



**RAPT**  
**CONSULTING**

# Acoustic Assessment – Proposed Retirement Village Newcastle Golf Club, Fern Bay NSW

Prepared for  
**Principle Living**

October 2023

**Relationships Attention Professional Trust**

**Document Details**

Acoustic Assessment – Proposed Retirement Village Newcastle Golf Club, Fern Bay NSW

**Prepared For:**

Principle Living

Suite 3 Ground Floor / 317 Hunter Street

Newcastle, NSW 2300

**Prepared By:**


RAPT Consulting

18&19 / 10 Kenrick Street

The Junction, NSW 2291

ABN: 30330220290

[www.raptconsulting.com.au](http://www.raptconsulting.com.au)

| Document ID    | Rev No. | Author                    |   |
|----------------|---------|---------------------------|---|
| 2221324_231025 | 0       | Gregory Collins -<br>MAAS |  |

## Table of Contents

|  |    |
|--|----|
| 1. INTRODUCTION  | 5  |
| 1.1 Background   | 5  |
| 1.2 Limitations  | 6  |
| 2. EXISTING ENVIRONMENT                                | 7  |
| 3. GUIDELINES  | 10 |
| 3.1 Development Near Rail Corridors and Busy Roads     | 10 |
| 3.2 State Environmental Planning Policy (Housing) 2021 | 10 |
| 4. ACOUSTIC ASSESSMENT                                 | 11 |
| 4.1 Mitigation Measures                                | 11 |
| 5. CONCLUSION  | 17 |

## Table Index

|   |    |
|---|----|
| Table 2-1 Background and Ambient Noise Monitoring Results | 9  |
| Table 3-1 Internal Noise Level Goals                      | 10 |
| Table 4-1 Internal Noise Goal Comparison                  | 11 |

## Figure Index

|   |    |
|---|----|
| Figure 1-1 Draft Masterplan   | 5  |
| Figure 2-1 Noise Monitoring Location (Nelson Bay Road in Background)    | 8  |
| Figure 4-1 Traffic Noise Reduction for Different Construction Materials | 12 |
| Figure 4-2 Specification A  | 12 |
| Figure 4-3 Specification B  | 13 |
| Figure 4-4 Categories of Noise Control Treatments                       | 14 |
| Figure 4-5 Category 2 Building Element Examples                         | 15 |
| Figure 4-6 Category 3 Building Element Examples                         | 16 |

# 1. Introduction

## 1.1 Background

RAPT Consulting has been engaged to undertake an acoustic assessment for Principle Living to inform a Development Application (DA) for a proposed retirement village located at 4A Vardon Road, Fern Bay NSW. The site is located at the Newcastle Golf Club. The subject site masterplan is shown in Figure 1-1.

