Blackett Acoustics
Noise & Vibration Consultants

15 September 2021

Project Number: BA210829
Email: katina@walsharchitects.com.au

Ms Katina Vlandis
Graduate of Architecture
Walsh Architects Pty Ltd

Dear Katina

Re: 58 Forest Way, Frenchs Forest – DA Traffic Noise Assessment

1. Introduction

Blackett Acoustics has been engaged to conduct a traffic noise impact assessment for a proposed residential development in Frenchs Forest.

This report addresses the acoustic issue of traffic noise intrusion; investigate the degree of traffic noise exposure and recommends construction to reduce traffic noise ingress to the proposed development. The recommended noise control measures are to support the DA process.

2. Project and Site Description

The Project Site location is situated at 58 Forest Way, Frenchs Forest. The Project Site has a typical setback distance of 5m from the nearest laneway of Forest Way. The proposed development consists of 4 apartment units.

During a site survey conducted on Wednesday, 1 September 2021, it was aurally and visual observed that the Project Site is affected by noise emission from traffic on Forest Way. However, the traffic volume on Forest Way was visibly reduced with the current Covid-19 lockdown restrictions in placed.

Figure 2-1 present an aerial outlining the Project Site with the proposed building envelope and the surroundings buildings. The proposed works are shown in Figure 2-2 to Figure 2-4, and further details can be found in drawing package (dated 13 September 2021) by Walsh Architects Pty Ltd.

