ANAVS-ACOUSTIC NOISE & VIBRATION SOLUTIONS P/L
Office 9, 438 Forest Rd, Hurstville , NSW 2220. ABN: 42 663 590 430
Phone: 9793 1393 Fax: 9708 3113 Email: info@acousticsolutions.com.au

Acoustic Report

- Traffic Noise Assessment-

Proposed Development at

No. 246 Canterbury Rd, Revesby

Prepared By: Domeniki Tsagaris (M.I.E. Aust), B.E.(UNSW)
Australian Acoustical Society (Sub).
Approved By: Moussa Zaioor (M.I.E. Aust), CPENG,
Australian Acoustical Society (Member).

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Document Control

Date	*Revision History*	*Prepared By:*	*Reviewed and Authorised by:*
13/01/2025	Initial Report	Domeniki Tsagaris	Moussa Zaioor
29.01.2025	For Submission	Domeniki Tsagaris	Moussa Zaioor Moussa Zaioor

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1.0 SCOPE OF WORK & DESCRIPTION

The aim of this report is to determine the building materials to be used and the construction methods to be adopted, such that the development at No. 246 Canterbury Rd, Revesby is built to achieve acceptable internal noise levels as per Canterbury Bankstown Council Requirements.

Internal noise intrusion levels are to be within the limits adopted by the Australian Standard/New Zealand Standard AS/NZS 2107:2016 *"Acoustics – Recommended Design Sound Levels and Reverberation Times"*, and Clause 2.120 of the State Environmental Planning Policy – (Transport and Infrastructure) 2021.

The site is located on Canterbury Road in the suburb of Revesby (Figure 1– Site Location). Canterbury Rd is classified as busy Road with an Annual Average Daily Traffic (AADT) >20,000 vehicles (Figure 2 – Surrounding Environment).

The architectural plans by MAHN Design dated December 12th, 2024 are for the proposed construction of secondary dwelling at the rear of an existing dwelling. (Figure 3 – Proposed Site Plan).

2.0 ACOUSTIC DESCRIPTORS

L_{Amax} – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which exceeds 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which exceeded 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

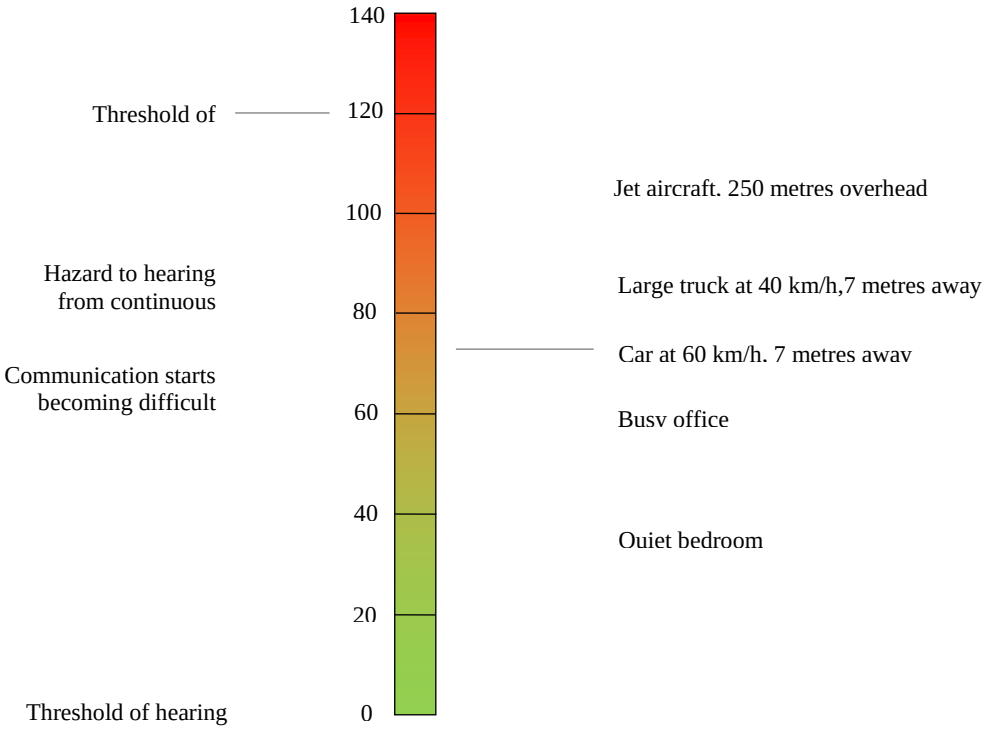
L_{A50} – The L_{A50} level is the noise level which is exceeded for 50% of the sample period. During the sample period, the noise level is below the L_{A50} level for 50% of the time.