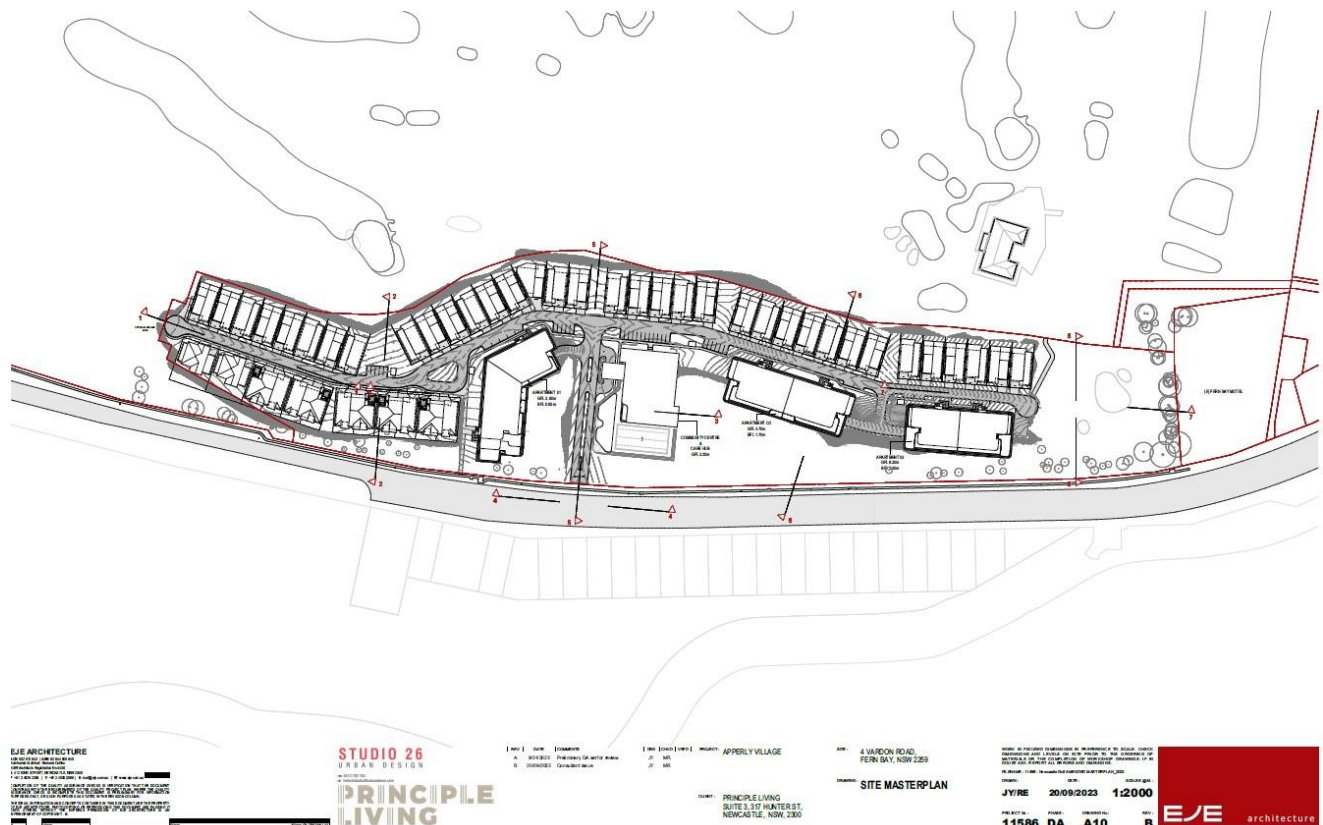


Figure 1-1 Site Masterplan (Source: EJE Architecture)

It is understood the seniors living development is proposed to consist of:

- Significant bulk earthworks to form the development pad
- 37 golf frontage homes
- 10 duplex villas
- 125 apartments over 3 buildings

## **1.2 Limitations**

The purpose of the report is to provide an independent acoustic assessment at to inform the proposal.

It is not the intention of the assessment to cover every element of the acoustic environment, but rather to conduct the assessment with consideration to the prescribed work scope.

The findings of the noise assessment represent the findings apparent at the date and time of the assessment undertaken. It is the nature of environmental assessments that all variations in environmental conditions cannot be assessed and all uncertainty concerning the conditions of the ambient environment cannot be eliminated. Professional judgement must be exercised in the investigation and interpretation of observations.

In conducting this assessment and preparing the report, current guidelines for noise were referred to. This work has been conducted in good faith with RAPT Consulting's understanding of the client's brief and the generally accepted consulting practice.

No other warranty, expressed or implied, is made as to the information and professional advice included in this report. It is not intended for other parties or other uses.

## 2. Existing Environment

To establish background and ambient noise levels, noise monitoring was undertaken by RAPT Consulting from 22 June to 27 June 2021 at the south-western boundary of the golf course. The site was selected as it provided an approximate location of the most potentially exposed residences to Nelson Bay Road noise, was indicative of the overall ambient noise environment for the project and it presented as a relatively secure location whereby minimising the risk of theft or vandalism to the monitoring equipment.

During site visits it was noted that that existing road traffic from Nelson Bay Road, and wildlife sources primarily described the ambient noise environment and was typical of an urban area.

The monitoring location is shown in Figure 2-1.





*Figure 2-1 Noise Monitoring Location (Nelson Bay Road in Background)*



Monitoring was undertaken using a RION NL-42 noise logger with Type 2 Precision. Calibration was checked prior to and at the conclusion of the measurements with no significant drift. These loggers are capable of measuring continuous sound pressure levels and are able to record  $L_{Amin}$ ,  $L_{A90}$ ,  $L_{A10}$ ,  $L_{Amax}$  and  $L_{Aeq}$  noise descriptors. The instrument was programmed to accumulate environmental noise data continuously over sampling periods of 15 minutes for the entire monitoring period.

