Blackett Acoustics
Noise & Vibration Consultants

173 BIRDWOOD ROAD, GEORGES HALL
AIRCRAFT NOISE ASSESSMENT

Report No BA250214
Version A

March 2025

Prepared
for

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Association of Australian Acoustical Consultants

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GLOSSARY

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are defined below.

Maximum Noise Level (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 is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

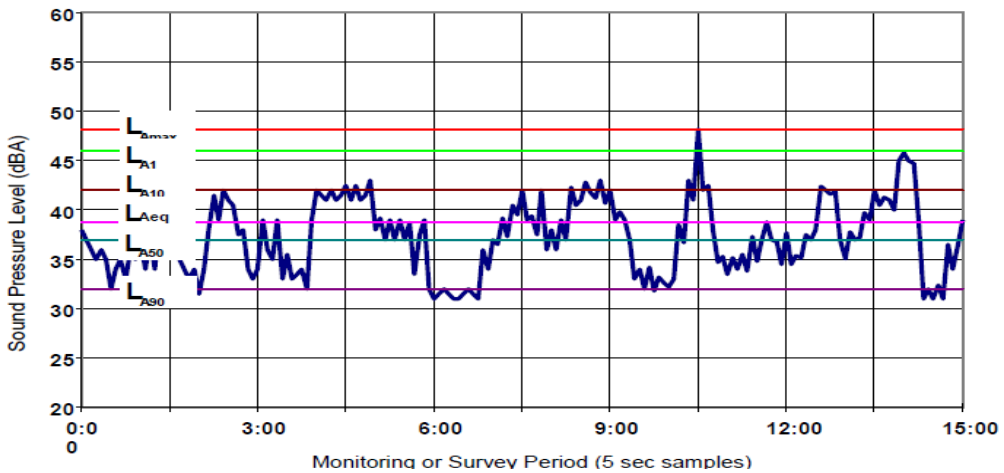
L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

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_{A90} – The L_{A90} level is the noise level which is exceeded for 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 night time) 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 night time.



