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Acoustical Assessment
Residential Development

At:

310 to 314 Swan Street & 984 to 988 Corella Street,
Albury, NSW 2640

Prepared for:

Brewster Murray Pty. Ltd.
Level 6, 99 York Street
Sydney, NSW 2000

Attention: Mr Anthony Geck

Reference: 2502002T-R

Prepared by:

Matthew Harwood MAAS
24 February 2025

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Brewster Murray Pty. Ltd. commissioned Harwood Acoustics Pty. Ltd. to carry out an acoustical assessment for a residential development proposed to be constructed at 310 to 314 Swan Street and 984 to 988 Corella Street, Albury, NSW.

The development will comprise 27 residential apartments in two blocks, over three levels with at grade car parking.

Accordingly, Harwood Acoustics Pty. Ltd. has prepared this report for the exclusive use of the Client identified on the title page. The report is prepared in accordance with the brief and scope of works agreed between the Client and Harwood Acoustics Pty. Ltd. and may not be suitable for use beyond that scope.

Harwood Acoustics Pty. Ltd. undertakes no duty nor accepts any responsibility to any third party who may rely upon this report.

Advice and recommendations provided in this report are in relation to acoustical issues only. No claims of expertise are made, and no liability is accepted, in relation to issues falling outside the field of acoustical consulting. These may include, but are not limited to, structural and waterproofing considerations, fire rating or thermal rating. Relevant authorities and / or experts should be consulted regarding areas other than acoustics.

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1. INTRODUCTION AND SUMMARY

Brewster Murray Pty. Ltd. commissioned Harwood Acoustics Pty. Ltd. to carry out an acoustical assessment for a residential development proposed to be constructed at 310 to 314 Swan Street and 984 to 988 Corella Street, Albury, NSW (the Site).

The Site is located on the north eastern corner of the intersections between Swan Street to the south, and Corella Street to the west on land zoned R1 General Residential under Albury City Council's Local Environment Plan 2010 (LEP).

Bounding the Site the to north and east are residential premises and there are residences across Corella Street to the west. Across Swan Street to the south is Sarvaas Park, as shown in the location plan at Figure 1.

The development will comprise 27 residential apartments in two blocks, over three levels with at grade car parking.

The development is being undertaken in accordance with SEPP (Housing) 2021 with Homes NSW and an assessment is likely to be required to consider the following acoustical matters:-

- Potential for noise intrusion into the new development from external sources such as traffic and aircraft,
- Potential for noise emission from the operation of mechanical plant servicing the development to impact existing and future residents,
- Potential for noise and vibration impacts to affect residents during the construction phase of the project, and
- Transfer of airborne and impact sound between future apartments and common spaces within the development.

The development Site is located well outside of the ANEF 20 contour of Albury Airport and an aircraft noise intrusion assessment is not required in accordance with Australian Standard AS 2021:2015 *Acoustics - Aircraft noise intrusion - Building siting and construction.*

A traffic noise assessment was undertaken in accordance with Clause 2.120 of the S*tate Environmental Planning Policy (Transport and Infrastructure)* 2021 (the SEPP) and the NSW Department of Planning and Environment's *Development Near Rail Corridors and Busy Roads – Interim Guidelines* 2008.

The clause sets internal noise limits of 35 dBA ($L_{eq,\ 9\ hour}$) inside bedrooms between the hours of 10 pm and 7 am and 40 dBA ($L_{eq,\ 15\ hour}$) inside all other habitable areas at all times.

External traffic noise levels were measured at the Site and were found to be:-

- 52 dBA $L_{eq,\ 15\ hour}$ during the day time, and
- 48 dBA $L_{eq,\ 9\ hour}$ during the night time at the closest facades of the development to Mate Street.

An assessment of the potential noise intrusion from road traffic into the proposed development has been undertaken based on Brewster Murray Pty. Ltd.'s architectural drawings for Project No. BH2CY, dated 07/02/2025.

The internal noise limits will be met during the day and night, using standard construction methods and materials outlined in Section 5 of this Report.

Providing the recommendations are implemented, the internal noise limits set by Clause 2.120 of the SEPP will be met for this development.

Section 7 of this Report established appropriate noise design goals for the operation of future mechanical plant in accordance with the NSW Environment Protection Authority's (EPA) *Noise Guide for Local Government* 2023. These are **47 dBA** ($L_{eq,\ 15\ minute}$) during the day time period, **44 dBA** ($L_{eq,\ 15\ minute}$) during the evening tome period and **35 dBA** ($L_{eq,\ 15\ minute}$) during the night time period.

The selection of mechanical plant has not been finalised at this stage and a further assessment will be undertaken prior to the issue of a Construction Certificate.

Similarly a Construction Noise and Vibration Management Plan (CNVMP) will be prepared prior to the issue of a Construction Certificate along with an assessment of compliance with Part F7 of the Building Code of Australia (BCA) 2022 under the National Construction Code.

2. SITE AND BUILDING DESCRIPTION

2.1 Site Description

The Site is located on the north eastern corner of the intersections between Swan Street to the south, and Corella Street to the west on land zoned R1 General Residential under Albury City Council's Local Environment Plan 2010 (LEP).

Bounding the Site the to north and east are residential premises and there are residences across Corella Street to the west. Across Swan Street to the south is Sarvaas Park.

The nearest residential receptor areas to the Site are shown in Figure 1 below and are as follows:-

R1 – 296 to 306 Swan Street

R2 – 297 to 311 Plover Street

R3 – 99 Corella St & 315 Plover St

R4 – 990 to 995 Corella Street

Figure 1: Location Plan. 310 & 314 Swan Street and 984 & 988 Corella Street, North Albury, NSW

(source: www.metromap.com.au)

Receptors:-

- R1 – represents the residential receptors bounding the Site to the east and those beyond,
- R2 – represents the residential receptors bounding the Site to the north east and those beyond,
- R3 – represents residential receptors bounding the Site to the north and those beyond,
- R4 – represents residential receptors across Corella Street to the west and those beyond, including the dwelling associated with the Sacred Heart Church.

