

# PROPOSED MIXED USE

1-7 Adler Circuit, Yarrabilba

## Noise Impact Assessment

**Radiance Spaces Pty Ltd**

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Date  
4 June 2024

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Report  
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# 1. INTRODUCTION

Trinity Consultants Australia (Trinity) was commissioned by Radiance Spaces Pty Ltd to provide a noise impact assessment for the proposed new mixed use development being constructed at 1-7 Adler Circuit, Yarrabilba.

The proposed development, a four-level building, includes a basement carpark, commercial uses at ground level and Level 1 and residential units on Levels 2 and 3. The noise assessment focuses on potential noise impacts from off-site uses (including road traffic and commercial activity) onto the proposed development. Where necessary, acoustic mitigation has been recommended to achieve a suitable acoustic amenity at the proposed development.

The purpose of this report is as follows:

- Outline the relevant project noise criteria.
- Present the results of noise monitoring.
- Predict and assess the road traffic noise impact onto the development.
- Predict and assess the noise emissions from the development.
- Describe noise mitigation requirements, if any.

To aid in the understanding of the terms in this report a glossary is included in **Appendix A**.

## 1.1 Information Request

This updated provides a response to the information request issued by the Department of State development, Infrastructure, Local Government and Planning (SDILGP) regarding the proposed development at 1-7 Adler Circuit, Yarrabilba. The information request was issued on 23 November 2023 in response to the noise assessment prepared by Trinity on 25 August 2023 (Report 237401.0087.R01V01).

A copy of the information request items are provided below followed by a response. This updated report also considers the latest plans issued on 1 May 2024.

### 1.1.1 Item 16 – Noise Emission Impacts

**16. The acoustic report focuses on reverse amenity and the impact on the residents that the proposed development is introducing, but not on the emissions of the uses on the site and the potential impact upon the surrounding area. Update the report to include all of the likely uses/activities proposed, and weekend use.**

SDILGP was called on 22 May 2024 to discuss this item. Trinity highlighted that Section 4 of the report addresses potential impacts onto off-site uses. In this section, it is noted that the nearest off-site sensitive uses are shielded from the main noisy activity at the proposed development (i.e. the nearest northern receptors along Yarrabilba Drive are shielded by the proposed building from car park activity).

SDILGP indicated that the main concern associated with this item was potential impacts onto the proposed units at the development site. Based on a review of the on-site uses and activities, car park and loading bay activity is expected to be the main source of noise impacting onto proposed residential units. The car park activity would affect the southern and western facades of the proposed units. These facades are noted to have no MP4.4 noise category requirements for reducing road traffic.

Additional noise modelling has been undertaken to assess car park and loading dock activity. Details of the modelling inputs and results are found in **Section 7.3** of this updated report.

The results show that Category 1 construction is required to mitigate on-site noise sources. This outcome is reflected in the acoustic markups provided in **Appendix C**.

## 1.1.2 Item 17 - Ventilation

### **17. Provide advice from a ventilation specialist to address traffic noise impact assessment measures (closed windows) as per the recommendations of the submitted acoustic report.**

SDILGP was called on 22 May 2024 to discuss this item. Trinity highlighted that ventilation design is usually addressed during the detailed design phase. It is understood that SDILGP mainly require clarification on the type of ventilation required (as opposed to high level design information).

Where windows are required to be closed, ventilation can be provided as mechanical ventilation or natural ventilation coming from another room (where windows do not need to be closed and subject to the relevant standards). In this instance, given the majority of facades requiring acoustic treatment for each unit, it is more likely that mechanical ventilation will be required for noise-affected rooms.

## 2. STUDY AREA DESCRIPTION

The proposed development is to be located at 1-7 Adler Circuit, Yarrabilba. The site location is shown in **Figure 2.1** (source: Queensland Globe).

**Figure 2.1: Site Location**



The site is currently vacant, and generally consists of cleared land.

The proposed development is surrounded by the following uses (refer **Figure 2.1**):

- Commercial and retail uses to the east, the south and the west.
- Commercial and retail uses to the northeast, and mixed uses with upper floor residentials to the north, opposite to Yarrabilba Drive.
- Yarrabilba Drive to the north.
- Waterford Tamborine Road to the further west.

