. As a result, no further assessment is required.

8 NOISE AND VIBRATION MANAGEMENT PLAN

8.1 Acoustic Management Procedures

8.1.1 Summary of procedures

Table 19 below summarises the management procedures recommended for airborne noise and vibration impact. These procedures are also further discussed in the report. Hence, where applicable, links to further references are provided in Table 19.

Table 19 Summary of mitigation procedures

Procedure	Abbreviation	Description	Further Reference
General Management Measures	GMM	Introduce best-practice general mitigation measures in the workplace which are aimed at reducing the acoustic impact onto the nearest affected receivers.	Refer to Section 8.4, 8.5 For noise impact, also refer to Section 7 For vibration impact, also refer to Section 8.3, 8.4, 8.5
Project Notification	PN	Issue project updates to stakeholders, discussing overviews of current and upcoming works. Advanced warning of potential disruptions can be included. Content and length to be determined on a project-by-project basis.	Refer to Section 8.4, 8.5
Verification Monitoring	V	Monitoring to comprise attended or unattended acoustic surveys. The purpose of the monitoring is to confirm measured levels are consistent with the predictions in the acoustic assessment, and to verify that the mitigation procedures are appropriate for the affected receivers. If the measured levels are higher than those predicted, then the measures will need to be reviewed and the management plan will need to be amended.	For noise impact, refer to Section 0 For 0 vibration impact, refer to Section 8.1.3
Complaints Management System	CMS	Implement a management system which includes procedures for receiving and addressing complaints from affected stakeholders	Refer to Section 8.4, 8.5
Specific Notification	SN	Individual letters or phone calls to notify stakeholders that noise levels are likely to exceed noise objectives. Alternatively, contractor could visit stakeholders individually in order to brief them in regards to the noise impact and the mitigation measures that will be implemented.	Refer to Section 8.4, 8.5
Respite Offer	RO	Offer provided to stakeholders subjected to an ongoing impact.	Refer to section 8.2.3
Alternative Construction Methodology	AC	Contractor to consider alternative construction options that achieve compliance with relevant criteria. Alternative option to be determined on a case-by-case basis. It is recommended that the selection of the alternative option should also be determined by considering the assessment of on-site measurements (refer to Verification Monitoring above).	Refer to section 8.7

The application of these procedures is in relation to the exceedances over the relevant criteria. For airborne noise, the criteria are based on NMLs. The allocation of these procedures is discussed in Section 8.1.2.

For vibration, the criteria either correspond to human comfort, building damage or scientific and medical equipment. The application of these procedures is discussed in Section 8.1.3.

8.1.2 Allocation of Noise Management Procedures

Management procedures have been allocated based on noise level exceedances at the affected properties, which occur over the designated NMLs. The allocation of these procedures is summarised in Table 20 below.

Table 20 Allocation of noise management procedures – residential receivers

Construction Hours	Exceedance over NML (dB)	Management Procedures (see definition above)
Standard Hours Approved Working hours	0 - 3	GMM
	4 - 10	GMM, PN, V [1], CMS, AC
	> 10	GMM, PN, V, CMS, SN, AC
	> 75dBA	GMM, PN, V, CMS, SN, AC, RO
Note 3 Verification monitoring to be undertaken upon complaints received from affected receivers		

8.1.3 Allocation of Vibration Management Procedures

Table 21 below summarises the vibration management procedures to be adopted based on exceedance scenarios (i.e., whether the exceedance occurs over human comfort criteria, building damage criteria, or criteria for scientific and medical equipment). Please note these management procedures apply for any type of affected receiver (i.e., for residences as well as non-residential receivers).

Table 21 Allocation of vibration management procedures

Construction Hours	Exceedance Scenario	Management Procedures
Standard Hours Approved Working Hours	Over human comfort criteria (refer to section 6.1)	GMM, PN, V, CMS
	Over building damage criteria (refer to section 6.2)	GMM, V, AC, CMS

8.2 Site Specific Noise Mitigation Measures

8.2.1 Respite Periods

Predicted noise levels outlined above indicate exceedances above the Noise Management Levels (NMLs) as well as the Highly Affected Level (HNAL) when in proximity to a boundary.

To militate against any exceedances, the site will need to introduce periods of respite for activities which are creating noise levels above the HNAL only (i.e., greater than 75dBA).

Table 22 Recommended Respite Periods

Monday to Friday	Saturday
7:00am to 8:00am – No noisy works (Respite Periods)	8:00am to 9:00am – No noisy works (Respite Period)
8:00am to 11:30am – Works	9:00am to 1:00pm – Works
11:30am to 12:30pm – No Noisy Works (Respite Periods)	
12:30pm to 3:30pm – Works	
3:30pm to 4:30pm – No noisy works (Respite Period)	
4:30pm to 6:00pm – Works	

8.2.2 Vehicle Driver Conduct

Delivery drivers are to be instructed to mitigate noise impacts including the following:

1. Mitigate engine braking from truck when possible, including deactivating breaks within the vicinity of residential receivers.
2. Reduce aggressive acceleration from the site.
3. Ensure all trucks and equipment are well maintained.
4. Other relevant noise reducing operations where possible.
5. Details of the required driver codes are included in the projects *Construction Management Plan.*

8.2.3 General Comments

The contractor will, where reasonable and feasible, apply best practice noise mitigation measures. These measures shall include the following:

- Maximising the offset distance between plant items and nearby noise sensitive receivers.
- Preventing noisy plant working simultaneously and adjacent to sensitive receivers.
- Minimising consecutive works in the same site area.
- Orienting equipment away from noise sensitive areas.
- Carrying out loading and unloading away from noise sensitive areas.

In order to minimise noise impacts during the works, the contractor will take all reasonable and feasible measures to mitigate noise effects.

The contractor will also take reasonable steps to control noise from all plant and equipment. Examples of appropriate noise control include efficient silencers and low noise mufflers.

The contractor should apply all feasible and reasonable work practices to meet the NMLs and inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels, duration of noise generating construction works, and the contact details for the proposal.

8.2.4 Noise Monitoring

Noise monitoring, if required, will be performed by an acoustical consultant directly engaged by the contractor.