2.2 Development Description

The development will comprise 27 residential apartments in two blocks, over three levels with at grade car parking. A ground floor and level 1 floor plan are shown in Figures 2 and 3 and full details can be seen in Brewster Murray Pty. Ltd.'s architectural drawings for Project No. BH2CY, dated 07/02/2025.

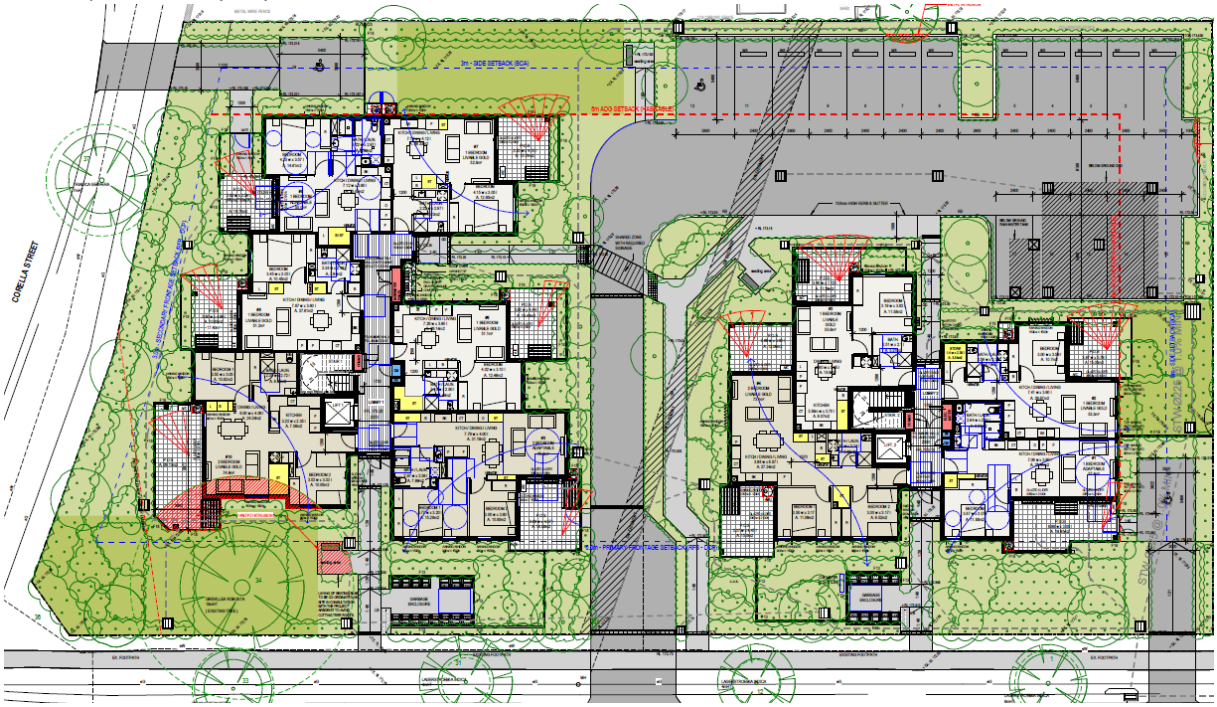

Figure 2. Ground Floor Plan

(source: Brewster Murray Pty. Ltd.'s architectural drawing DA05 for Project No. BH2CY, dated 07/02/2025)

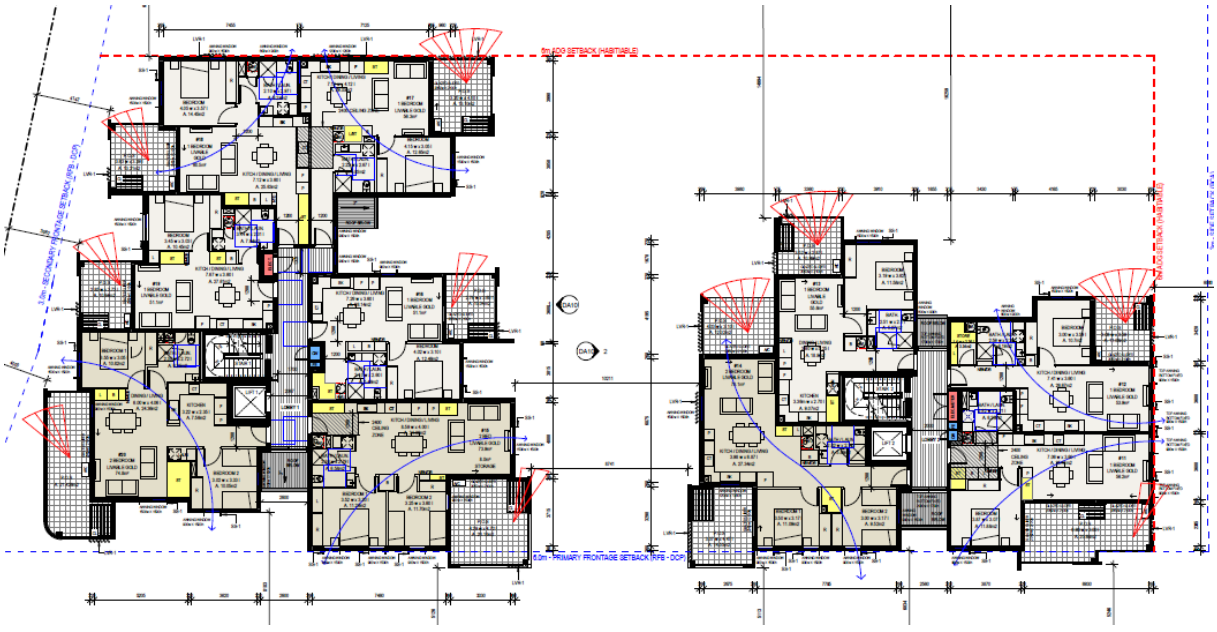

Figure 3. First Floor Plan

(source: Brewster Murray Pty. Ltd.'s architectural drawing DA06 for Project No. BH2CY, dated 07/02/2025)

3. NOISE CRITERIA

This section outlines the noise guidelines applicable to this proposal and establishes the project specific noise goals.