L_{A90} – The L_{A90} level is the noise level which exceeded 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and nighttime) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and nighttime.

The level of common sounds on the dB(A) scale as the figure below:



3.0 ACOUSTICAL STUDY

3.1 Australian Standards AS/NZS 2107:2016

The above standard has formulated the criteria for developments situated in urban areas.

As traffic noise levels are not constant, a L_{eq} noise level descriptor is used when assessing this type of noise source. The L_{eq} is the mean energy level of noise being measured and has been found to accurately describe the level of annoyance caused by traffic noise.

It is usual practice, when we find it necessary to recommend internal sound levels in buildings to refer to Australian/New Zealand Standard AS/NZS 2107:2016 "Acoustics – Recommended Design Sound Levels and Reverberations times for Building Interiors".

AS/NZS 2107:2016 sets out design internal noise levels and reverberation times for different buildings depending on the use of these structures. The noise levels recommended in AS/NZS 2107:2016 take into account the function of the area and apply that to the sound level measured within the space unoccupied although ready for occupancy.

In Table 1, Page 13, the standard recommends the following noise levels for residential buildings proposed next to major Roads.

Type of occupancy/activity	Design sound level ($L_{Aeq,t}$) range	Design reverberation time (T) range, s
RESIDENTIAL BUILDINGS (see Note 5 and Clause 5.2)		
Houses and apartments in inner city areas or entertainment districts or near major roads—		
Apartment common areas (e.g. foyer, lift lobby)	45 to 50	—
Living areas	35 to 45	—
Sleeping areas (night time)	35 to 40	—
Work areas	35 to 45	—
Houses and apartments in suburban areas or near minor roads—		
Apartment common areas (e.g. foyer, lift lobby)	45 to 50	—
Living areas	30 to 40	
Sleeping areas (night time)	30 to 35	
Work areas	35 to 40	—

3.2 SECTION 2.12 OF THE SEPP (TRANSPORT AND INFRASTRUCTURE) 2021- INTERNAL NOISE LIMITS-

Sections 2.120 of the SEPP (Transport & Infrastructure) 2021 replaced clause 102 of the SEPP 2007 which states that where a development for residential use and is located in or adjacent to a relevant busy road, a consent authority must not grant consent unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:

For Clauses 87 (Rail) and 102 (Road):

- If the development is for the purpose of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following LA_{eq} levels are not exceeded:
  - in any bedroom in the building : 35dB(A) at any time 10pm–7am
  - anywhere else in the building (other than a garage, kitchen, bathroom or hallway): 40dB(A) at any time.

Simlar to the above newly adopoted section 2.120 of the SEPP (Ttransport & Infracstructure) 2021 states the following:

(3) If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded—

(a) in any bedroom in the residential accommodation—35 dB(A) at any time between 10 pm and 7 am,

(b) anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.

External façade recommendations will be provided in Section 5.0 of this report to ensure compliance with the above internal amenity criteria.

4.0 NOISE SURVEY, INSTRUMENTATION & RESULTS

On January 23rd, 2025, an engineer from our office went to the above address to carry out acoustic measurements near the proposed building line in direct line of sight of Canterbury Rd. (Figure 4 – Noise Reading Location- Point A).

Unattended noise monitoring was conducted in order to determine a sample of existing equivalent sound pressure levels during the day [7:00-22:00] **$L_{Aeq\ (15\ hr)}$- Day** and night [22:00-7:00] $LAeq_{\ (9\ hr)}$**- Night.**

The unattended sound level measurements and analysis performed throughout this study are performed using a wireless sound level data logger NSRTW_mk3 (Serial No. CPp0Dd04c1c9iLtiSwBRPD- Office tag -machine 1-). The sound logger specification is as follows:

Type 1 digital MEMS microphone

- Non-volatile 128 Mb recording memory
- Records L-max, L-min and Leq levels
- Log interval adjustable from 125 ms (8 points per second) up to hours
- A, C and Z weighting curves
- Oscilloscope and spectrum analyser features
- Observes and records 100% of the acoustic signal
- Software calculates global Leq according to ISO and OSHA methods
- WIFI connectivity to report measured levels remotely
- Weatherproof casing designed for indoor/outdoor applications
- Activity detection and logging.
- Long-term measurement and recording of acoustic levels for environmental impact studies.