### 3. PROPOSED DEVELOPMENT

The proposed development includes the following components:

- 34 residential units on Level 1, Level 2 and Level 3, consisting of 2 and 3 bedroom designs.
- 46 car parking spaces and 8 motorbike parking spaces located in the building basement.
- Carpark, loading bay and 3x retail tenancies on ground floor.

The site is close to Waterford Tamborine Road, a State-controlled road, however the site is outside the state road traffic noise corridor (and the local Yarrabilba Drive was the more dominant road noise source). The site is also surrounded by commercial and retail uses. The nearest off-site noise sensitive receivers include upper floor residences on the opposite side of Yarrabilba Drive.

Parking and loading dock are accessed off Adler Cct. via a driveway located at the southern side of the street frontage.

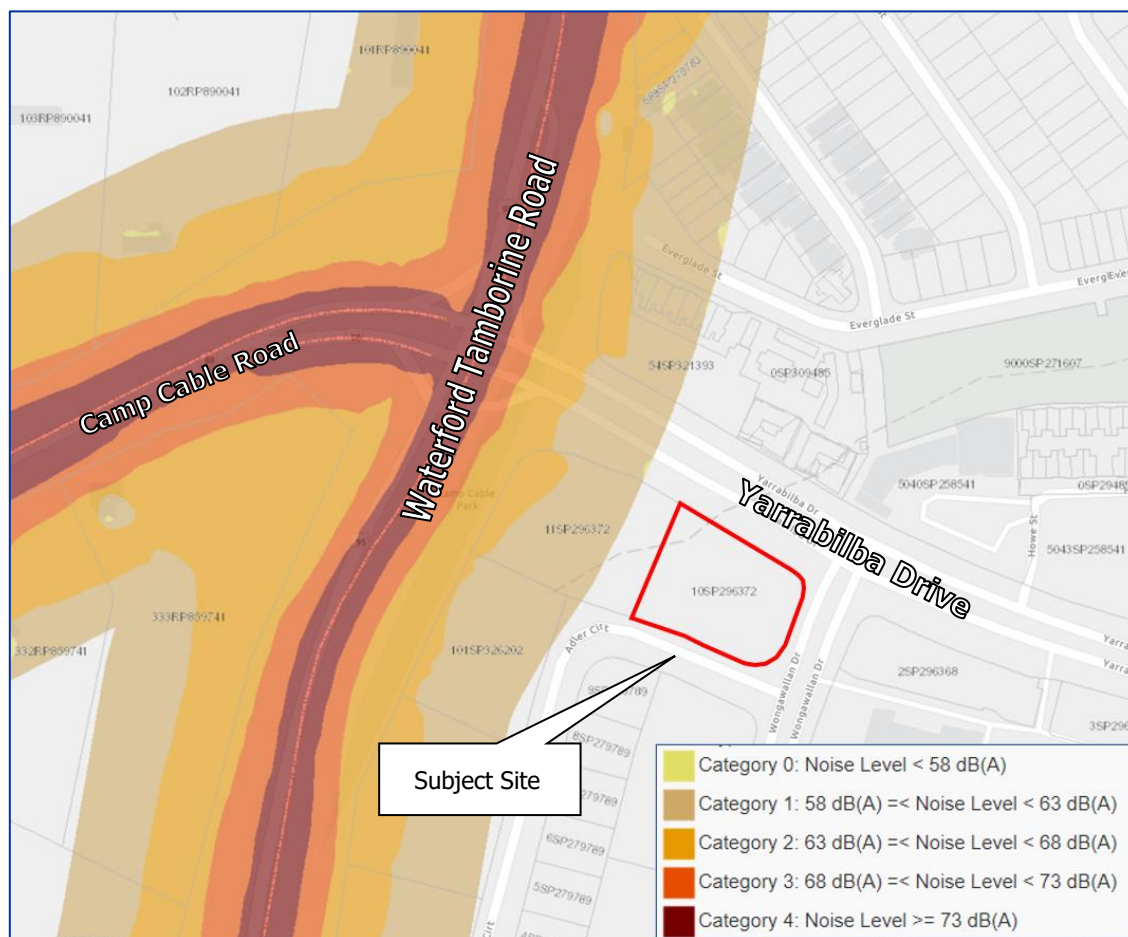
The proposed hours of operation are 8 am to 6 pm for retail tenancies.