Noise monitoring is recommended to be undertaken by attended noise measurements at the start of any new phase of works (i.e. demolition or remediation works etc.). The statistical parameters to be measured should include the following noise descriptors: LAmin, LA90, LA10, LA1, LAmax and LAeq.

This monitoring should also be complemented by undertaking attended noise measurements in order to:

- Differentiate between construction noise sources and other extraneous noise events (such as road traffic and aircraft noise)
- Note and identify any excessive noise emitting machinery or operation.

In addition to the above detailed measurements, should any complaints be received which have not been determined previously, it should be confirmed by conducting additional attended noise measurements.

The survey methodology and any equipment should comply with the requirements discussed in Standard AS 1055.1-1997.

Based on the proposed works to be undertaken as part of the project the following noise monitoring is recommended:

- Attended noise monitoring of construction activities is to be undertaken during the following periods:
    - Commencement of any rock breaking or sawing on the site.
    - In response to any ongoing complaints received from neighbours.

8.2.5 Alternate Equipment or Process

Exceedance of the site's NMLs should result in an investigation as to whether alternate equipment could be used, or a difference process could be undertaken.

In some cases, the investigation may conclude that no possible other equipment can be used, however, a different process could be undertaken.

8.2.6 Acoustic Enclosures/Screening (If required)

Typically, on a construction site there are three different types of plant that will be used: mobile plant (i.e., excavators, skid steers, etc.), semi mobile plant (i.e., hand tools generally) or static plant i.e. (diesel generators).

For plant items which are static it is recommended that if required, in the event exceedances are being measured due to operation of the plant item, an acoustic enclosure/screen is constructed to reduce impacts. These systems can be constructed from Fibre Cement (FC) sheeting or, if airflow is required, acoustic attenuators or louvres.

For semi mobile plant, relocation of plant should be investigated to either be operated in an enclosed space or at locations away from a receiver.

With mobile plant it is generally not possible to treat these sources. However, investigations into the machine itself may result in a reduction of noise (i.e., mufflers/attenuators etc).

8.3 Vibration Mitigation Measures

8.3.1 General Comments

As part of the CNVMP, the following vibration mitigation measures should be implemented:

- Any vibration generating plant and equipment is to be in areas within the site in order to lower the vibration impacts.
- Investigate the feasibility of rescheduling the hours of operation of major vibration generating plant and equipment.
- Use lower vibration generating items of construction plant and equipment; that is, smaller capacity plant.
- Minimise conducting vibration generating works consecutively in the same area (if applicable).
- Use only dampened rock breakers and/or "city" rock breakers to minimise the impacts associated with rock breaking works.
- Conduct attended measurements of vibration generating plant at commencement of works in order to validate the indicative safe working distances advised in Table above and, consequently, to establish safe working distances suitable to the project. Measurements should be conducted at the nearest affected property boundary. These safe working distances should be defined by considering the vibration criteria discussed above. (i.e., criteria for structural damage, human comfort and impact to scientific or medical equipment).

8.3.2 Vibration Monitoring

Vibration monitoring, if required, should be undertaken continuously at the nearest most affected structures.

The monitoring location would be on a stiff part of the structure (at the foundation) on the side of the structure adjacent to the subject demolition and construction works.

The vibration monitoring system will be configured to record the peak vibration levels and to trigger an alarm when predetermined vibration thresholds are exceeded. The thresholds correspond to an "Operator Warning Level" and an "Operator Halt Level", where the Warning Level is 75% of the Halt Level. The Halt Level should be determined based on the vibration criteria for building contents and structure.

Exceedance of the "Operator Warning Level" would not require demolition work to cease, but rather, alerts the site manager to proceed with caution at a reduced force or load. An exceedance of the "Operator Halt Level" would require the contractor to implement an alternative technique pending further analysis of the vibration frequency content in order to determine any potential exceedance of the criteria.

The vibration monitoring equipment would be downloaded and analysed by the acoustical consultant.

Reports of the measured vibration levels and their likely impacts would be prepared by the acoustical consultant and issued to the contractor.

- Attended vibration monitoring of construction activities is to be undertaken during the following periods
    - In response to any ongoing complaints received from neighbours.

8.4 Community Consultation

Active community consultation and the maintenance of positive relations with local residents and businesses would assist in alleviating concerns and thereby minimising complaint. It is common for construction projects to provide community consultation if an exceedance of noise goals has been predicted. This communication is commonly conducted in the form of a letter box drop or more active engagement with more highly impacted receivers.

This form of notification should provide specific notification of the duration and timing of the construction activities so that residents are informed about the proposed works ahead of time. The letter should also provide the community with a hotline number for a community liaison officer available to adequately respond to all project related enquiries.

Ideally the hotline number should provide concerned locals an opportunity to raise any concerns with the project proponent and provide an opportunity to determine the best method to satisfy all requirements.

Prior to the works onsite being undertaken, it is recommended that community consultation with the neighbouring affected parties be undertaken.

The communication however should not be limited to the beginning of the onsite works but throughout providing the community with constant updates to the progress and upcoming works. In our experience these could include:

- Site noticeboard.
- Email notifications; and
- Letterbox drops.

8.5 Complaints Management System

Should complaints arise they must be dealt with in a responsible and uniform manner, therefore, a management system to deal with complaints is detailed above including details included in the project Construction Management Plan.

8.6 Contingency Plans

Contingency plans are required to address noise or vibration problems if excessive levels are measured at surrounding sensitive receivers and/or if justified complaints occur. Such plans include:

- Stop the onsite works.
- Identify the source of the main equipment within specific areas of the site which is producing the most construction noise and vibration at the sensitive receivers; and
- Review the identified equipment and determine if an alternate piece of equipment can be used or the process can be altered.
- In the event an alternate piece of equipment or process can be used, works can re-commence.
- In the event an alternate piece of equipment or process cannot be determined implement a construction assessment to be performed by a suitably qualified acoustic consultant.

The Superintendent shall have access to view the Contractor's noise measurement records on request. The Superintendent may undertake noise monitoring if and when required.

8.7 General Mitigation Measures (Australian Standard 2436-2010)

As well as the above project specific noise mitigation controls, AS 2436-2010 "Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites" sets out numerous practical recommendations to assist in mitigating construction noise emissions. Examples of strategies that could be implemented on the subject project are listed below, including the typical noise reduction achieved, where applicable.