The logger is factory calibrated, and the calibration certificate dated 14/08/2023 is presented in Figure 5 – Calibration Certificate.

The logger microphone was positioned at around 1.5m from ground level. The machine was calibrated prior and after reading using our Svantek SV 33A S/N: 90200 class 1 Calibrator with No significant drift recorded. Any readings affected by strong wind or rain have been disregarded [1]. A Summary of calculated noise readings - is presented in Table 4.1 below:

Table 4.1- Results of Noise Readings on January 23rd – January 24th 2025*

Location	***$L_{Aeq,\ 15\ hr}$ -Day- dB(A)** Logarithmic Average***	***$L_{Aeq,\ 9hr}$ -Night- dB(A)** Logarithmic Average***
Point A	56 dB(A)	52 dB(A)

***Site is mainly affected by Traffic noise from Canterbury Rd**

Note [1]: Noise data is validated using the weatherzone websites addresses:

https://www.weatherzone.com.au/station/SITE/66137/observations/2025-01-23

to
https://www.weatherzone.com.au/station/SITE/66137/observations/2025-01-24

5.0 BUILDING FACADE & ROOF RECOMMENDATIONS

The most practical façade and roof building materials and specifications to suit the required noise reduction indices for the above project are calculated using the following formula:

$R_w = L_{(ext)} - L_{(int)} + 10 \log (S/A) + ADJ$ where

$R_{w=}$ Transmission loss of room façade.
$L_{(ext)=}$ External Noise level L eq $_{x\ hrs}$.= dB(A).- As determined from Table 4.1-
$L_{(int)=}$ Internal Noise level L eq $_{x\ hrs}$.= dB(A).- 35 for bedrooms, 40 for living areas-
S = Total exterior surface area of the room.
A = Total sabins of absorption of the room.
ADJ = 3 + F+ G where F = 2 for Rail noise, F= 4 for Traffic noise with negligible trucks [percentage < 10%], and F= 6 for Traffic Noise with more than 10% trucks.

G allows for Primary angles of sound per the table below.

Angle of Incidence, deg.	Adjustment (G), dB
0-30	-3
30-60	-1
Random	0
60-80	+2

As the façade is made up of individual elements with different transmission coefficients. The total transmission loss of the façade is calculated using the following equation where n represents each material components of the façade :

$$R_{Total} = -10log_{10}\left(\frac{1}{\sum_{n=1}^{N} S_n}\sum_{n=1}^{N} S_n \tau_n\right)$$

External façade building recommendations calculated using the above formulas are provided in Table 5.1 below to ensure compliance with the noise criteria stated in sections 3.0 of this report.

Table 5.1 Windows/Sliders, Doors, Walls & Roof Specifications

Building Component	***Rw Rating to be Achieved on Site***
Window, Sliding Doors in all Habitable Areas are to be 6.38mm Laminated type with full perimeter Fin Mohair woven brush acoustic seals in a commercial frame section (1)(2)(3).	**32**
Windows and Sliding Doors in all other Non-Habitable Areas (Toilets, laundries, ….) are to be unrestricted in accordance with Australian Standard AS 2047 (Windows in Buildings) (1)(2)(3).	**30**

Entry Doors are to be solid core with acoustic seals fitted around the doors. A drop seal is also required at the base of the doors [(2),(3)].	**30-33**
External Walls & Facia are to be standard double brick cavity walls or 250/240 mm brick veneer construction with R2, 75mm thick insulation in the stud cavity [(2)(3)] OR 90mm conventional timber stud-framed walls cladded externally with min. 6.0 mm thick selected cladding and lined internally with 13mm plasterboard, plus cavity filled with 75mm 11kg/m^3 insulation. [(2)(3)].	**50**
Roof and Facia is to be Colorbond Steel Roofing with R2 insulation over battens, 10mm plasterboard ceiling with 75mm thick, 11kg/m3 insulation, in the ceiling cavity [(3)].OR Tiled Roof with sarking, 10 mm thick plasterboard ceiling and ceiling cavity filled with 75mm thick, 11kg/m3 insulation [(3)].	**43-48**

NB: This report is to be read in conjunction with the BASIX/NatHERS certificate and any other related building specification.