The  $L_{A90}$  descriptor is used to measure the background noise level. This descriptor represents the noise level that is exceeded for 90 percent of the time over a relevant period of measurement. In line with the procedures described in the EPA's NPfl, the assessment background level (ABL) is established by determining the lowest tenth-percentile level of the  $L_{A90}$  noise data acquired over each period of interest. The background noise level or rating background level (RBL) representing the day, evening and night-time assessment periods is based on the median of individual ABL's determined over the entire monitoring duration. The RBL is representative of the average minimum background sound level, or simply the background level.

The  $L_{Aeq}$  is the equivalent continuous noise level which would have the same total acoustic energy over the measurement period as the varying noise actually measured, so it is in effect an energy average. Logged data was reviewed and filtered to exclude any extraneous data during the monitoring period. Table 7 of the NSW EPA Road Noise Policy provides guidance on the application of a façade correction factor. Due to the monitoring location was not within 3.5 metres of a wall that could reflect sound, a façade correction factor of 2.5 dB(A) has been added to the measurements.

The RBL and ambient  $L_{Aeq}$  levels are provided in Table 2-1 below.

*Table 2-1 Background and Ambient Noise Monitoring Results*

| Descriptor      | Newcastle Golf Course Noise Level<br>dB(A) | Time Interval    |
|-----------------|--|------------------|
| $L_{A90}(11hr)$ | 55   | 7:00am - 6:00pm  |
| $L_{A90}(4hr)$  | 46   | 6:00pm – 10:00pm |
| $L_{A90}(9hr)$  | 35   | 10:00pm – 7:00am |
| $L_{Aeq}(15hr)$ | 67   | 7:00am - 10:00pm |
| $L_{Aeq}(9hr)$  | 61   | 10:00pm – 7:00am |

### 3. Guidelines

#### 3.1 Development Near Rail Corridors and Busy Roads

The Department of Planning Guideline “Development near Rail Corridors and Busy Roads – Interim Guideline” (Guideline) Section 3.5 of the guideline specifies the internal noise criteria outlined in Table 3-1 Below.

*Table 3-1 Internal Noise Level Goals*

| Type of Occupancy   | Noise Level                  | Time Period                   |
|---|------------------------------|-------------------------------|
| Sleeping areas / Bedrooms   | 35dB(A)<br>Windows<br>Closed | Night<br>10:00pm to<br>7:00am |
| Other Habitable Rooms (excluding garages, kitchens<br>bathrooms and Hallways) | 40dB(A)<br>Windows<br>Closed | Any Time                      |

The guidelines outlined above originated from the Rail Infrastructure Corporation (RIC) publication “Consideration of Rail Noise and Vibration in the Planning Process” (2003) where it is specific that the criteria apply with windows and doors closed. If noise levels with windows or doors open exceed these criteria by more than 10 dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire.

#### 3.2 State Environmental Planning Policy (Housing) 2021

The State Environmental Planning Policy (SEPP) Division 6 Section 100 Visual and Acoustic Privacy states:

*Seniors housing should be designed to consider the visual and acoustic privacy of adjacent neighbours and residents by—*

*(a) using appropriate site planning, including considering the location and design of windows and balconies, the use of screening devices and landscaping, and*

*(b) ensuring acceptable noise levels in bedrooms of new dwellings by locating them away from driveways, parking areas and paths.*

## 4. Acoustic Assessment

The NSW Environmental Noise Management Manual specifies that standard window glazing of a building will typically attenuate the external noise levels by at least 20dB(A) with the windows closed and 10 dB(A) with the windows open (allowing for natural ventilation). This means that an external noise level of 60 Leq dB(A) during the day and 55 Leq dB(A) night would result in compliance with the internal noise level goals outlined in Table 3-1.

The predicted internal noise levels for standard façade glazing are presented in Table 4-1 based on the noise monitoring results.

*Table 4-1 Internal Noise Goal Comparison*

| Type of Occupancy  | Recorded Ambient Noise Level | Internal Noise Level | Noise Goal Level          | Time Period                |
|--|------------------------------|----------------------|---------------------------|----------------------------|
| Sleeping areas / Bedrooms  | 61 dB(A)                     | 41 dB(A)             | 35dB(A)<br>Windows Closed | Night<br>10:00pm to 7:00am |
| Other Habitable Rooms (excluding garages, kitchens bathrooms and Hallways) | 67 dB(A)                     | 47 dB(A)             | 40dB(A)<br>Windows Closed | Any Time                   |

The predicted internal noise levels particularly for the closest facades to Nelson Bay Road indicate internal noise goals may be exceeded by 7 dB(A) for habitable rooms and 6 dB(A) for bedrooms. To achieve noise goals with the windows shut on the eastern façade of the project, mitigation measures during building design should be implemented. Additionally, internal noise levels with windows or doors open in sleeping areas exceed the criteria by more than 10dBA, therefore the design of the ventilation for these rooms should be such that occupants can leave windows closed.