3.1 Aircraft Noise – AS 2021:2015

Australian Standard AS 2021:2015 *Acoustics - Aircraft noise intrusion - Building siting and construction* sets an indoor design sound level for aircraft noise intrusion to be measured on slow response as shown in Table 1 below:

Table 1 AS 2021:2015 Indoor Design Sound Levels

Building Type & Activity	Indoor Design Sound Level $L_{s,\,max}$ dBA
House, homes, units, flats, caravan parks	
Sleeping areas and dedicated lounges	50
Other habitable spaces	55
Bathrooms, toilets or laundries	60

3.2 Clause 2.120 - State Environmental Planning Policy (Transport & Infrastructure) 2021

Clause 2.120 states:-

"2.120 Impact of road noise or vibration on non-road development

(1) This section applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of TfNSW) and that the consent authority considers is likely to be adversely affected by road noise or vibration:

(a) residential accommodation,
(b) a place of public worship,
(c) a hospital,
(d) an educational establishment or centre-based child care centre.

(2) Before determining a development application for development to which this section applies, the consent authority must take into consideration any guidelines that are issued by the secretary for the purposes of this clause and published in the Gazette.

(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 L_{Aeq} levels are not exceeded:

(a) in any bedroom in the building-35 dB(A) at any time between 10.00 pm and 7.00 am,
(b) anywhere else in the building (other than a garage, kitchen, bathroom or hallway)-40 dB(A) at any time."

(4) In this section, freeway, tollway or transitway have the same meaning as they have in Road ACT 1993.

3.3 NSW Department of Planning and Environment

The NSW Department of Planning and Environment published the *Development Near Rail Corridors and Busy Roads – Interim Guidelines in 2008* (the Guidelines). The Guidelines refer to the internal noise limits set by Clause 107 and in addition, states:-

"If internal noise levels with windows or doors open exceed the criteria by more than 10 dB, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia".

3.4 NSW EPA's Noise Guide for Local Government (2023)

The Environment Protection Authority (EPA) updated the *Noise Guide for Local Government* (the Guide) in January 2023. The Guide is specifically aimed at assessing noise from light industry, shops, entertainment, public buildings, air conditioners, pool pumps and other noise sources in residential areas.

The Guide is advisory in nature, and council officers are encouraged to use it to develop council procedures or policy to deal with noise issues relevant to local circumstances.

The Guide typically recommends that a noise source is generally considered to be intrusive if the noise from the source, when measured over a 15-minute period ($L_{eq,\ 15\ minute}$), exceeds the background noise ($L_{90,\ 15\ minute}$) by more than 5 dB.

The assessment methodology and criterion are consistent with the EPA's *Noise Policy for Industry* 2017 intrusiveness project trigger levels and are deemed to be an appropriate guide for establishing acceptable noise design goals for mechanical plant servicing this development.

3.4.1 Measured Background Noise Levels

In order to establish the project intrusiveness noise levels, it is necessary to determine the background noise levels in the vicinity of all potentially affected residential Receptors.

The background noise level is defined by the EPA as 'the underlying level of noise present in ambient noise when all unusual extraneous noise is removed' and is considered to be represented by the $L_{A90,\ 15\ minute}$ descriptor. This is a statistical measure of the sound pressure level that is exceeded for 90 % of the time.

The Rating Background Level is the single-figure background noise level derived from monitoring $L_{A90,\ 15\ minutes}$ over a representative period of time. The Rating Background Level is established for the day, evening and night time periods and is used for assessment purposes.

When measuring background noise levels, it is important to undertake sufficient monitoring of background noise to allow intrusive noise to be assessed adequately.

In this instance a noise logger was temporarily installed at the Site between Friday 14 and Thursday 20 February 2025.

The results of the survey are summarised in Table 2 below and instrumentation used during the noise survey is shown in Appendix A.

Table 2 Rating Background Noise Levels – Swan Street, North Albury

Time of Day	Rating Background Level ($L_{90,\ 15\ minute}$) dBA	Existing Ambient Noise Levels ($L_{eq,\ 15\ minute}$) Level dBA
Day (7 am to 6 pm)	**41**	**54**
Evening (6 pm to 10 pm)	**37**	**47**
Night (10 pm to 7 am)	**30**	**47**

3.5 Project Specific Noise Goals

When all the above factors are considered, project specific noise goals are as follows: -

Traffic Noise Intrusion into new Apartments

- **35 dBA** $L_{eq,\ 15\ hour}$ inside bedrooms between 10 pm and 7 am, and
- **40 dBA** $L_{eq,\ 9\ hour}$ inside common living areas at any time.

Aircraft Noise Intrusion into new Apartments (if within the ANEF 20 Contour)

- **50 dBA** $L_{s,\ max}$ inside bedrooms and dedicated lounges,
- **55 dBA** $L_{s,\ max}$ inside other living areas at any time, and
- **60 dBA** $L_{s,\ max}$ inside bathrooms toilets and laundries

Noise Design Goals for the operation of mechanical plant

- (41 + 5 =) **46 dBA** $L_{eq,\ 15\ minute}$ during the day time period,
- (37 + 5 =) 4**2 dBA** $L_{eq,\ 15\ minute}$ evening time period, and
- (30 + 5 =) **35 dBA** $L_{eq,\ 15\ minute}$ during the night time period.

4. AIRCRAFT NOISE INTRUSION

The Site is located on the northern side of Swan Street and the eastern side of Corella Street in a predominantly residential area. Approximately 2 kilometres to the south east of the Site is the Albury Airport as shown in Figure 4 below.

Section 18.3 of chapter 18 of Albury City Council's Development Control Plan 2010 (DCP) requires that:-

- land uses within the vicinity of the airport and designated flight paths are not adversely affected by noise, and
- that land uses within the vicinity of the airport and designated flight paths do not place an operational limitation on the activities of the airport.

In determining whether there is potential for aircraft noise impacts at the Site of the proposed development, consideration is to be given to Australian Standard AS 2021:2015 *Acoustics – Aircraft Noise Intrusion – Building Siting and Construction*.