8.7.1 Adoption of Universal Work Practices

- Regular reinforcement (such as at toolbox talks) of the need to minimise noise and vibration.
- Regular identification of noisy activities and adoption of improvement techniques.
- Avoiding the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon nearby sensitive receivers.
- Where possible, avoiding the use of equipment that generates impulsive noise.
- Minimising the need for vehicle reversing for example (particularly at night), by arranging for one-way site traffic routes. Use of broadband audible alarms on vehicles and elevating work platforms used on site.
- Minimising the movement of materials and plant and unnecessary metal-on-metal contact.
- Minimising truck movements.

8.7.2 Plant and Equipment

- Choosing quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks.
- Selecting plant and equipment with low vibration generation characteristics.
- Operating plant and equipment in the quietest and most efficient manner.

8.7.3 On Site Noise Mitigation

- Maximising the distance between noise activities and noise sensitive land uses.
- Installing purpose-built noise barriers, acoustic sheds and enclosures.

8.7.4 Work Scheduling

- Scheduling work to coincide with non-sensitive periods.
- Planning deliveries and access to the site to occur quietly and efficiently and organising parking only within designated areas located away from the sensitive receivers.
- Optimising the number of deliveries to the site by amalgamating loads where possible and scheduling arrivals within designated hours.
- Including contract conditions that include penalties for non-compliance with reasonable instructions by the principal to minimise noise or arrange suitable scheduling.

8.7.5 Source Noise Control Strategies

Some ways of controlling noise at the source are:

- Where reasonably practical, noisy plant or processes should be replaced by less noisy alternatives.
- Modify existing equipment: Engines and exhausts are typically the dominant noise sources on mobile plant such as cranes, graders, excavators, trucks, etc. In order to minimise noise emissions, residential grade mufflers should be fitted on all mobile plant utilised on site.
- Siting of equipment: locating 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.
- Regular and effective maintenance.

8.7.6 Miscellaneous Comments

- Deliveries should be undertaken, where possible, during standard construction hours.
- Maximise hammer penetration (and reduce blows) by using sharp hammer tips. Keep stocks of sharp profiles at site and monitor the profiles in use.
- It is advised that mobile plant and trucks operating on site for a significant portion of the project are to have reversing alarm noise emissions minimised. This is to be implemented subject to recognising the need to maintain occupational safety standards.
- No public address system should be used on site (except for emergency purposes).

9 CONCLUSION

This report has been undertaken such that the construction noise and vibration requirements of the projects SSD-100293708 including noise and vibration resulting from the proposed construction appliances to be undertaken as part of the proposed early works SSDA to be undertaken at the 300 Burns Bay Road, Lane Cove project.

An assessment of noise and vibration impacts from the required processes to be undertaken during the activities to be undertaken as part of the early works of the project has been undertaken. Suitable treatments, management controls, periodic measurements and community engagement have been detailed in this report.

Provided that the recommendations in this report are incorporated into the project site's construction methodology, compliance with the requirements of the EPA's Interim Construction Noise Guideline and the project SEARS will be achieved.

For any additional information please do not hesitate to contact the person below.

Regards

Ben White
Director
PULSE WHITE NOISE ACOUSTICS PTY LTD

APPENDIX A. APPENDIX TERMINOLOGY

Sound power level	The total sound emitted by a source
Sound pressure level	The amount of sound at a specified point
Decibel [dB]	The measurement unit of sound
A Weighted decibels [dB(A])	The A weighting is a frequency filter applied to measured noise levels to represent how humans hear sounds. The A-weighting filter emphasises frequencies in the speech range (between 1kHz and 4 kHz) which the human ear is most sensitive to, and places less emphasis on low frequencies at which the human ear is not so sensitive. When an overall sound level is A-weighted it is expressed in units of dB(A).
Decibel scale	The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows:
	0dB(A) Threshold of human hearing 30dB(A) A quiet country park 40dB(A) Whisper in a library 50dB(A) Open office space 70dB(A) Inside a car on a freeway 80dB(A) Outboard motor 90dB(A) Heavy truck pass-by 100dB(A) Jackhammer/Subway train 110 dB(A) Rock Concert 115dB(A) Limit of sound permitted in industry 120dB(A) 747 take off at 250 metres
Frequency [f]	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high pitched sound and a low frequency to a low pitched sound.
Ambient sound	The all-encompassing sound at a point composed of sound from all sources near and far.
Equivalent continuous sound level [L_{eq}]	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.
Reverberation	The persistence of sound in a space after the source of that sound has been stopped (the reverberation time is the time taken for a reverberant sound field to decrease by 60 dB)
Air-borne sound	The sound emitted directly from a source into the surrounding air, such as speech, television or music
Impact sound	The sound emitted from force of one object hitting another such as footfalls and slamming cupboards.
Air-borne sound isolation	The reduction of airborne sound between two rooms.
Sound Reduction Index [R] *(Sound Transmission Loss)*	The ratio the sound incident on a partition to the sound transmitted by the partition.
Weighted sound reduction index [R_w]	A single figure representation of the air-borne sound insulation of a partition based upon the R values for each frequency measured in a laboratory environment.
Level difference [D]	The difference in sound pressure level between two rooms.
Normalised level difference [D_n]	The difference in sound pressure level between two rooms normalised for the absorption area of the receiving room.
Standardised level difference [D_{nT}]	The difference in sound pressure level between two rooms normalised for the reverberation time of the receiving room.
Weighted standardised level difference [$D_{nT,w}$]	A single figure representation of the air-borne sound insulation of a partition based upon the level difference. Generally used to present the performance of a partition when measured in situ on site.
C_{tr}	A value added to an R_w or $D_{nT,w}$ value to account for variations in the spectrum.