### 4.1 Mitigation Measures

Based on the monitoring results, windows with direct line of sight to traffic such as areas on the eastern façade, sleeping area / bedroom would need to attenuate at least 26dB(A) of the traffic noise (61 calculated - 35 acceptable). The façade of any living areas would need to attenuate at least 27 dB(A) (67 – 40). Figure 4-1 is a reproduction of Figure B2 from the Guideline showing a typical situation of a dwelling adjacent to a busy road.

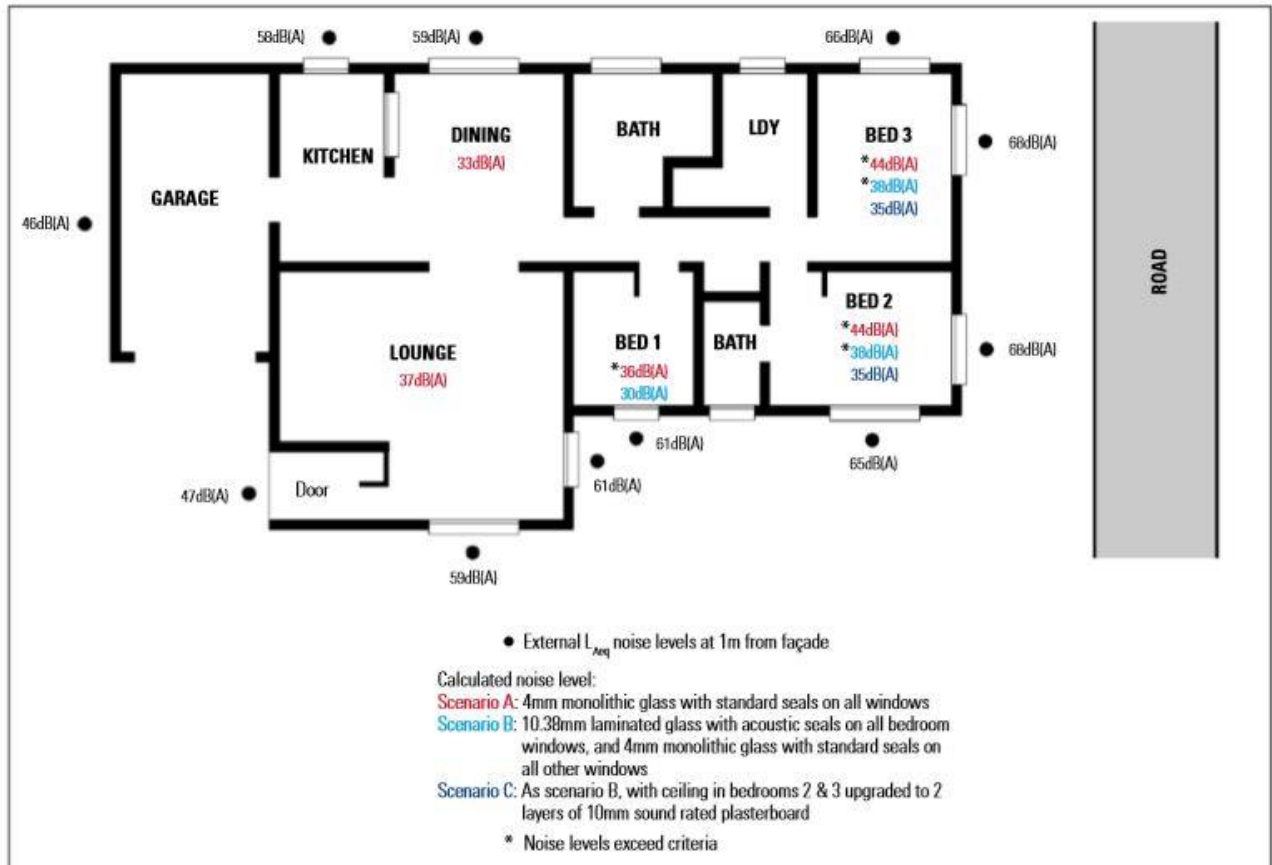


Figure 4-1 Traffic Noise Reduction for Different Construction Materials

Figure 4-1 shows a traffic noise level of 68 dB(A) at windows directly facing a busy road. The figure shows that this noise may be reduced by 30 dB(A) by the sound transmission loss associated with construction adhering at a minimum, to “Scenario B”. Therefore, as a minimum, the façade of any bedrooms or living areas which may front Nelson Bay Road are recommended to be constructed with consideration to Specification B from the Guideline. Specification A and B from the guideline are outlined below.