1 INTRODUCTION

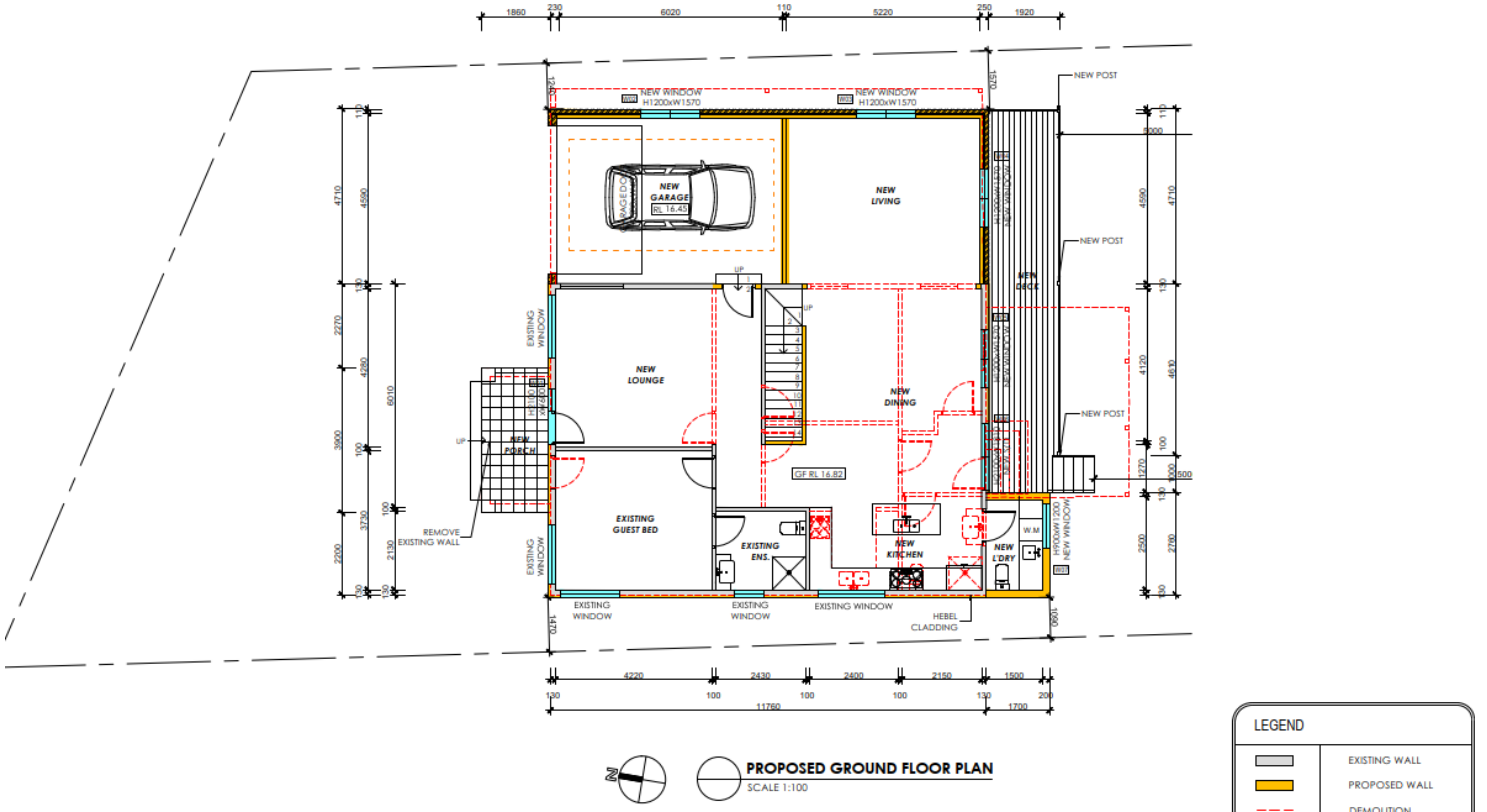
This report contains the aircraft noise impact assessment and relevant environmental noise controls to support the residential development at 173 Birdwood Road, Georges Hall.

See Figure 1-1 showing the relative location of the subject site with respect to Bankstown Airport runway. The proposed alteration and addition are to be designed and constructed to meet *Australian Standard AS2021:2015 Acoustics – Aircraft noise intrusion – Building siting and construction*.

Figure 1-1 Location of 173 Birdwood Road, Georges Hall relative to Bankstown Airport

Figure 1-2 to Figure 1-4 present the proposed internal layout of the development and further details can be found in drawing package (Job No. 440 Rev F dated 24 October 2024) provided by Fuvis Building Design Pty Ltd.

Figure 1-2 Proposed Internal Layout – Ground Level



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E	AMENDED		14-05-24	
D	AMENDED		01-03-23	
C	AMENDED		18-01-23	
B	AMENDED		05-10-18	
A	DA		08-05-18	