Figure 2-1 Aerial of Project Site

Figure 2-2 Proposed Internal Layout – Basement Level

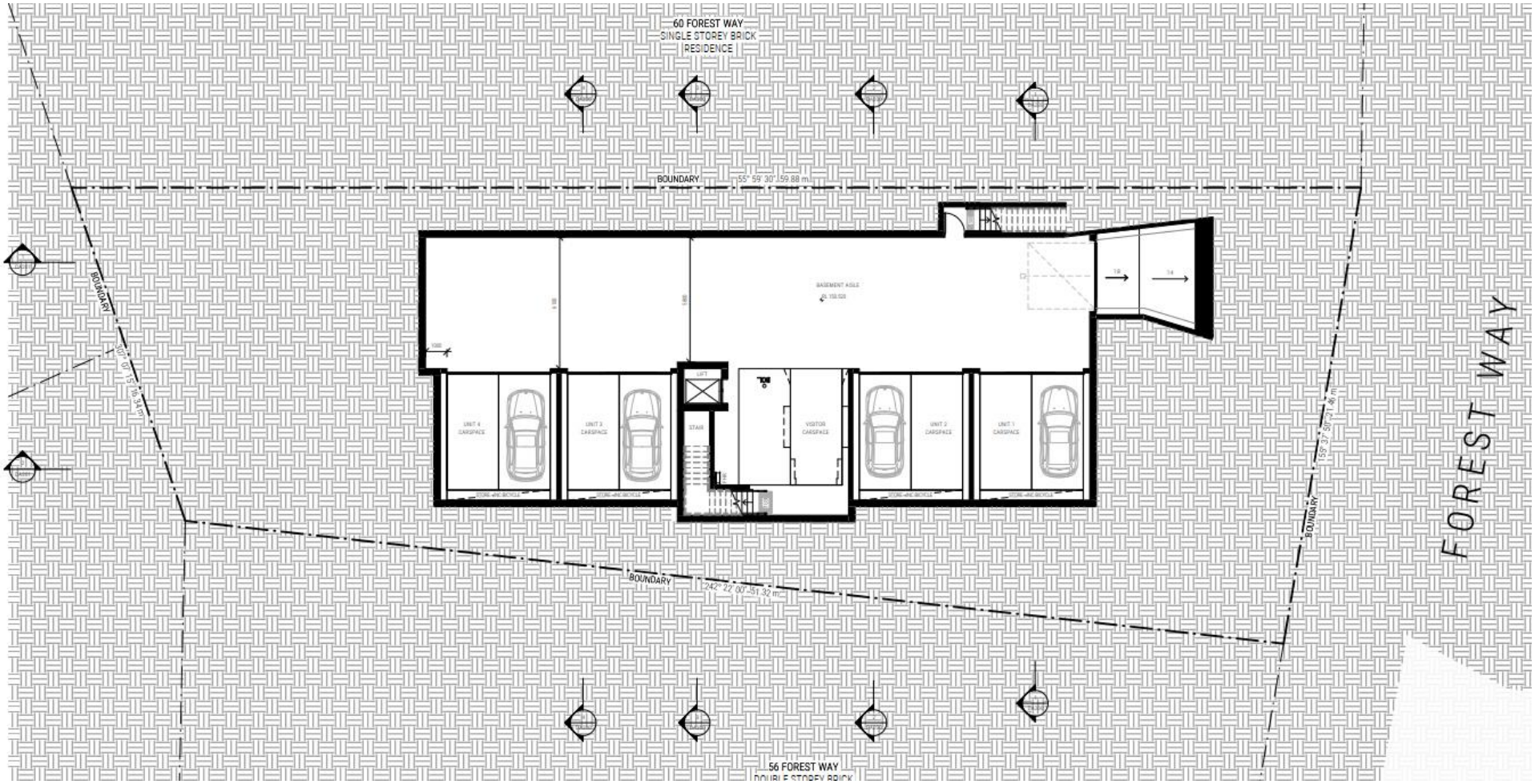


Figure 2-3 Proposed Internal Layout – Ground Level

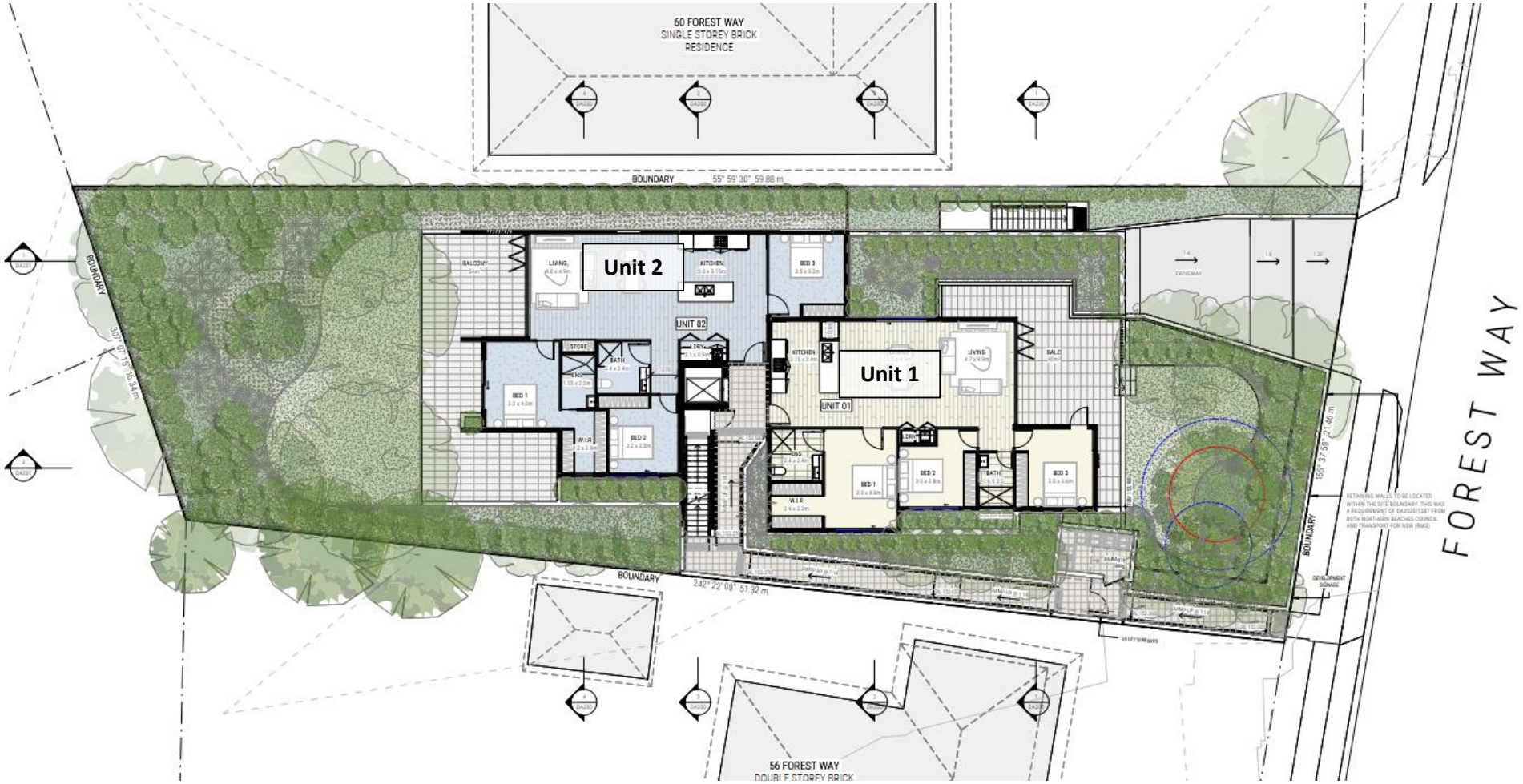


Figure 2-4 Proposed Internal Layout – First Level

3. NSW Infrastructure SEPP Noise Requirements

The Department of Planning and Environment's (DoPE) document entitled *"Development near Rail Corridors and Busy Roads – Interim Guideline" (*DRCBR) provides guidance in relation to mitigation of noise sensitive developments in order to provide a minimum deemed acceptable level of acoustic amenity near road and rail.

Extracted from DRCBR, Table 3-1 provides a summary of the recommended internal noise levels under Clause 102 of the NSW Infrastructure SEPP, where noise sensitive spaces are likely to be impacted by traffic noise ingress.

Table 3-1 NSW Infrastructure SEPP Recommended Internal Noise Levels

Residential Buildings		
Type of occupancy	**Internal L_{Aeq} Noise Level (dBA)**	**Applicable time period**
Sleeping areas (bedroom)	35	Night time 10.00pm to 7.00am
Other habitable rooms (excluding garages, kitchens, bathrooms & hallways)	40	At any time

Note: Airborne noise is calculated as $L_{Aeq,15hr(day)}$ and $L_{Aeq,9hr(night)}$.

4. Traffic Noise Measurements & Results

Operator attended noise measurements were conducted in free field positions as outlined in Figure 2-1 on Wednesday, 1 September 2021 between 8.30am to 9.30am, it was visually and aurally observed that the Project Site is currently impacted by noise emission from traffic on Forest Way. Based on visual observation, traffic movements on Forest Way were intermittent during the time of measurement.