The standard provides criteria to determine whether a building site's exposure to aircraft noise is acceptable, conditionally acceptable, or unacceptable for various activities based on Australian Noise Exposure Forecast (ANEF) contours.

In this instance the development Site is well outside of the ANEF 20 contour and is therefore acceptable without the need for an aircraft noise intrusion assessment. (refer Figures 5 and 6).

Figure 4. Location Plan - 310 to 314 Swan Street and 994 to 998 Corella Street, North Albury

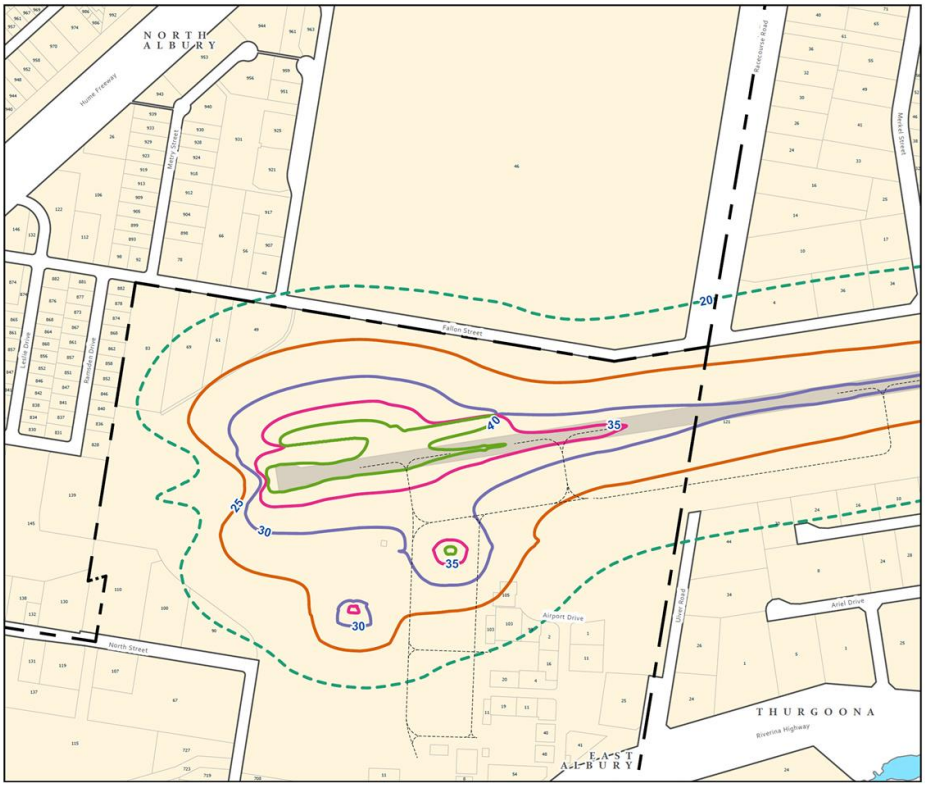

Figure 5. Albury Airport ANEF Contours (Western extent of Runway)

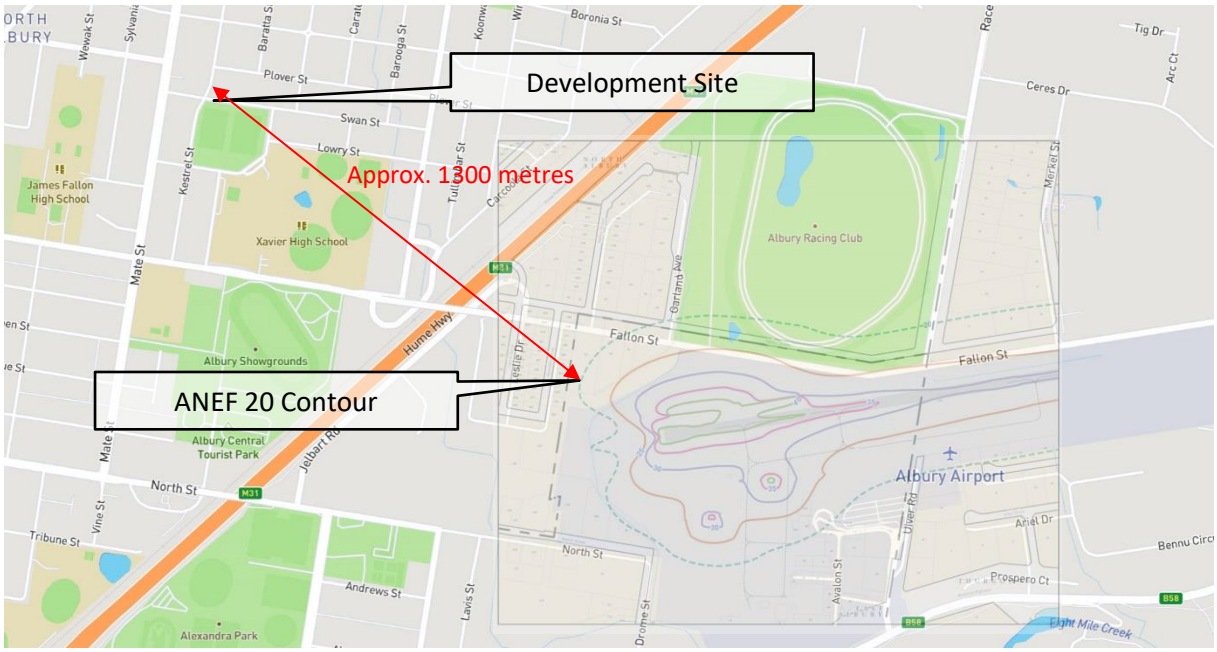

Figure 6. Albury Airport ANEF Contours & Development Site

As can be seen from above the development Site is a long way outside of the ANEF 20 and there is consequently no requirement for an aircraft noise instruction assessment to be undertaken.

5. MEASURED TRAFFIC NOISE LEVELS

The author visited the Site in February 2025 to undertake attended noise surveys and to place a noise logger for long-term traffic noise measurements.

A combination of long-term unattended and short-term attended noise measurements were used to determine traffic noise levels at the closest future façade of the development to Mate Street.