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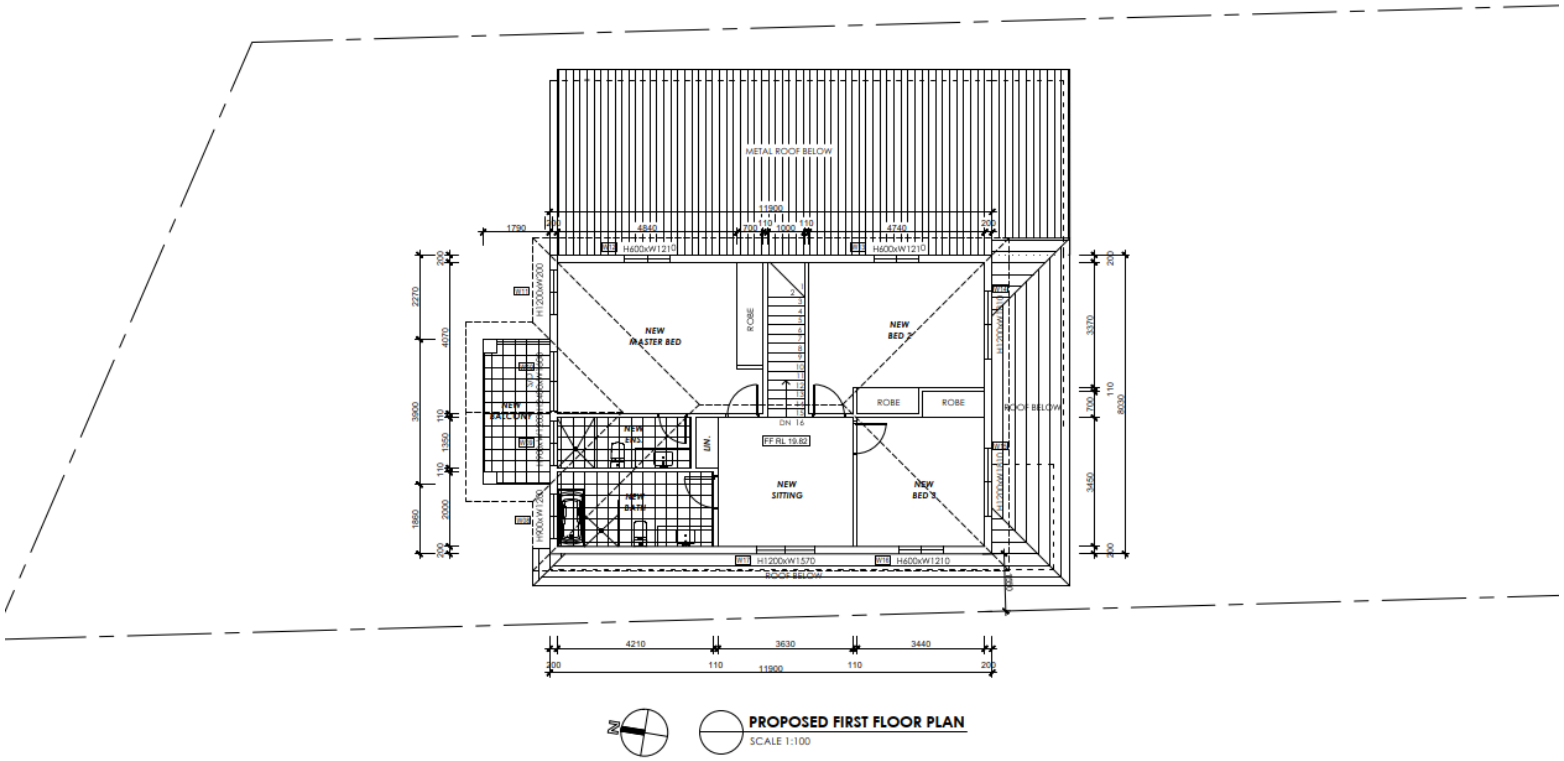
PROJECT NAME & ADDRESS: 173 BIRDWOOD ROAD GEORGES HALL

DRAWING TITLE: PROPOSED GROUND FLOOR PLAN

design by:	FUVIS BUILDING DESIGN
approved by:	FUVIS BUILDING DESIGN
drawn by:	J.K.
revision:	F
job number:	440
scale:	1:100 (A3)
date:	24-OCT-24
drawing number:	A05