[(1).] No through weep holes in windows/sliders. [(2)] All gaps between window & door frames and the masonry walls are to be sealed using acoustic foam Hilti CP620 or similar(Bostic/Parfix/Sika). . Glass wool batts should be applied prior to the application of the foam to seal larger gaps. [(3)] All gaps are to be acoustically sealed.

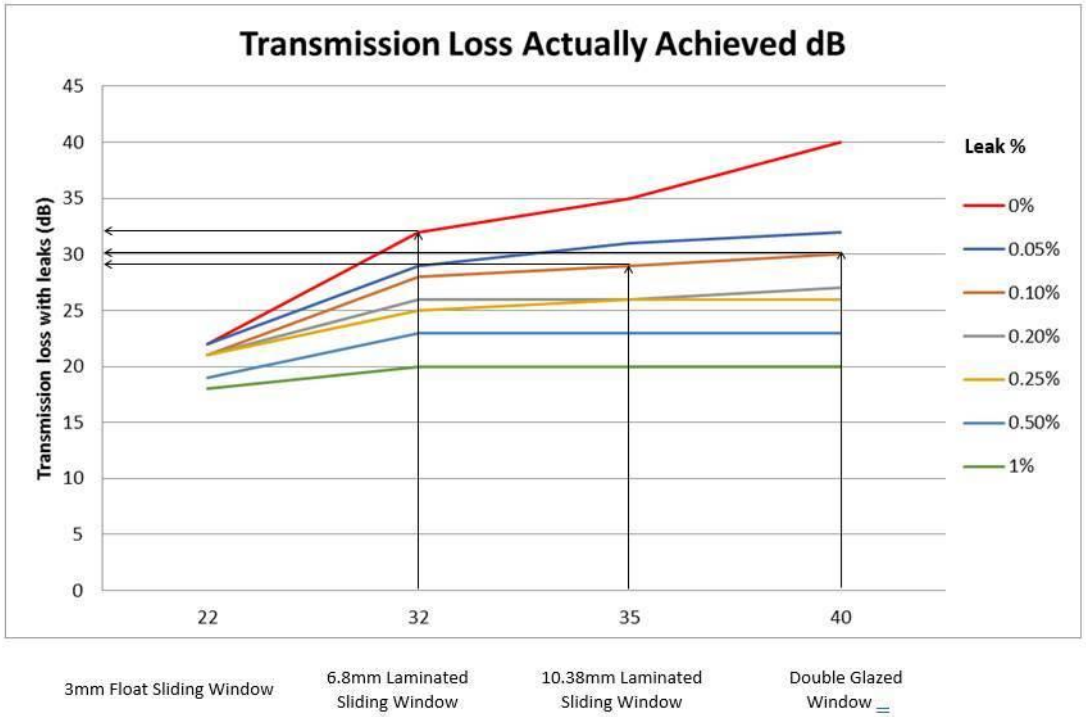
*****Glazing Notes -Leaks & Glazing Attenuation-**

- The Acoustic performance of a glazing system highly depends on the leaks around and within the glazing frame and façade. A double-glazing system with Rw of 40 will have its acoustic performance dropped to Rw of 30 (less than that of 6.38 mm glass) at a leak of 0.1 %. Moreover, a double-glazing system with Rw of 40 will have its acoustic performance dropped to Rw of 20 (less than that of 3.0 mm float glass) at a leak of 1 % of the glazing area.

- A 10.38mm laminated glazing system with Rw of 35 will have its acoustic performance dropped to Rw of 29 (less than that of 6.38 mm glass) at a leak of 0.1 %. Moreover, 10.38m mm laminated glazing system with Rw of 35 will have its acoustic performance dropped to Rw of 20 (less than that of 3.0 mm float glass) at a leak of 1 % of the glazing area.

- A double-glazing system with Rw of 40, a 10.38m mm laminated glazing system with Rw of 35, and a 6.38 mm laminated glazing system with Rw of 32 will all attain almost the same Rw of around 20 (less than that of 3.0 mm float glass) at a leak of 1 % in the façade or within/around the glazing system.