### Specification A

|         |  |         |
|---------|--|---------|
| Windows | standard 4mm monolithic glass with standard weather seals on all windows                           | (Rw 25) |
| Doors   | 30mm solid core timber – lounge room aluminium framed glass sliding door – lounge and dining rooms | (Rw 24) |
| Walls   | brick-veneer and standard plasterboard on timber studs with insulation in cavity                   | (Rw 52) |
| Roof    | tiled roof and standard plasterboard ceiling with insulation                                       | (Rw 43) |
| Floor   | concrete slab  |         |

Note: 'Rw' is the weighted sound reduction index of a building element

Figure 4-2 Specification A

## Specification B

|         |  |         |
|---------|--|---------|
| Windows | 10.38mm laminated glass with acoustic seals on all bedroom windows, standard 4mm monolithic glass with standard seals on all other windows | (Rw 35) |
| Doors   | 30mm solid core timber – lounge room aluminium framed glass sliding door – lounge and dining rooms   | (Rw 24) |
| Walls   | brick-veneer and standard plasterboard on timber studs with insulation in cavity   | (Rw 52) |
| Roof    | tiled roof and standard plasterboard ceiling with insulation   | (Rw 43) |
| Floor   | concrete slab  |         |

Note: 'Rw' is the weighted sound reduction index of a building element

Figure 4-3 Specification B

The above relates to facades with a full line of sight to the traffic. Figure 4-1 also shows windows which are on facades perpendicular to the road. The noise impacting on these windows is consequently shielded from 50% of the traffic noise by the building structure, and noise levels are 2-3 dB below the traffic noise level for windows which have direct line of sight to the traffic. Figure 4-1 also demonstrates that as the distance from the road increases resulting noise levels at other windows shown in the figure decrease as well.

The recommendations are generally applicable to the western facades of the development. Units further removed from Nelson Bay Road will be, by definition, more distant from the traffic noise and may be shielded, or at least partially shielded, from the traffic noise by the intervening structure and other buildings closer to the road.

Additionally it is recommended that where practicable, sleeping areas be situated away from facing Nelson Bay Road.

## Ventilation Requirements

The Guideline also qualifies that if internal noise levels with windows and doors open sufficiently to provide adequate ventilation exceed the criteria by more than 10 dB(A) the design of the ventilation of these rooms should be such that occupants can leave windows closed, if they so desire, while meeting the ventilation requirements of the Building Code of Australia. This equates to an internal noise level, with windows open, of 45 dB(A) Leq during the night and 50 dB(A) Leq during the day.

Windows in facades with line of sight to Nelson Bay Road where the received noise is 61 dB(A) Leq (9hr) and 67 dB(A) Leq (15 hr) are predicted to exceed the criterion by more than 10 dB(A) if those windows are open. Therefore, it is recommended that the project be designed such that ventilation requirements are satisfied with consideration to the Building Code of Australia for occupants of all units may leave their windows closed if they so desire.

## External Noise

The Guideline indicates that where a new residential development is planned to occur near a busy road appropriate building design, layout and construction techniques should be applied to minimise noise intrusion and provide suitable internal noise levels for sleeping and other uses. While the guideline generally applies to internal spaces, which are regarded as the most sensitive, external areas should be also be considered. Measured noise levels indicate exterior noise ranged from 67 dB(A) Leq(15hr) and 61 dB(A) Leq(9hr) at the western façade facing Nelson Bay Road. To minimise noise exposure and to provide residences with privacy particularly for residences facing Nelson Bay Road, it is recommended acoustic fences be investigated and installed on the western facades of the private space areas where appropriate. To act as an acoustic barrier any fencing or walls must be solid (minimum 10kg/m<sup>2</sup>) and to be at least 1.8 metres high with no gaps for the passage of sound.