Impact sound isolation	The resistance of a floor or wall to transmit impact sound.
Impact sound pressure level [L_i]	The sound pressure level in the receiving room produced by impacts subjected to the adjacent floor or wall by a tapping machine.
Normalised impact sound pressure level [L_n]	The impact sound pressure level normalised for the absorption area of the receiving room.
Weighted normalised impact sound pressure level [$L_{n,w}$]	A single figure representation of the impact sound insulation of a floor or wall based upon the impact sound pressure level measured in a laboratory.
Weighted standardised impact sound pressure level [$L'_{nT,w}$]	A single figure representation of the impact sound insulation of a floor or wall based upon the impact sound pressure level measured in situ on site.
C_I	A value added to an L_{nW} or $L'_{nT,w}$ value to account for variations in the spectrum.
Energy Equivalent Sound Pressure Level [$L_{A,eq,T}$]	'A' weighted, energy averaged sound pressure level over the measurement period T.
Percentile Sound Pressure Level [$L_{Ax,T}$]	'A' weighted, sound pressure that is exceeded for percentile x of the measurement period T.
Speech Privacy	A non-technical term but one of common usage. Speech privacy and speech intelligibility are opposites and a high level of speech privacy means a low level of speech intelligibility. It should be recognised that acceptable levels of speech privacy do not require that speech from an adjacent room is inaudible.
Sound Pressure Level, LP dB	A measurement obtained directly using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the rms sound pressure to the reference sound pressure of 20 micro Pascals.
Sound Power Level, Lw dB	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power levels is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt
Noise Reduction	The difference in sound pressure level between any two areas. The term "noise reduction" does not specify any grade or performance quality unless accompanied by a specification of the units and conditions under which the units shall apply
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Background Sound Low	The average of the lowest levels of the sound levels measured in an affected area in the absence of noise from occupants and from unwanted, external ambient noise sources. Usually taken to mean the LA90 value
Character, acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on
LMax	The maximum sound pressure level measured over a given period.
LMin	The minimum sound pressure level measured over a given period.
L1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L10	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L90	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
Leq	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.

APPENDIX B: UNATTENDED NOISE LOGGING – NOISE LOGGER DATA

300 Burns Bay Road, Lane Cove

Ambient noise monitoring report

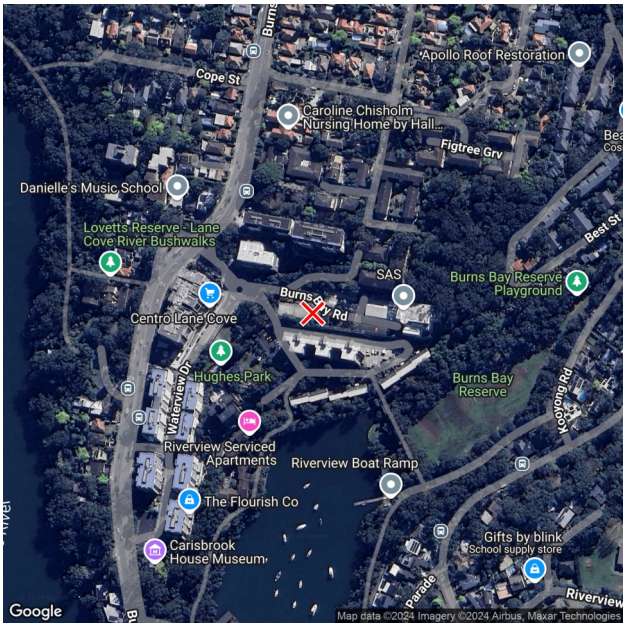
Item	Information
Logger Type	NL-42
Serial number	998081
Address	300 Burns Bay Road, Lane Cove
Location	300 Burns Bay Road, Lane Cove
Facade / free field	Free field
Environment	

Measured noise levels

Logging date	Rating Background Level			$L_{Aeq,period}$		
	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am
Thu 26 Sep 2024	-	46	-	58	58	54
Fri 27 Sep 2024	47	44	39	58	56	53
Sat 28 Sep 2024	45	42	37	56	54	51
Sun 29 Sep 2024	42	40	36	49	47	46
Mon 30 Sep 2024	47	42	37	57	56	51
Tue 01 Oct 2024	43	41	36	54	55	51
Wed 02 Oct 2024	44	42	35	56	55	52
Thu 03 Oct 2024	43	42	36	49	47	46
Fri 04 Oct 2024	43	41	35	50	47	47
Sat 05 Oct 2024	43	42	36	53	47	46
Sun 06 Oct 2024	42	41	36	52	54	44
Mon 07 Oct 2024	42	40	36	49	46	47
Tue 08 Oct 2024	46	41	37	57	56	51
Wed 09 Oct 2024	-	-	-	59	-	52
Summary	**43**	**42**	**36**	**55**	**54**	**50**

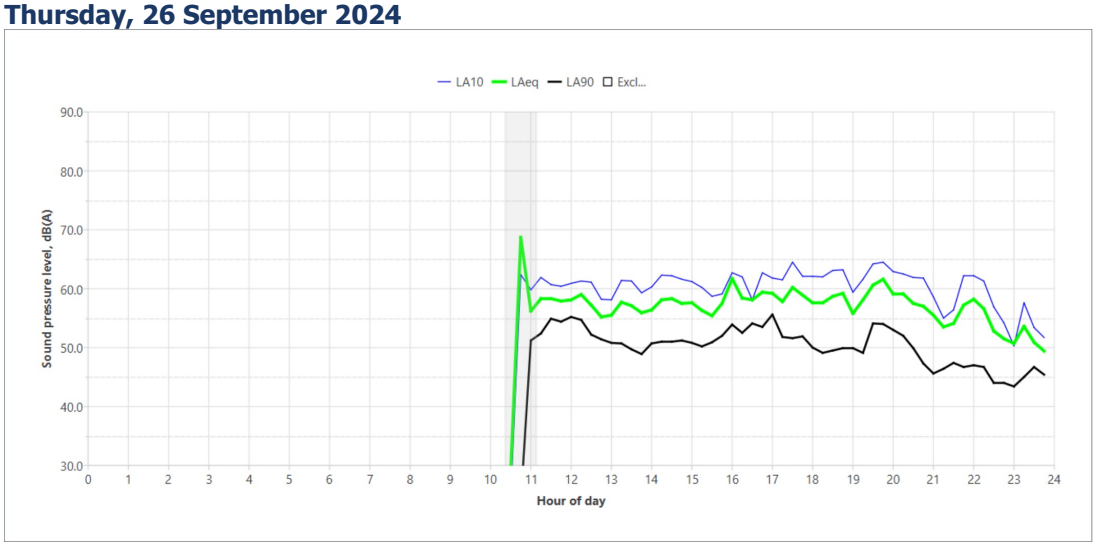
Note: Results with a '-' identify that there were not enough measurements available to correctly calculate the level, in accordance with the Noise Policy for Industry. The data has been excluded either from weather or manual exclusions. See the charts for more information