Figure 1-3 Proposed Internal Layout – First Level



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DRAWING TITLE: PROPOSED FIRST FLOOR PLAN

design by:	FUVIS BUILDING DESIGN
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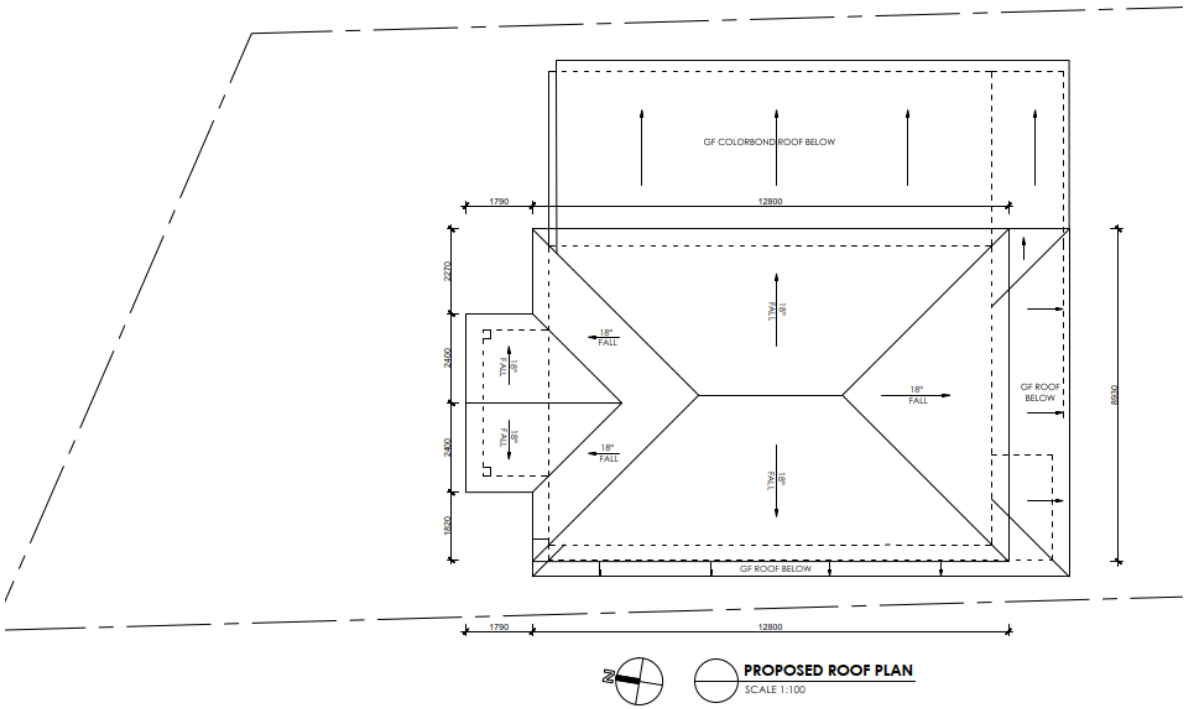
drawn by:	J.K.
revision:	F
job number:	440
scale:	1:100 (A3)
date:	24-OCT-24
drawing number:	A06

Figure 1-4 Proposed Layout – Roof Level



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A	DA		08-05-18	

PROJECT NAME & ADDRESS: 173 BIRDWOOD ROAD GEORGES HALL

DRAWING TITLE: PROPOSED ROOF PLAN

design by:	FUVIS BUILDING DESIGN
approved by:	FUVIS BUILDING DESIGN
drawn by:	J.K.
revision:	F
job number:	440
scale:	1:100 (A3)
date:	24-OCT-24
drawing number:	A07

2 RECOMMENDED INTERNAL NOISE LEVELS

The *Australian Standard AS2021:2015* nominates the maximum allowable internal noise levels from aircraft flyovers. These are summarised in Table 2-1 for this development.