The proposed building plans are included in **Appendix B**.

## 4. KEY NOISE ISSUES

The proposed development is impacted upon by road traffic noise from Yarrabilba Drive, and this is required to be considered in the project design. It should be noted that noise from Waterford Tamborine Road is not dominant but audible. **Figure 4.1** shows that the subject site is immediately outside the State controlled corridor associated with Waterford Tamborine Road.

**Figure 4.1: 1-7 Adler Circuit - Transport Noise Corridor from Logan City Council**



At the time of the site visit there was audible noise from a childcare to the south, a retail premise to the southwest, a bottle/container recycle business, on Adler Circuit and from Coles to the southeast on Wongawallan Drive (refer **Figure 2.1**). Thus, these premises have been considered in the noise assessment.

Also considered is potential noise impacts from on-site ground level car parking and loading bay activity. The car park and loading activity would affect the southern and western facades of the proposed units. There is also potential for noise transmission through the ceiling of the ground floor business uses up to the Level 1 residential apartments. Noise can be suitably mitigated through selection of appropriate ceiling/floor material. It is recommended that this aspect is investigated during the detailed design phase of the project.

In terms of potential noise impacts on to off-site sensitive uses, based on the proposed site layout and shielding provided by the proposed multi-storey building, noise from car park activity is unlikely to impact onto the nearest residential (R1) uses to the north (opposite side of Yarrabilba Drive). Furthermore, given the level of noise from Yarrabilba Drive, any mechanical plant items likely to be installed for the proposed development, such as kitchen exhausts, air conditioning or chiller units, are not expected to have a major impact onto R1. Mechanical plant noise is not assessed in detail in this report, however, it is noted that the plant should be

selected to comply with the relevant provisions of the Environmental Protection (Act) 1994 (Division 3 Default Noise standards).

Noise from fire engines dispatched from Yarrabilba Fire Station was not assessed as assessing noise from emergency services such as ambulances and fire engines is not a common practice.

In summary, this assessment considers the following noise sources in further detail:

- Road traffic noise impacts from Yarrabilba Drive and Waterford Tamborine Road
- Noise impacts from surrounding commercial activity and on-site carparking activity.

## 5. NOISE MEASUREMENTS

### 5.1 Overview

Acoustic measurements consisted of an attended noise measurement and noise logging. The noise measurement location is shown in **Figure 2.1**. Location A was located at the northeast corner of the project site.

The noise monitoring was undertaken in general accordance with Australian Standard AS1055 Acoustics – Description and measurement of environmental noise and the DES Noise Measurement Manual.

### 5.2 Attended Noise Measurement

An attended noise measurement was undertaken at Location A. The measurement was undertaken on Friday 07/07/2023 using a field and laboratory calibrated Norsonic NOR140 sound level meter. The microphone height was approximately 1.3m above natural ground level and was located in the free field.

Weather during the time of monitoring was fine, 3/8 cloud cover, without wind.

The measured noise levels are summarised in **Table 4.1**.

**Table 5.1: Attended Noise Measurement Results**

| Location | Date, Time and Duration              | Results and Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A        | 10:45 am<br>07/07/2023<br>15 minutes | <p>Statistical noise levels: <math>L_{eq}</math> 65 dBA, <math>L_{10}</math> 67 dBA, <math>L_{90}</math> 54 dBA</p> <p>Noise from Yarrabilba Drive is dominant and constant 55 (car) to 75 (bus, truck) dBA</p> <p>Noise from Waterford Tamborine Road is barely audible</p> <p>Mechanical plant noise from Coles site is barely audible</p> <p>Fire engine pass by on Adler Cct. 67 to 77 dBA</p> <p>Motorcycle pass by 78 to 82 dBA</p> <p>Wind/tree noise 54 to 55 dBA</p> |

Note: \* The reported noise levels, excluding the statistical noise levels, are the instantaneous levels read from the sound level meter, and generally represent the range in noise levels or maximum noise levels for a particular noise source.