Logger location

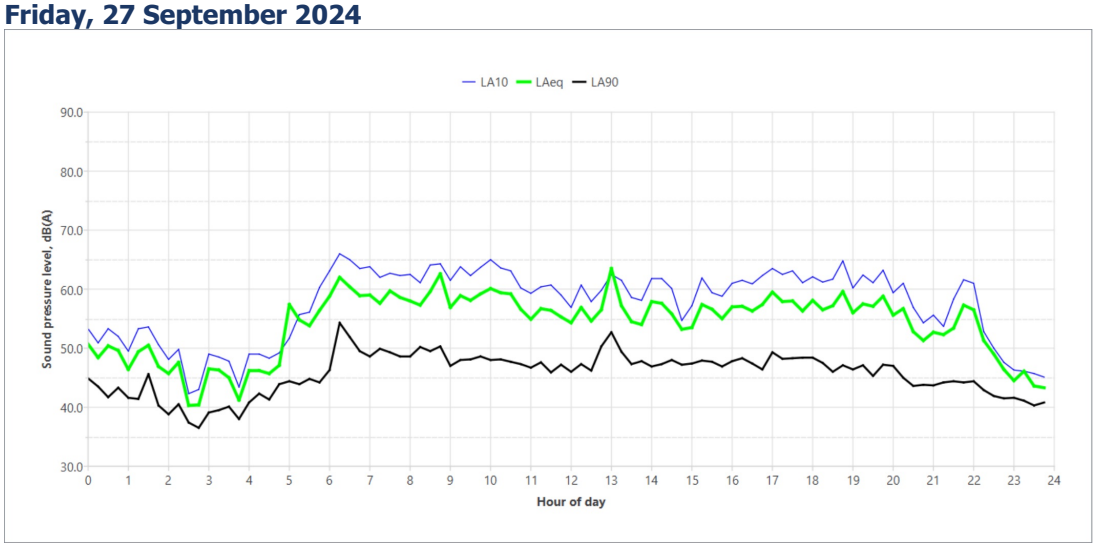


Logger deployment photo

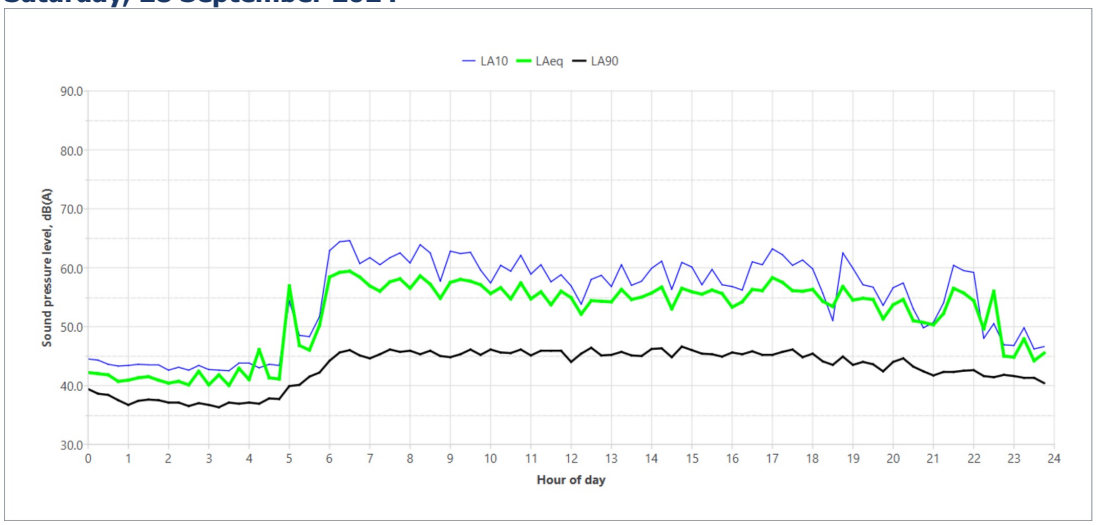
Thursday, 26 September 2024



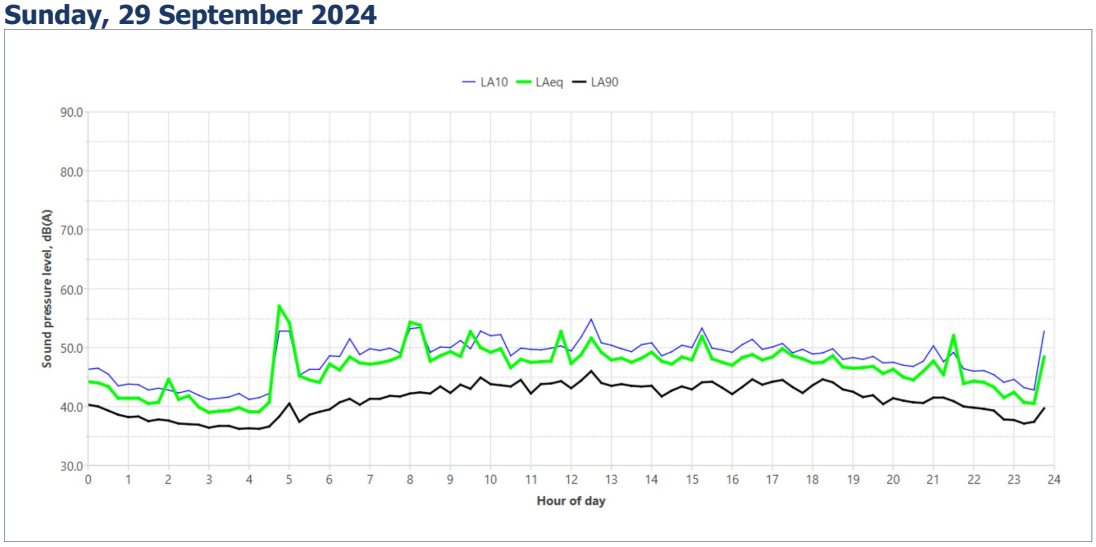
Friday, 27 September 2024