## Building Treatments

Figure 4-4 provides acoustic performance of building elements taken from Appendix C of the Guideline.

| Category of Noise Control Treatment | R <sub>w</sub> of Building Elements (minimum assumed) |                 |      |            |       |
|-------------------------------------|---|-----------------|------|------------|-------|
|                                     | Windows/Sliding Doors                                 | Frontage Facade | Roof | Entry Door | Floor |
| Category 1                          | 24  | 38              | 40   | 28         | 29    |
| Category 2                          | 27  | 45              | 43   | 30         | 29    |
| Category 3                          | 32  | 52              | 48   | 33         | 50    |
| Category 4                          | 35  | 55              | 52   | 33         | 50    |
| Category 5                          | 43  | 55              | 55   | 40         | 50    |

*Figure 4-4 Categories of Noise Control Treatments*

Specification A figure 4-1 demonstrated that internal noise targets could be achieved with consideration to measured exterior noise levels for residences with that level of window glazing with the exception of living areas and bedrooms of directly facing Nelson Bay Road that will require Specification B. Acoustically speaking, windows are usually the weakest parts of a facade. An open or acoustically ineffective window will adversely compromise the effect of an otherwise acoustically effective facade. Proper installation is critical to the effectiveness of noise attenuation of windows and other building elements. Therefore, given the measured exterior noise levels associated with the project, it is recommended that as a minimum, Category 3 of noise control treatment be utilised for residences particularly for western facades in the design of this development. A minimum of category 2 is recommended for the remaining units. Examples of category 2 and 3 building types are shown in Figures 4-5 and 4-6. Other options exist provided the right reduction index (R<sub>w</sub>) is satisfied.









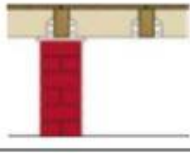

| Category No. | Building Element      | Standard Constructions   | sample  |
|--------------|-----------------------|--|---|
| 2            | Windows/Sliding Doors | Openable with minimum 6mm monolithic glass and full perimeter acoustic seals   |    |
|              | Frontage Facade       | <b>Timber Frame or Cladding Construction:</b><br>6mm fibre cement sheeting or weatherboards or plank cladding externally, 90mm deep timber stud or 92mm metal stud, 13mm standard plasterboard internally with R2 insulation in wall cavity. |    |
|              |                       | <b>Brick Veneer Construction:</b><br>110mm brick, 90mm timber stud frame or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, 10mm standard plasterboard internally.   |    |
|              |                       | <b>Double Brick Cavity Construction:</b><br>2 leaves of 110mm brickwork separated by 50mm gap  |    |
|              | Roof                  | Pitched concrete or terracotta tile or metal sheet roof with sarking, 10mm plasterboard ceiling fixed to ceiling joists, R2 insulation batts in roof cavity.   |   |
|              | Entry Door            | 40mm solid core timber door fitted with full perimeter acoustic seals  |  |
|              | Floor                 | 1 layer of 19mm structural floor boards, timber joist on piers   |  |
|              |                       | Concrete slab floor on ground  |  |

Figure 4-5 Category 2 Building Element Examples







| Category No. | Building Element      | Standard Constructions   | sample  |
|--------------|-----------------------|--|---|
| 3            | Windows/Sliding Doors | Openable with minimum 6.38mm laminated glass and full perimeter acoustic seals   |    |
|              | Frontage Facade       | <b>Brick Veneer Construction:</b><br>110mm brick, 90mm timber stud or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, 10mm standard plasterboard internally. |    |
|              |                       | <b>Double Brick Cavity Construction:</b><br>2 leaves of 110mm brickwork separated by 50mm gap  |    |
|              | Roof                  | Pitched concrete or terracotta tile or sheet metal roof with sarking, 1 layer of 13mm sound-rated plasterboard fixed to ceiling joists, R2 insulation batts in roof cavity.          |   |
|              | Entry Door            | 45mm solid core timber door fitted with full perimeter acoustic seals  |  |
|              | Floor                 | Concrete slab floor on ground  |  |

Figure 4-6 Category 3 Building Element Examples

## 5. Conclusion

This acoustic assessment has been undertaken as part of a development application for Principle Living to inform a Development Application (DA) for a proposed retirement village located at 4A Vardon Road, Fern Bay NSW.

Based on the monitoring results inclusive of road traffic, natural sounds and the information provided regarding the development, it is expected compliance with all noise goals can be achieved provided design measures similar to what has been outlined in Section 4.1 of this report are investigated and implemented.