Table 2-1 *AS 2021:2000* Allowable Noise Levels – dBA

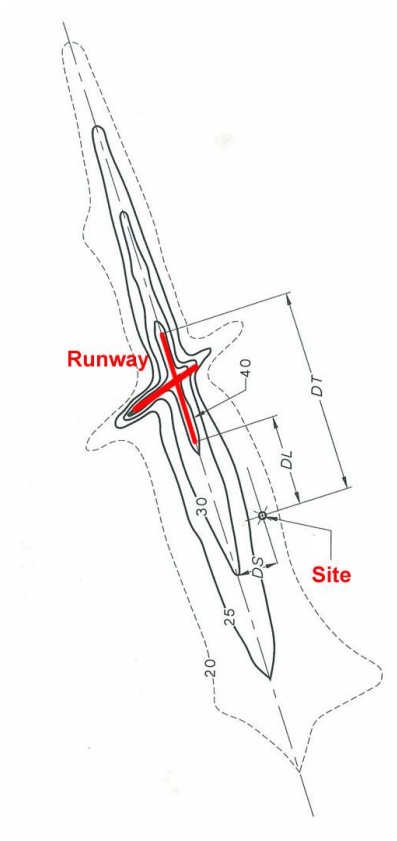
Building Type and Activity	Indoor Design Sound Level*
Sleeping areas	50
Other habitable spaces (e.g. Living rooms)	55
Bathrooms, toilets, laundries, kitchens	60

*The Standards states that windows and doors are assumed shut.

3 AIRCRAFT NOISE LEVELS

Maximum aircraft noise levels are determined from the standard based on the location of the project site. The location is defined in terms of the length from each end of the relevant runway. Figure 3-1 shows how the distances *DS, DL* and *DT* are determined.

Figure 3-1 Determination of *DS, DL* and *DT*



The relevant runway for this assessment is the 11C/29C runway at the Bankstown Airport.

Table 3-1 shows the noise levels for different aircrafts at the project site, based on measured distances of:

- DS: 735m.
- DL: 168m.
- DT: 1,601m.

Table 3-1 Maximum *AS2021* Aircraft Noise Levels at Project Site – dBA

Aircraft Type	Take Off	Landing
DHC-6	***71***	62
DHC-8	61	50
Fairchild SA226-TC	***71***	62
Beech 1900D	60	58

For design purposes, the maximum aircraft noise level impinging the Project Site is from aa take off by a DHC-6 ad Fairchild SA226-TC at **71dBA**.

Accordingly, the reductions required for each space are shown in Table 3-2 below.

Table 3-2 Required Noise Reductions for Each Space – dBA

Space	Indoor Design Levels	Noise Reduction Required
Sleeping areas	50	21
Other habitable spaces (e.g. Living rooms & kitchens)	55	16
Bathrooms, toilets & laundries	60	11

4 RECOMMENDED CONSTRUCTION

Acoustic calculation, taking into account the low frequency characteristic of noise, has been carried out to determine the building construction requirements of the external building envelope for different space types when fully furnished. The following sections detail the construction necessary to achieve the desired ANR values. Note that external windows and doors must be kept closed and all gaps must be sealed airtight, otherwise the ANR of the building envelope will be significantly reduced.

Roof-ceiling system

In order to achieve the desired ANR, it is recommended that the ceiling construction to consist of the following:

- Selected metal roof cladding.
- Timber joists to create a minimum cavity depth of 250mm.
- Cavity insulation equivalent to or greater than R2.5 ceiling batts with nominal thickness of 75mm and density of 20kg/m^3.
- Internal ceiling lining consisting of 1 layer of 13mm Fyrchek with a minimum mass of 10.5kg/m^2 or equivalent.

Wall System

The proposed wall construction for all levels is assumed to be of Hebel PowerPanel and expanded polystyrene panel construction.

The proposed Hebel PowerPanel wall construction is to consist of the following.

- 75mm PowerPanel^{XL}.
- 35mm Hebel Top Hat.
- Bradford Enviroseal.
- Cavity insulation equivalent to or greater than R2.5 ceiling batts with nominal thickness of 75mm and density of 20kg/m^3
- 90mm timber stud.
- 1 layer of 13mm standard plasterboard.

The proposed expanded polystyrene panel wall construction is to consist of the following.