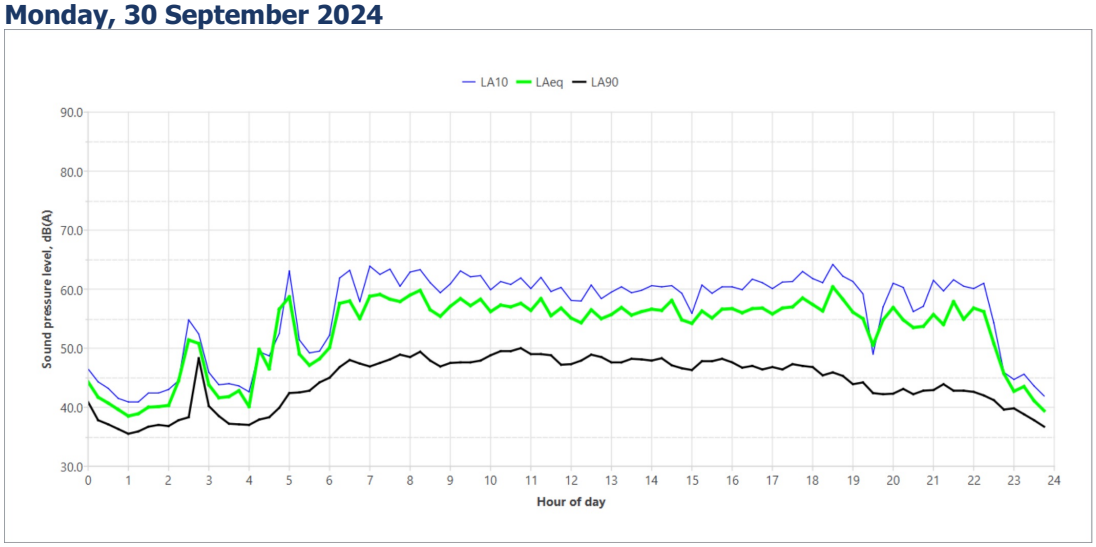
Saturday, 28 September 2024



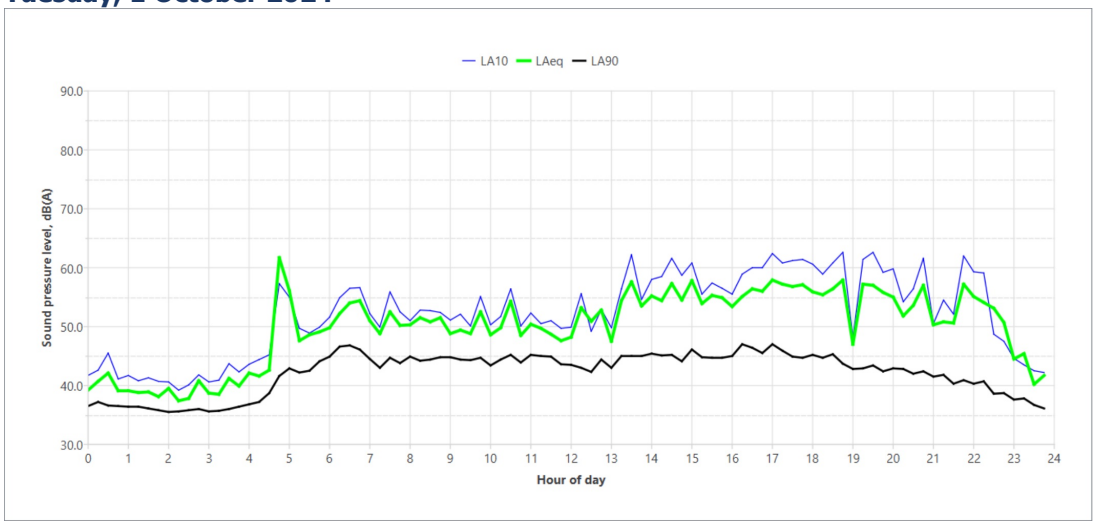
Sunday, 29 September 2024



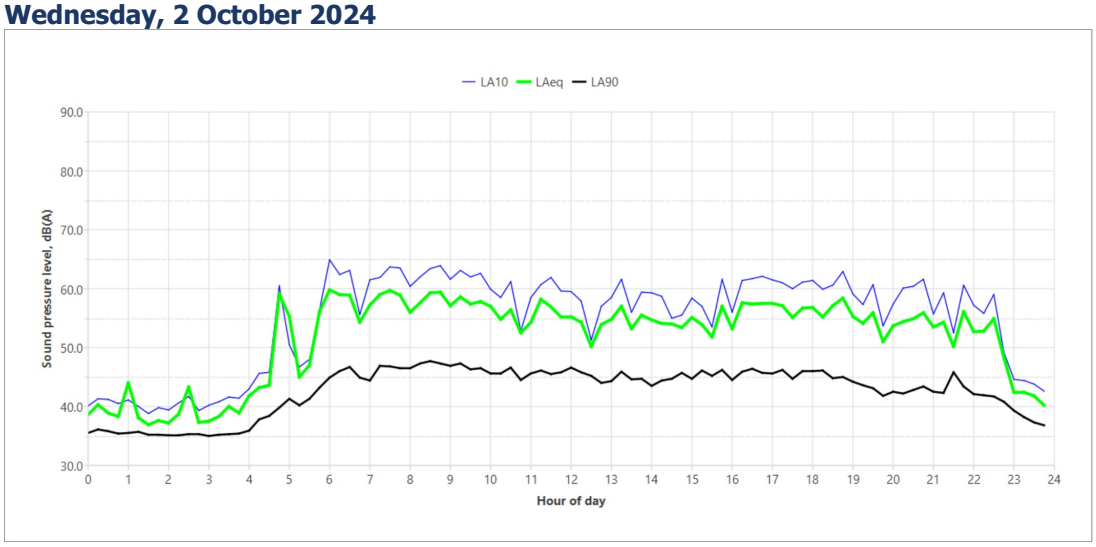
Monday, 30 September 2024



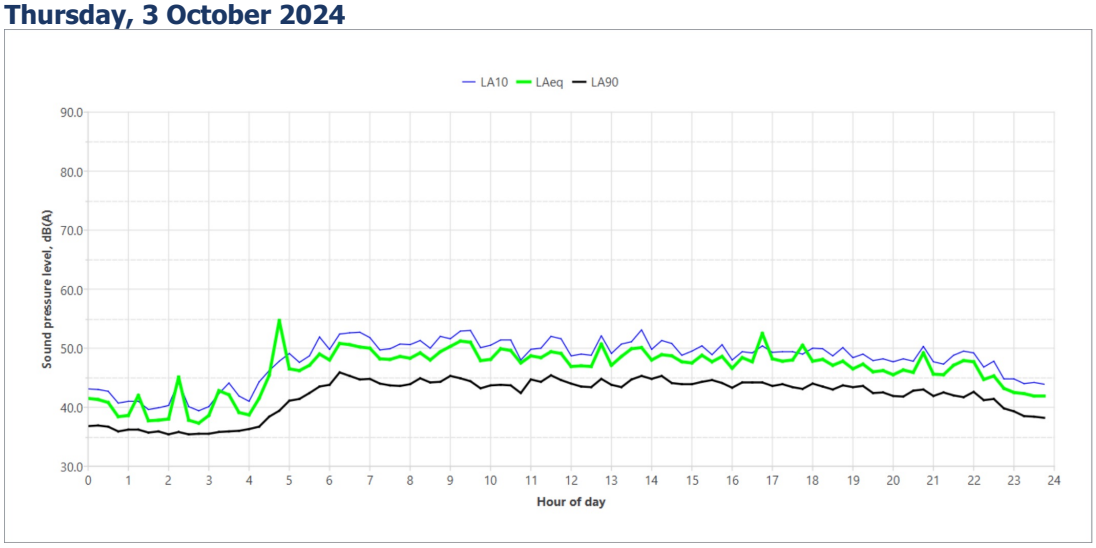