The octave band and overall 'A' frequency weighted sound pressure levels of traffic noise at the nearest proposed façade of the development are provided in Table 3 below.

Table 3 L_{eq} Traffic Noise Levels – Closest potential future façades

Traffic Noise Levels		Sound Pressure Levels (dB) at Octave Band Centre Frequencies (Hz)							
	dBA	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Day time $L_{eq, 15\ hr}$	**54**	57	54	52	49	50	47	39	31
Night time $L_{eq, 9\ hr}$	**49**	52	49	47	44	45	42	34	26

The required traffic noise reduction is as follows:

- (54 – 40 =) 14 dB for the closest Living areas, and
- (49 – 35 =) 14 dB for the closest bedrooms.

6. NOISE MODELLING AND RECOMMENDED ACOUSTICAL TREATMENT

6.1 Noise Modelling Methodology

We have modelled the proposed development using Brewster Murray Pty. Ltd.'s architectural drawings for Project No. BH2CY, dated 07/02/2025.

The internal noise level can be calculated using the formula: -

$$L_{p2} = L_{p1} - R_w + 10\ Log_{10}\ (S/A) – K + 6\ dB$$

Where:

L_{p1} is the external traffic noise level,
R_w is the weighted sound reduction index of the partition,
S is the area of the partition (e.g. wall, roof, window or glazed door),
A is the acoustic absorption of the room,
K is an angle of view correction.

5.2 Building Construction Recommendations

The levels of traffic noise intrusion have been calculated based on reductions achieved after transmission through the roof, floor, walls, glazed doors and windows.

The required internal noise levels set by Clause 2.120 of the SEPP can be met using the following construction methods and materials.

5.2.1 Walls

- External walls of brick veneer or masonry construction will be acoustically acceptable,
- Any external wall cladding should comprise cement composite external cladding with a minimum mass of 12.5 kg / m^2, for example Hardies *Scyon, Newport, Linea*, *Stria*, or CSR *Cemental, Balmoral, Scarborough* or approved equivalent with similar minimum mass,
- Internal wall linings should comprise one layer of 10 mm thick (minimum) standard plasterboard, and
- All wall cavities lined with minimum 50 mm thick glasswool or polyester insulation (min 10 kg/m^3 density) or approved equivalent, for example, CSR Bradford 90 mm R2.5.

5.2.2 Ceiling and Roof System

- The roof may be of concrete slab, concrete tile or corrugated sheet steel (*Colorbond*) construction,
- Heavy duty vapour barrier is to be laid below the roof,
- Ceilings should comprise one layer of 10 mm thick (minimum) standard plasterboard construction,
- Minimum 50 mm thick glasswool or polyester insulation should be laid between the ceiling joists in all rooms below the roof (min. density 10 kg/m^3) or approved equivalent. (Insulation not required for acoustical reasons if the roof is a concrete slab).

5.2.3 Windows and Glazed Doors

Glazing

- Windows and glazed doors may be fixed, sliding, awning or double hung style in aluminium or timber frames,
- Table 4 below specifies minimum sound reduction index (R_w) ratings required for various windows and glazed doors.
- Glazing other than those specified in Table 4 may be of standard thickness with a minimum R_w **25**,
- An example glazing specification is given in Table 4, however an alternative construction may be used providing the minimum R_w rating is achieved.

Table 4 Recommended Window Schedule

Unit / Room / Glazing	Min R_w	Example Only Glazing Specification
Units 10, 20 & 27		
Living, dining, Kitchen (west facing glazed sliding door 2050 x 2100)	**28**	5 or 6 mm float glass

All glazed doors in Table 2 should be fitted with acoustic seals comprising foam weather seals (e.g. Q-Lon from Schlegel or similar).

NB - a number of factors affect the glazing requirements that are outside acoustical issues. For this reason, it is not practicable to provide an example glazing thickness in Table 4 as it may not be suitable for a number of other reasons. A minimum required sound reduction rating (R_w) is therefore provided which is to be achieved with whichever glazing is selected. Confirmation should be sought from the glazing manufacturer or supplier that whichever glazing is selected achieves the minimum acoustical rating shown in Table 4.

As an example, it may be that a 5 mm thick float glass window in aluminium frames from one manufacturer meets an R_w 28 rating, whereas another manufacturer may require 6 mm float glass or 6.38 mm laminated glass to meet the R_w 28 rating.

5.3 Mechanical Ventilation Requirements

The NSW Department of Planning and Environment's document Development near Rail Corridors and Busy Roads – Interim Guideline 2008 states:

> *"If internal noise levels with windows or doors open exceed the criteria by more than 10dB, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia."*

The external noise level from road traffic at the nearest façades of the dwellings is:

- 54 dBA ($L_{eq,\ 15\ hour}$) in the day time period, and
- 49 dBA ($L_{eq,\ 9\ hour}$) in the night time period

A reduction of up to 10 dB from outside to inside is typically achieved with the windows/doors open. This therefore results in internal noise levels of:-

- (54 – 10 =) 44 dBA during the day in the living rooms, and
- (49 – 10 =) 39 dBA at night.

As detailed in Section 3.3, the internal assessment trigger level for the requirement for natural ventilation is 10 dB above the acceptable internal noise level when the windows or doors are partially open.

This results in trigger levels of (40 + 10 =) 50 dBA (day time) and (35 + 10 =) 45 dBA (night time).

The predicted internal noise levels are below the trigger levels in all rooms of all proposed apartments. There is therefore no need acoustically for an alternative fresh air supply in any rooms within this development.

7. MECHANICAL PLANT

At the time of writing this report the selection of mechanical plant has not been finalised.

Mechanical plant is likely to include:-

- building ventilation fans, and
- air conditioning for the apartments.

Once selections of the mechanical plant to service the building are finalised, a further assessment may be undertaken, and noise control design provided, if required.

The level of noise emission from all mechanical plant combined must not exceed the following noise levels when measured over a 15 minute period at the most affected point within any neighbouring residential property boundary:-

- **46 dBA** $L_{eq,\ 15\ minute}$ during the day time period,
- **42 dBA** $L_{eq,\ 15\ minute}$ evening time period, and
- **35 dBA** $L_{eq,\ 15\ minute}$ during the night time period.