The graph below shows the actual transmission loss achieved inside a room with different glazing thicknesses relative to small leaks occurring along the window frame and façade.



- Awning windows- Upon testing Awning windows, small part of the chainwinder remains visible when the windows are shut, resulting in the window sash not achieving a very tight closure against the frame. We expect a drop of around 10dB in the sound reduction index 'RW' of the window when this occurs, deeming the window acoustically noncompliant. When selecting a suitable awning frame, ensure the chainwinder to be fully and securely enclosed with no portion of the chain hanging outside the chainwinder compartment. The exterior seals are not a replacement for the necessity of the windows closing very tightly.

A test report is to be provided from a recognized acoustic laboratory, verifying that the glazing system (glass, frame and seals) will meet the nominated sound rating required.

6.0 SLEEP AROUSAL

Section 5.4 of the NSW Road Noise Policy mentions the Environment Protection Authority NSW 1999 guideline which aims at limiting the level of sleep disturbance due to environmental noise. It states that the $L_{A1,\ 1\text{-minute}}$ level of any noise should not exceed the ambient L_{AF90} noise level by more than 15dB. This guideline takes into account the emergence of noise events but does not directly limit the number of such events or their highest level, which are also found to affect sleep disturbance.
Applying the above thus the sleep disturbance criteria for the above project is $L_{A1,\ 1\ minute}$ and should not be exceeded by [L_{A90} = 32 dB(A) –at mid night-plus 15] = 37 dB(A) on the north façade.

There are other studies on sleep disturbance like the one carried the enHealth Council (2004) and the guidelines published by the World Health Organisation (1999) were reviewed and analysed in terms of the guidance on noise exposure and sleep disturbance. The enHealth report states that:

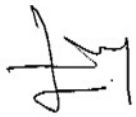
'As a rule for planning for short-term or transient noise events, for good sleep over 8 hours the indoor sound pressure level measured as a maximum instantaneous value should not exceed; approximately 45 dB(A) $L_{A,(Max)}$ more than 10 or 15 times per night.

7.0 DISCUSSION & CONCLUSION

The construction of the proposed development at No. 246 Canterbury Rd, Revesby if carried out as recommended in the plans and specifications and including the acoustic recommendations in Section 5.0 of this report, will meet the required internal noise levels as required in Clause 2.120 of the State Environmental Planning Policy – (Transport & Infrastructure) 2021 , AS/NZS 2107 "*Acoustics – Recommended Design Sound Levels and Reverberation Times*" and Canterbury Bankstown Council Conditions and Requirements.

Should you require further explanations, please do not hesitate to contact us.