Tuesday, 1 October 2024



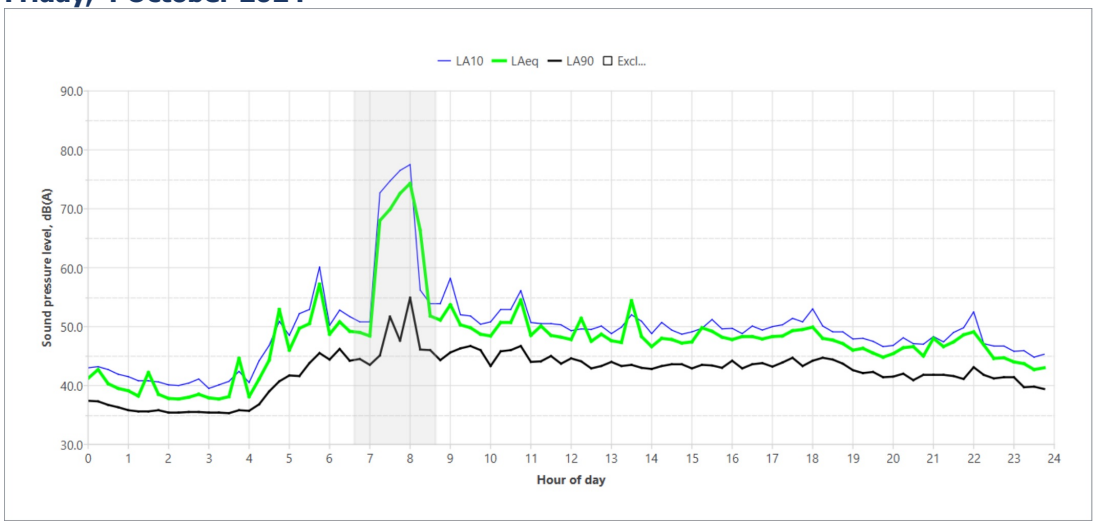
Wednesday, 2 October 2024



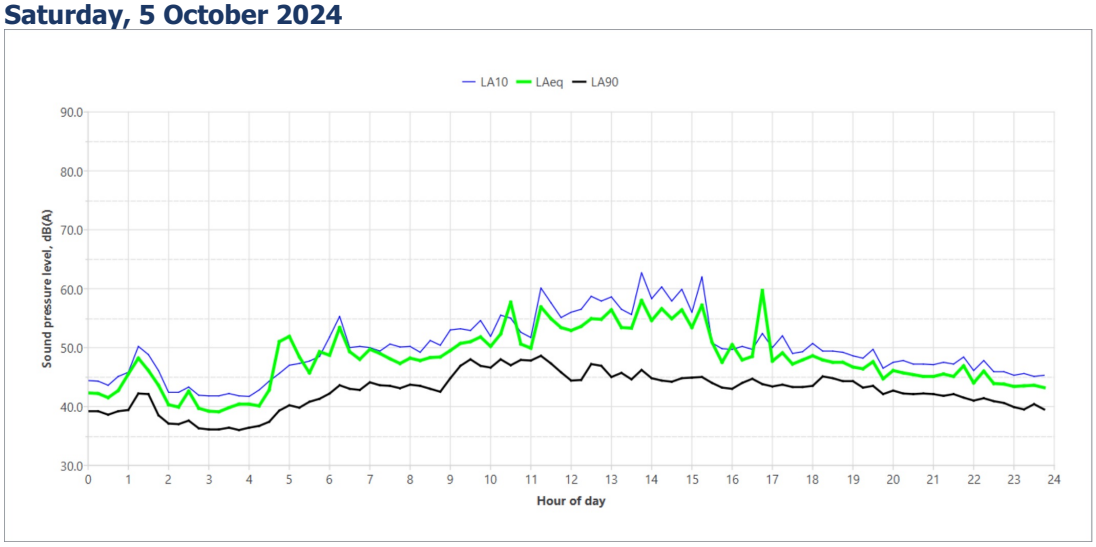
Thursday, 3 October 2024



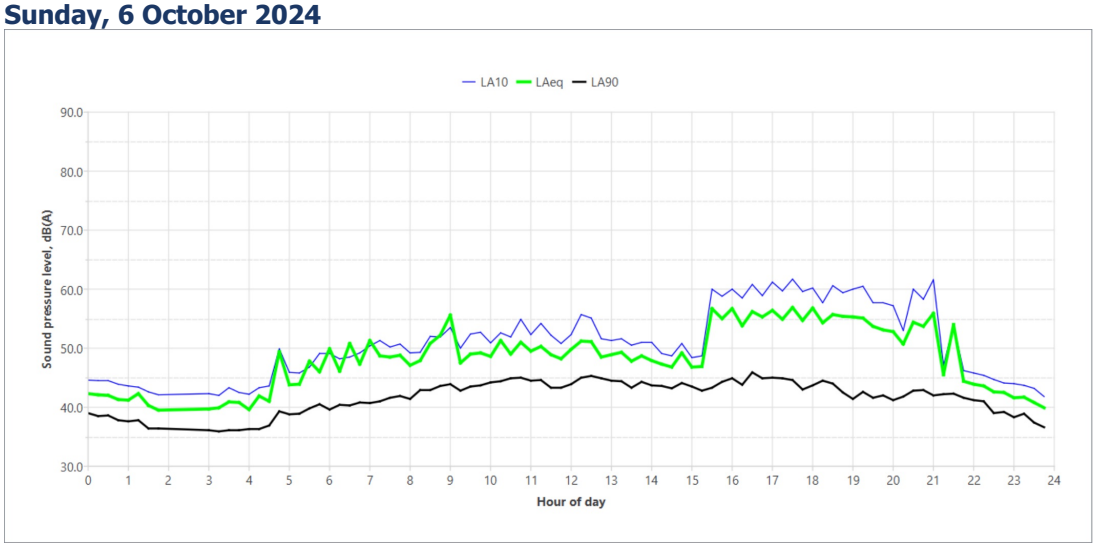