- Extenal polymer modified render with a minimum thickness of 6mm.
- Expanded polystyrene panel such as 60mm thick NRG Greenboard (19kg/m^3) with all joints and perimeters acoustically sealed.
- 90mm timber stud frame or 92mm metal stud.
- Cavity insulation equivalent to or greater than R2.5 ceiling batts with nominal thickness of 75mm and density of 20kg/m^3.
- Internal wall lining consisting of 2 layers of 13mm Fyrchek with a minimum mass of 10.5kg/m^2 or equivalent.

Entry Door

All entry doors must be solid-core doors with a minimum thickness of 35mm and must be fitted with acoustic perimeter/astragal seals as well as threshold/drop seals. Door seals equivalent to Raven RP47 (door frame) and RP38 (door bottom) are recommended.

It should be noted that the acoustic performance of a closed door is a result of the combination of door, seals and frame. The performance of the frame depends on the air tightness provided by the seals and the construction of the frame itself. The gap between the door jamb casing and timber frame need to be filled with oversized backing rod and silicone sealant (1:1 depth to width ratio for joint widths less than 12mm and 2:1 ratio for joint widths greater than 12mm). Where void is larger than the 30mm, install timber packer to take up void around door jamb and timber frame instead of using backing rod and seal remaining gap with silicone sealant.

Window / Sliding Door

Where possible, compression style windows (e.g. awning, casement) should be used instead of sliding style windows (e.g. horizontal sliding, double hung). This is because compression style windows provide a tighter seal against the frame whereas sliding windows generally allow greater air infiltration and therefore greater noise infiltration.

It is recommended that the selected window frames to have the panels with an interlocking design feature between each sash. This feature is typically designed to improve the water penetration resistance; However, it will also provide benefits to the acoustic properties of the overall window frame system. The design feature is graphically illustrated in Figure 4-1.

Figure 4-1 Interlocking Design Between Each Sash

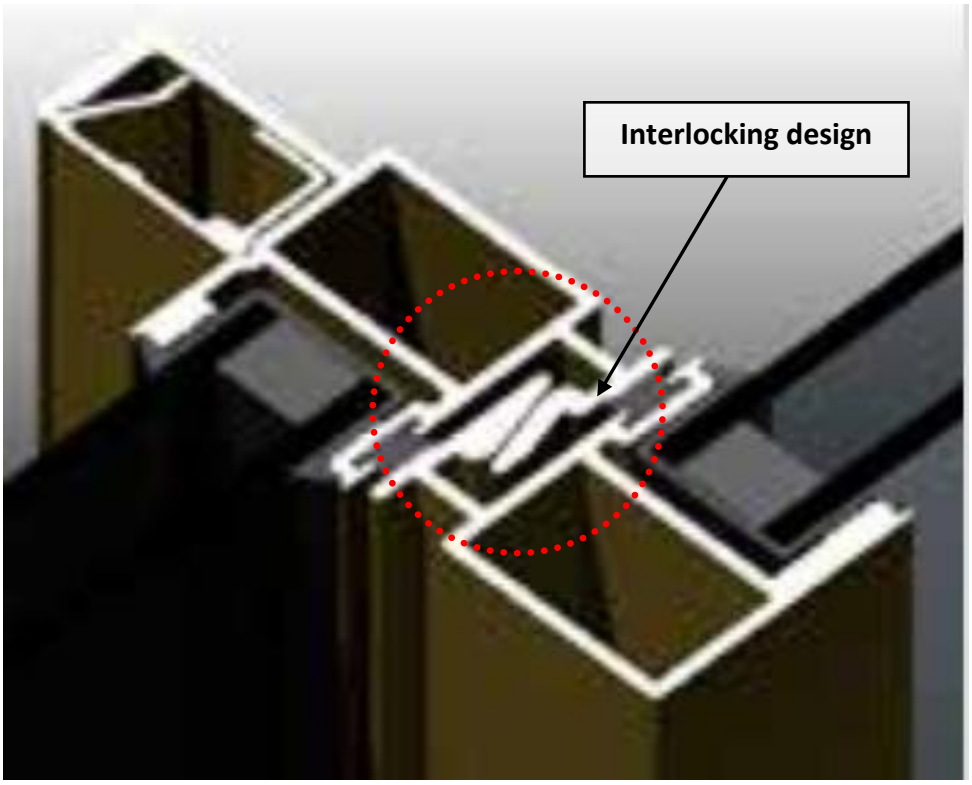


Table 4-1 presents the summaries of recommended glazing for the window system in the proposed development.