All mechanical plant will be designed and controlled, where necessary, to ensure the appropriate noise limits are met at all neighbouring receptor locations. An assessment will be undertaken at the Construction Certificate stage.

8. CONCLUSION

A traffic noise intrusion assessment for a residential development proposed to be constructed at 310 to 314 Swan Street and 984 to 988 Corella Street, Albury, NSW was undertaken.

Traffic noise levels were established at the development site and predicted at the façade of each of the future units. We are confident that the external traffic noise levels assumed in this assessment are reliable and typical for the location.

These external traffic noise levels were used to calculate internal noise levels within the proposed units. Recommendations are made in Section 5 of this report to reduce internal noise levels within various rooms.

Providing these recommendations are implemented, the internal noise level requirements set by Clause 2.120 of the NSW Government's *State Environmental Planning Policy* (Transport and Infrastructure) 2021 will be met for this development.

A further assessment of mechanical plant noise emission will be undertaken prior to the issue of a Construction Certificate as detailed in Section 6 of this Report.

Recommendations to address the BCA *Deemed-to-Satisfy Provisions* and / or *Performance Requirements* of Part F7 of the Building Code of Australia will be provided prior to the issue of a Construction Certificate.

Matthew Harwood, MAAS

Director & Principal Consultant

Harwood Acoustics Pty Ltd

Attachments:

Important Note
Appendix A – Noise Survey Instrumentation
Appendix B – Noise Survey Results

Important Note

All products and materials suggested by Harwood Acoustics Pty Ltd are selected for their acoustical properties only.

Recommendations made in this report are intended to resolve acoustical problems only, therefore all other properties such as aesthetics, air flows, chemical, corrosion, combustion, construction details, decomposition, expansion, fire rating, fumes, grout or tile cracking, loading, shrinkage, smoke, ventilation etc. are outside Harwood Acoustic's fields of expertise and ***must*** *be checked with the supplier or suitably qualified specialist before purchase.*

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No responsibility is accepted for the use of any part of the report in any other context or for any other purpose.

Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

Noise Survey Instrumentation	Appendix A

The instrumentation used during the noise survey consisted of the following: -

Description	Model No.	Serial No.
Infobyte Noise Logger Im4	Im4	104
SvanTek Acoustical Calibrator	SV34A	58762

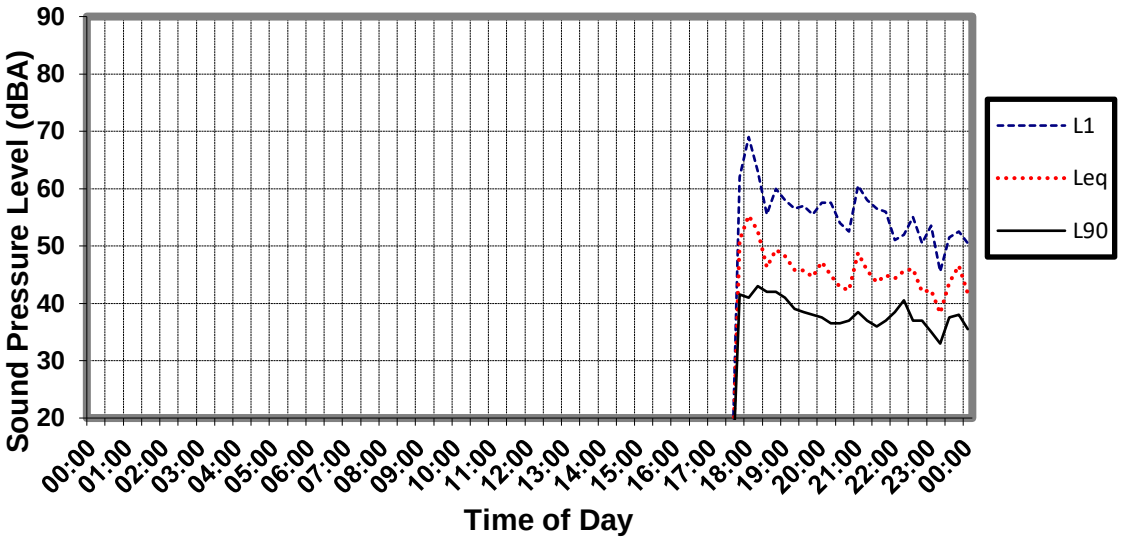
The Infobyte Im4 noise logger conforms to Australian Standard AS 1259 as a Type 2 precision sound level meter.

The calibration of the sound level meter and noise logger was checked before and after the measurement periods. No significant system drift occurred over the measurement periods.

The sound level meter, noise logger and acoustical calibrator have been checked, adjusted and aligned to conform to the factory specifications and issued with conformance certificates as required by the regulations.

Noise Survey Results	Appendix B

Friday February 14th 2025



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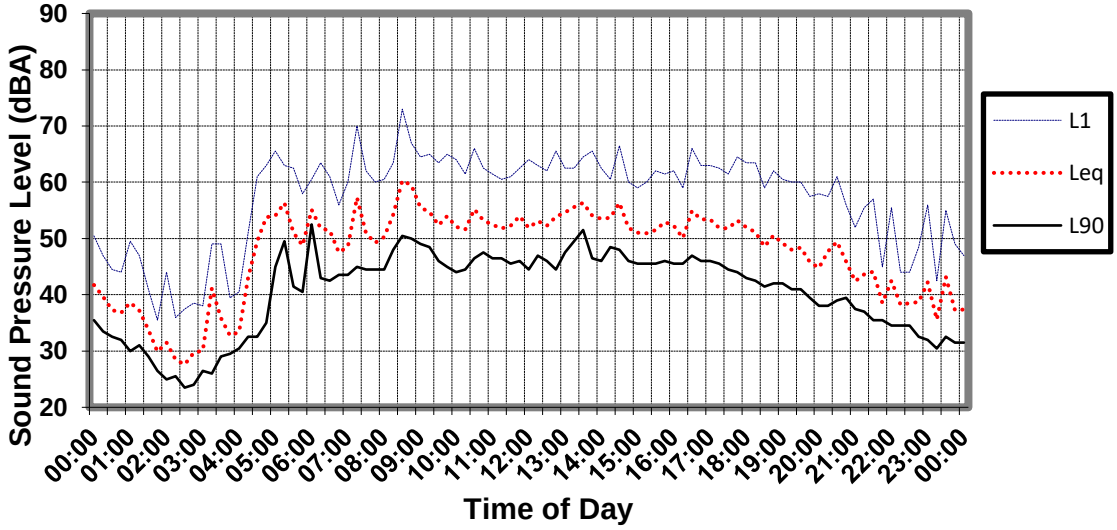