All noise measurements were conducted using a NTi XL2 Sound Level Meter (SLM). The sound level meter conforms to Australian Standard 1259 *Acoustics - Sound Level Meters* as a Type 1 Precision Sound Level Meter which has accuracy suitable for field and laboratory use. The A-Weighting filter of the meter was selected, and the time weighting was set to "Fast". The calibration of the meter was checked before and after the measurements with a sound level calibrator and no significant drift was noted. The weather was clear with no recorded rainfall and negligible wind.

Table 4-1 presents the measured L_{Aeq} noise levels associated with traffic on Forest Way.

Table 4-1 Measured L_{Aeq} Noise Levels from Forest Way – dBA

Meas. Location	Date & Time	Time Period	Overall Measured $L_{Aeq,1hr}$
5m from the nearest laneway of Forest Way at 1.5m above ground.	01/09/2021 8.30am-9.30am	Daytime	60

In order to verify the typical traffic noise levels associated with traffic on Forest Way, reference is made to historical Annual Average Daily Traffic (AADT) from Year 2019 and Year 2020 for Forest Way.

The AADT data were obtained from Transport for NSW Traffic Volume Viewer station ID 57025. The established daytime and night time traffic volumes on Forest Way are as presented below:

- **Year 2019 Daytime Traffic Volume** – 27,476 vehicles with 10% heavy vehicles.
- **Year 2019 Night Time Traffic Volume** – 5,342 vehicles with 14% heavy vehicles.
- **Year 2020 Daytime Traffic Volume** – 17,710 vehicles with 13% heavy vehicles.
- **Year 2020 Night Time Traffic Volume** – 3,230 vehicles with 16% heavy vehicles.