Acoustic seals only provide suitable performance if they are fitted properly. Seals should be selected based on their acoustic performance, simplicity of use, life cycle and maintenance requirements. Generally, Q-lon seals are more effective than brush seals. Standard mohair seals should be avoided where possible.

The gap between window reveal and timber frame need to be filled with oversized backing rod and silicone sealant (1:1 depth to width ratio for joint widths less than 12mm and 2:1 ratio for joint widths greater than 12mm). Where void is larger than the 30mm, install timber packer to take up void around window frame instead of using backing rod and seal remaining gap with silicone sealant.

Table 4-1 Recommended Glazing for Window and Door System

Level	Space	Window & Door No.	Recommended Minimum Glazing Requirement
Ground	Garage & Laundry	W02 & W07	Standard 4mm glass with a minimum rating of $R_w + C_{tr}$ 28 (R_w: 31, C_{tr}: -3).
	Lounge, Dining, Living & Kitchen	W01, W03, W04, W05 & W06	6.38mm laminated glass with a minimum rating of $R_w + C_{tr}$ 30 (R_w: 33, C_{tr}: -3).
First	Bath & Ensuite	W08 & W09	Standard 4mm glass with a minimum rating of $R_w + C_{tr}$ 28 (R_w: 31, C_{tr}: -3).
	Sitting	W17	6.38mm laminated glass with a minimum rating of $R_w + C_{tr}$ 30 (R_w: 33, C_{tr}: -3).
	Master Bed, Bed 2 & Bed 3	W10, W11, W12, W13, W14, W15 & W16	10.38mm laminated glass with a minimum rating of $R_w + C_{tr}$ 33 (R_w: 36, C_{tr}: -3).

Any thermal double-glazing systems proposed are to meet the minimum $R_w + C_{tr}$ ratings outlined in Table 4-1. Note that windows and doors must only be procured from suppliers that have conducted laboratory testing on their products.

5 VENTILATION

In order to fully comply with AS2021 it is necessary to provide alternative ventilation so that external windows and doors can be kept closed. In this way the indoor noise goals can be met while providing room ventilation that meets the Building Code of Australia. Typical ways to achieve this are as below:

Option 1

Fully ducted air-conditioning with provision included of outside air. Many domestic air conditioning systems do not include outside air by default – it must be specified at the time of tendering and ordering. Commercial ducted air-conditioning systems usually do have provision for outside air as a standard feature.

Option 2

A proprietary wall-mounted ventilation system, such as Aeropac. Aeropac units are approximately $800 each (per habitable room). Available from Acoustica, phone: 1300 722 825.

Option 3

Provision of an attenuated air inlet in an external faced proprietary unit such as "Silenceair". Available from www.silenceair.com

6 CONCLUSION

As assessment of aircraft noise intrusion in accordance with the requirement of AS2021 has been conducted for the residential development at 173 Birdwood Road, Georges Hall.

To ensure compliance with AS2021, recommendations have been made including upgrading of the constructions for ceilings, walls and windows. The design of the air-conditioning should include provision of fresh air.

Note

All materials specified by Blackett Acoustics have been selected solely on the basis of acoustic performance. Any other properties of these materials, such as fire rating, chemical properties etc. should be checked with the suppliers or other specialised bodies for fitness for a given purpose.

Version	Status	Issue Date	Prepared by
A	Final	5 March 2025	Jimi Ang