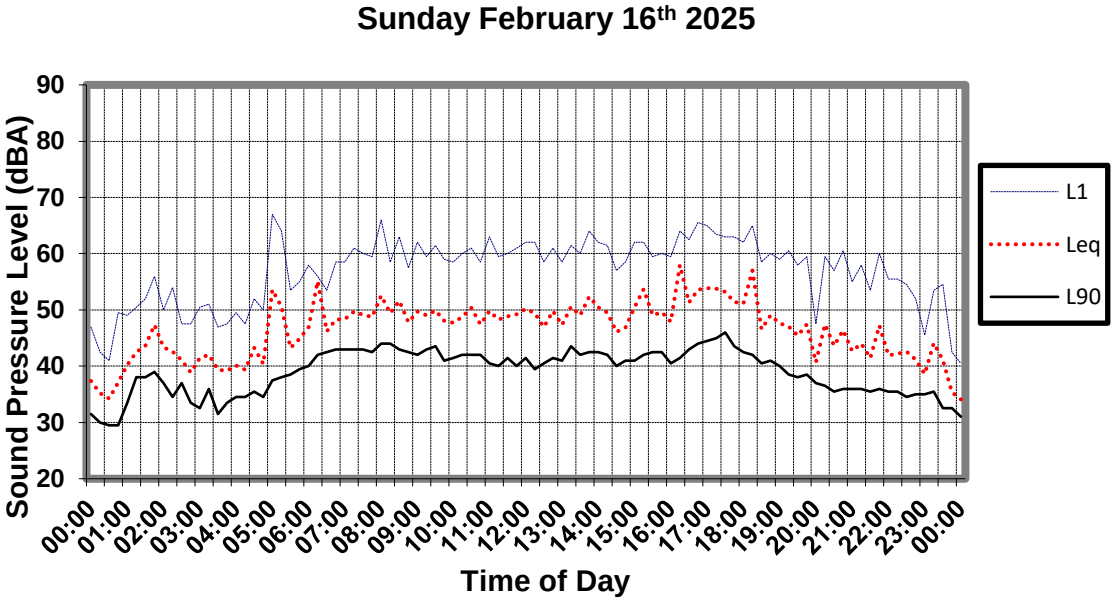
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Time of Day
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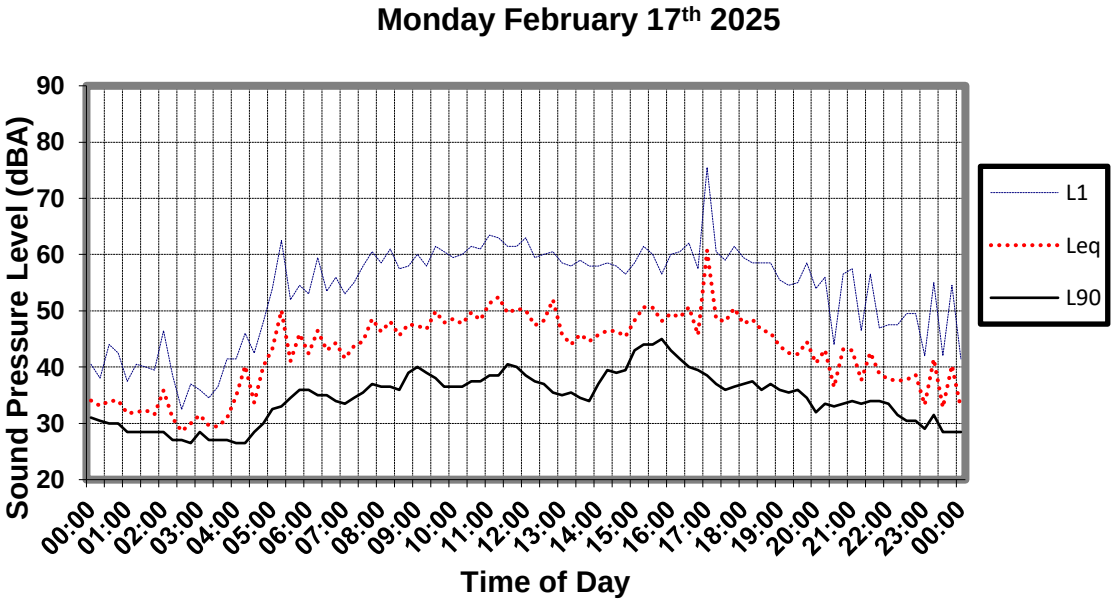
Leq
L90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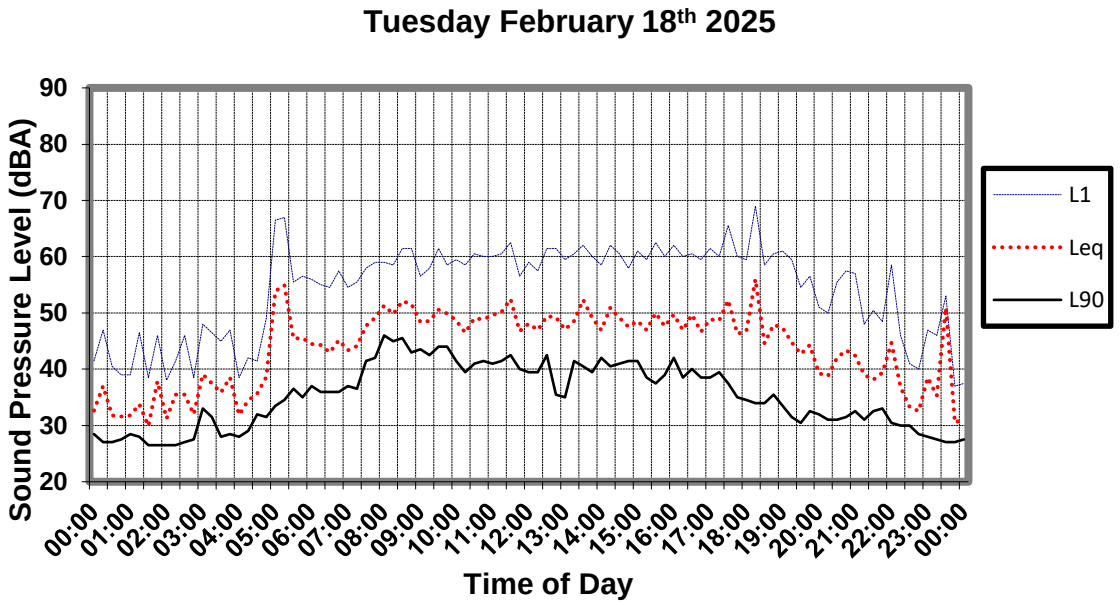
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Time of Day
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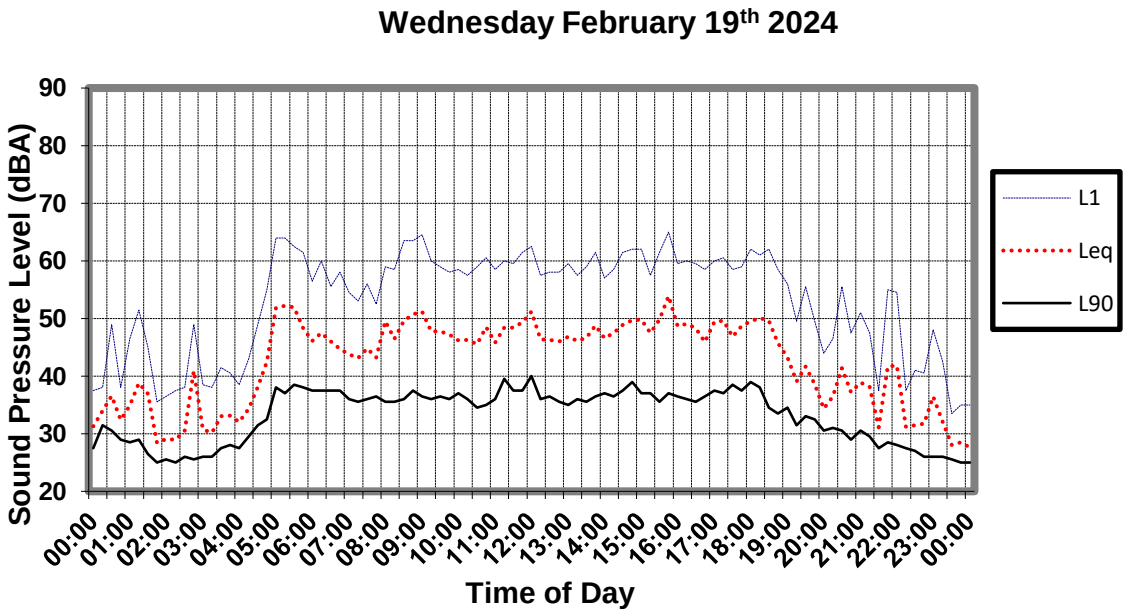
Leq
L90