Based on the traffic volume presented above, there is an overall decrease in traffic volume on Forest Way since the start of Covid-19 pandemic. In order to establish a conservative assessment, the Year 2019 AADT will be adopted.

Based on the indicative building envelopes within the Project Site, worst-case traffic noise emissions to the proposed building envelopes have been predicted using CadnaA acoustic noise prediction software. Factors that have been taken into consideration in the noise modeling are:

- building envelope locations
- ground topography
- noise attenuation due to geometric spreading
- ground absorption

To validate the noise model, a single receiver point representing the attended noise monitoring location was established in the model. The noise model was then used to calculate noise level at the single receiver point. Table 4-2 presents the comparison between the predicted noise level and the attended noise measurement level.

Table 4-2 Predicted Noise Level Compared with Measured Levels – dBA

Location	Measured $L_{Aeq,period}$ Traffic Noise Level	Predicted $L_{Aeq,period}$ Traffic Noise Level
5m from the nearest laneway of Forest Way	60	60

The established model validates well with the measured existing noise environment and will be used for predicting potential noise levels impacting on the building envelope based on Year 2019 traffic volume.

The predicted daytime and night time external $L_{Aeq,period}$ noise levels to the proposed development are graphically presented in Figure 4-1 and Figure 4-2.

Figure 4-1 Predicted Daytime $L_{Aeq,15hrs}$ External Noise Levels

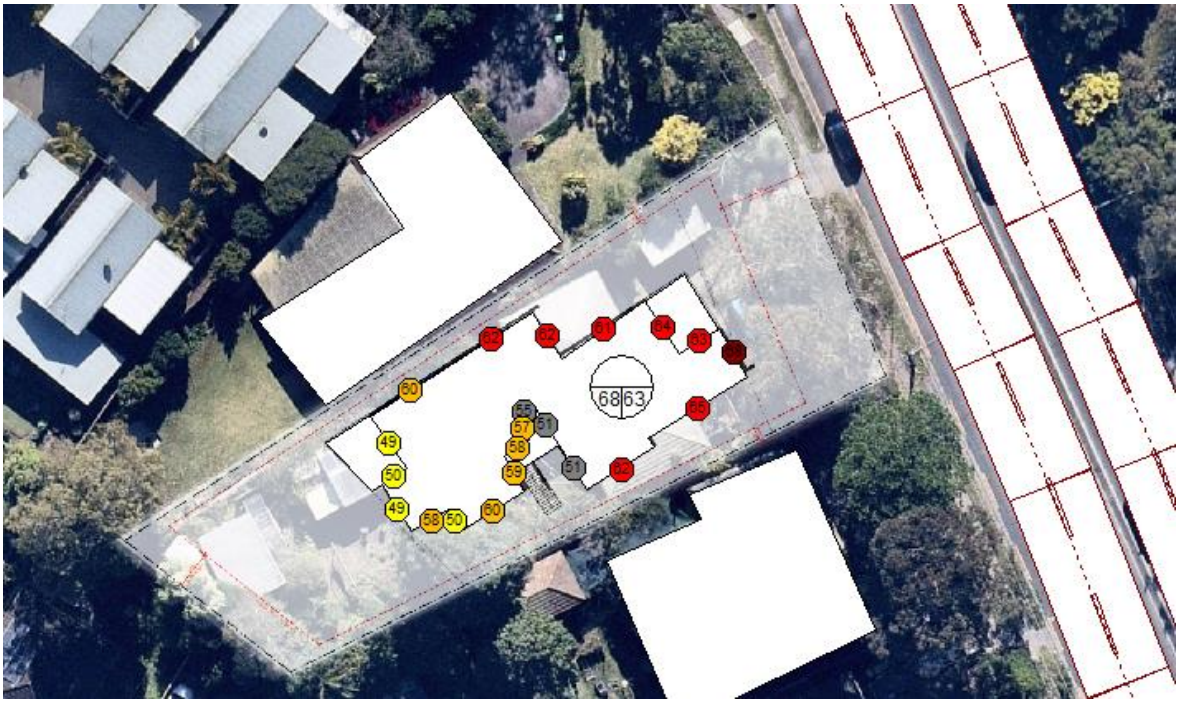
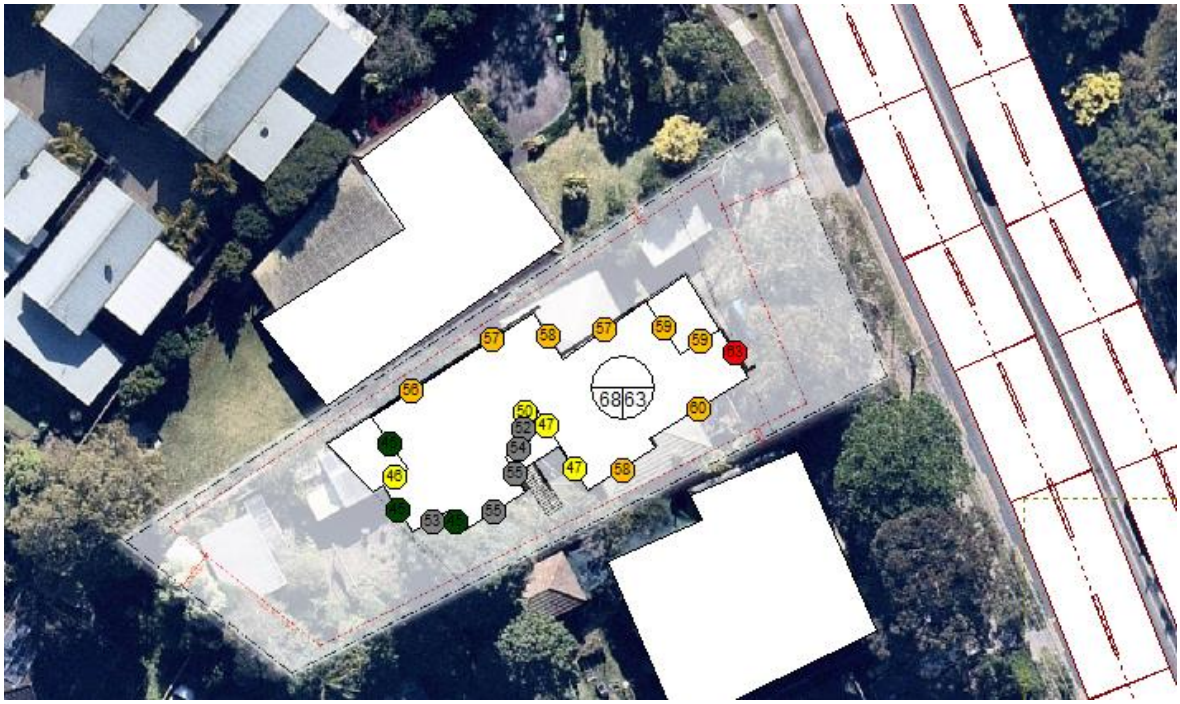


Figure 4-2 Predicted Night Time $L_{Aeq,15hrs}$ External Noise Levels



Based on the predicted $L_{Aeq,period}$ noise levels presented in Figure 4-1 and Figure 4-2, it can be established that Unit 1 and Unit 3 are worst affected by traffic noise emission levels from Forest Way.

For design purposes, the predicted traffic noise levels impacting the Unit 1 and Unit 3 will be used. Accordingly, the reductions required for each space within the worst-affected units are shown in Table 4-3 below.

Table 4-2 Required Noise Reductions for Each Space – dBA

Type of occupancy	Internal L_{Aeq} Noise Level	Transportation Noise Reduction (TNR) Required
Sleeping areas (bedroom)	35	28
Other habitable rooms (excluding garages, kitchens, bathrooms & hallways)	40	28

5. 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 TNR values. Note that external windows and doors must be kept closed and all gaps must be sealed airtight, otherwise the TNR of the building envelope will be significantly reduced.