Yours Sincerely,

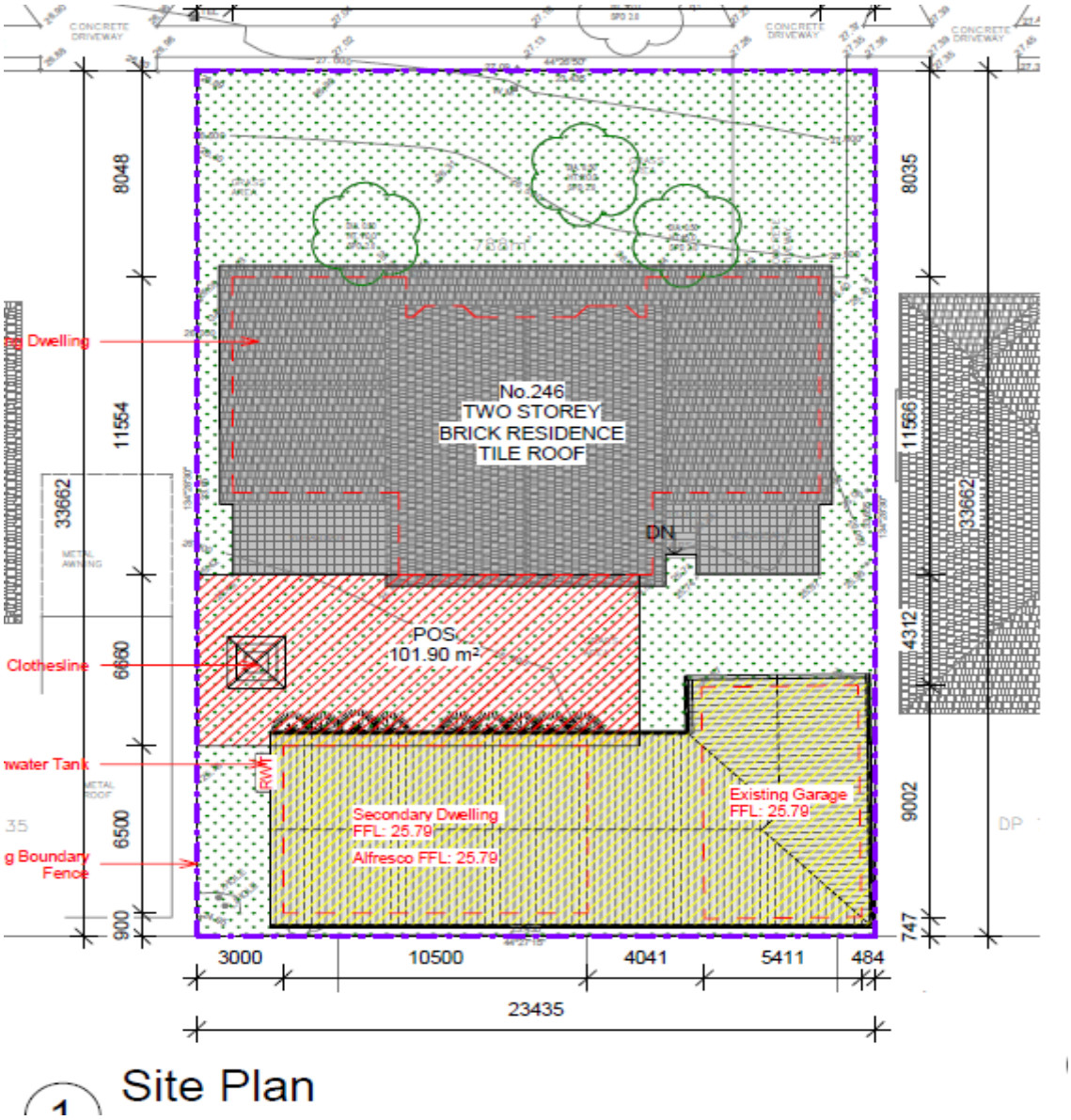


M. Zaioor
M.S. Eng'g Sci. (UNSW).
M.I.E.(Aust), CPEng
Australian Acoustical Society (Member)

8.0 APPENDIX

Figure 1 - Site Location

Figure 2 - Surrounding Environment



Site Plan

Figure 3 - Proposed Site Plan

Figure 4 - Noise Reading Location- Point A

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www.instrumentchoice.com.au
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Category-2S - Traceable Certificate

Calibration Certificate Details / **Calibration Schedule**

Calibration Date	14/08/2023	**Calibration Interval**	
Certificate Number	2S-14082023018	**Next Due Date**	

Company Details

Company Name	ANAVS - Acoustic Noise & Vibration Solutions P/L Office 9, 438 Forest Rd Hurstville NSW 2220 Australia

Equipment Details

Instrument Type	Sound Meter	**Serial Number**	CPp0Od04c1c9iLtiSwBRPD 96043
Manufacturer	Convergence	**Model**	NSRTW_mk3
Physical Condition	Good		

Accuracy Calibration-2S performed (final after adjustments)

(Adjustments noted in "Any problems identified" below)

Ambient Temperature & RH whilst performing test		20.3°C and 52% RH			
Reference Meter Reading	**Acceptable Difference**	**Supplied Meter Reading Before Calibration**	**Supplied Meter Reading After Calibration**	**Difference**	**Pass/Fail**
94.0dB	±1dB	93.9dB	94.0dB	0.0dB	Pass
114.0dB	±1dB	113.8dB	113.9dB	0.1dB	Pass

Traceability Details

Make	**S/N**	**Cal Report No:**	**Tested at NATA Lab**
Casella CEL-120/1	5230660	C35894A	9262

Any Problems Identified

The meter is performing as expected

Category-2S Pass: (Yes) / No **Battery Replacement:** (Yes) / No

Name	Bang Hoang
Signed	
Date	14/08/2023

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Figure 5 - Calibration Certificate