Wednesday February 19th 2024
Sound Pressure Level (dBA)
90
80
70
60
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Time of Day
L1
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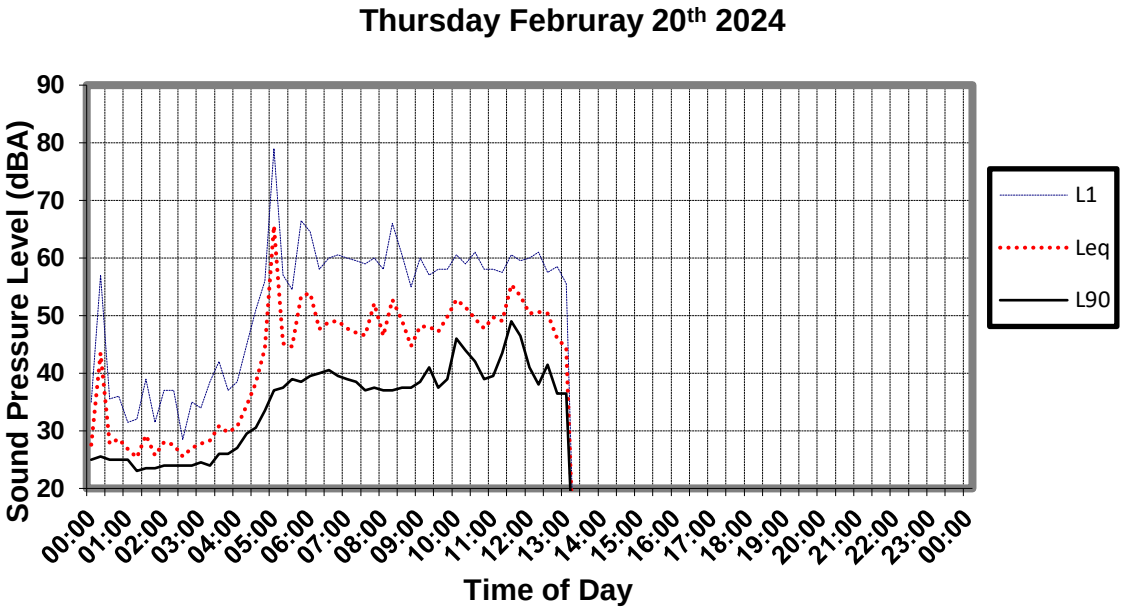
L90


Thursday Februray 20th 2024
Sound Pressure Level (dBA)
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Time of Day
L1
Leq
L90