Roof-ceiling system

Roof-ceiling system will consist of the following:

- Selected roof tiles or metal roof sheeting.
- Minimum cavity depth of 200mm if it is a flat roof or a raked ceiling.
- Cavity insulation equivalent to or greater than R2.0 cavity insulation (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 masonry construction.

The masonry wall construction will have an internal lining of plasterboard and insulation batts in the wall cavity. Such constructions have a sound insulation rating of at least R_w of 50 and does not require any further upgrade for sound insulation purposes.

The following provide 2 options for the proposed wall construction on all levels.

Option 1 – Brick Veneer Construction:

- 110mm brick, 90mm timber stud frame or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, 10mm standard plasterboard internally.

Option 2 – Double Brick Cavity Construction:

- 2 leaves of 110mm brickwork separated by 50mm gap.

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 needs 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

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.

Table 5-1 to Table 5-4 provide the minimum recommended glazing constructions that should be adopted to meet the noise objectives detailed in the Standard.

Table 5-1 Recommended Glazing for Window System – Unit 1

Room	Recommended Minimum Glazing Requirement
Bath & WIR	Standard 4mm glass with a minimum rating of R_w 25.
Bed 1, Bed 2, Living, Dining & Kitchen	10.5mm VLam Hush glass with a minimum rating of R_w 38.
Bed 3	12.5mm VLam Hush glass with a minimum rating of R_w 40.

Table 5-2 Recommended Glazing for Window System – Unit 2

Room	Recommended Minimum Glazing Requirement
WIR	Standard 4mm glass with a minimum rating of R_w 25.
Bed 1, Bed 2, Living, Dining & Kitchen	6.38mm laminated glass with a minimum rating of R_w 32.
Bed 3	10.5mm VLam Hush glass with a minimum rating of R_w 38.

Table 5-3 Recommended Glazing for Window System – Unit 3

Room	Recommended Minimum Glazing Requirement
Bath & WIR	Standard 4mm glass with a minimum rating of R_w 25.
Bed 1, Bed 2, Living, Dining & Kitchen	10.5mm VLam Hush glass with a minimum rating of R_w 38.
Bed 3	12.5mm VLam Hush glass with a minimum rating of R_w 40.

Table 5-4 Recommended Glazing for Window System – Unit 4

Room	Recommended Minimum Glazing Requirement
WIR	Standard 4mm glass with a minimum rating of R_w 25.
Bed 1, Bed 2, Living, Dining & Kitchen	6.38mm laminated glass with a minimum rating of R_w 32.
Bed 3	10.5mm VLam Hush glass with a minimum rating of R_w 38.

In order to fully comply with Clause 102 of Infrastructure SEPP, 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. Any mechanical ventilation system that is installed should be acoustically designed such that acoustic performance for the acoustic performance of the recommended construction are not reduced by any duct or pipe penetrating the building fabric elements. Noise emission to the adjacent property boundaries by any ventilation system shall comply with Council requirements.

The provision of alternative ventilation can be achieved in a number of ways. Some of these are described in principle below. The options outlined have not been approved for this project by a mechanical engineer as complying with the ventilation requirements but are identical to approved systems used on other similar projects.

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 such as “Silenceair”. Silenceair® units are approximately $180 each from www.silenceair.com

Option 4

Similar to Option 3 but with an alternative attenuated air inlet provided by the Builder. This could consist of a simple external air grille in the brick wall, connected to a 1.2m long internally insulated plasterboard bulkhead.

6. Conclusion

Blackett Acoustics has been engaged to conduct an acoustic assessment of the proposed residential development at 58 Forest Way, Frenchs Forest.

Assessment of traffic noise intrusion in accordance with the requirements of *Development near Rail Corridors and Busy Roads – Interim Guideline"* has been conducted. Recommendations contained in this report have been made for the building elements to control traffic noise ingress from Forest Way to within design levels recommended in the guideline.

We trust this information is sufficient to satisfy your requirements. Please contact us if you have any further queries.

Yours faithfully

Jimi Ang
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