Friday, 4 October 2024



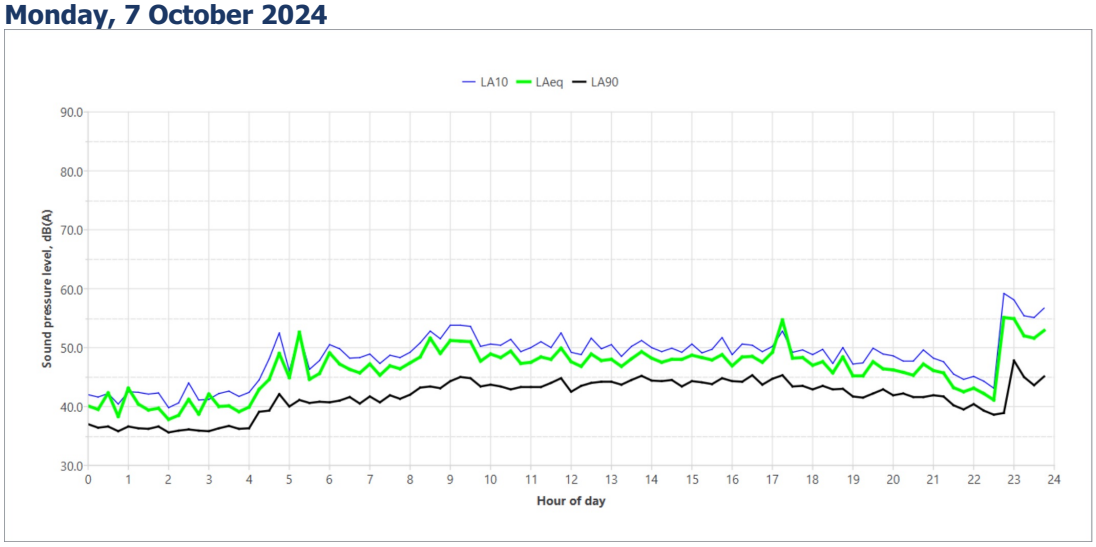
Saturday, 5 October 2024



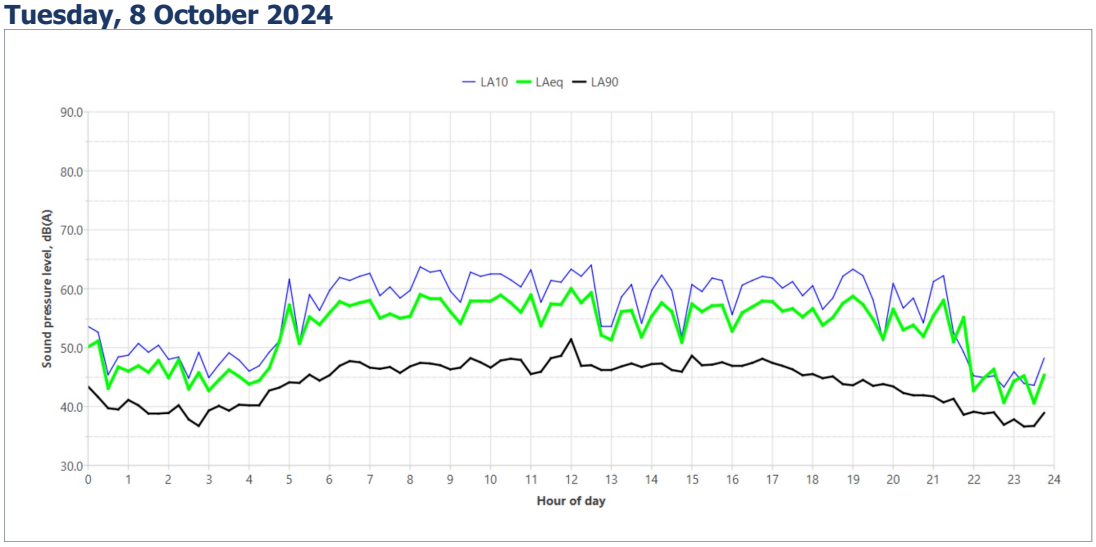
Sunday, 6 October 2024



Monday, 7 October 2024



Tuesday, 8 October 2024



Wednesday, 9 October 2024