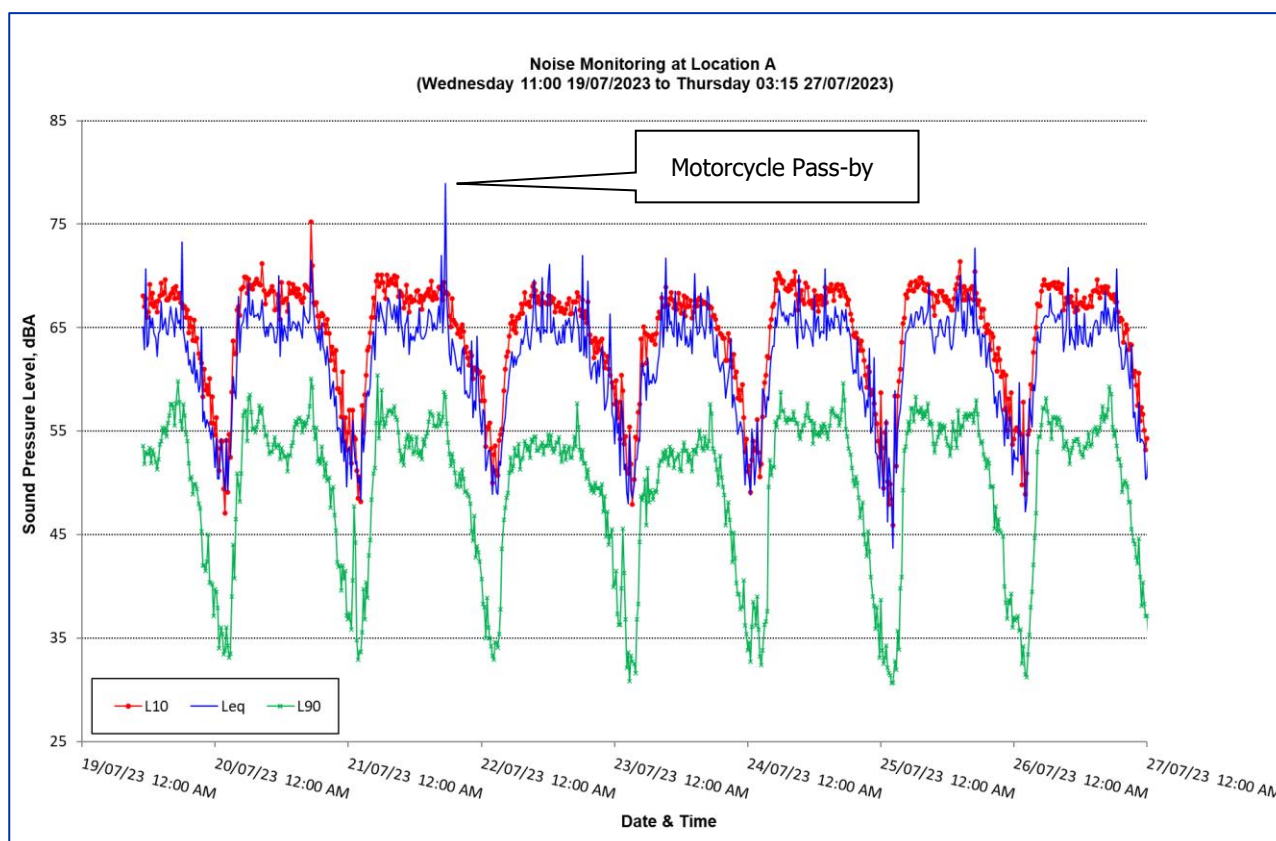
### 5.3 Noise Logging

Noise logging was undertaken at Location A. Logging was undertaken from Tuesday 19/07/2023 to Thursday 27/07/2023 using a field and laboratory calibrated Larson Davis LD831/C environmental noise logger. Noise logging was undertaken in the free field.

Data from the Bureau of Meteorology (Greenbank (Defence)) indicates that weather during the monitoring period was generally fine and warm, but with light rainfall on Wednesday 19<sup>th</sup> (0.2mm). Overall, the noise monitoring data is considered acceptable for use in this report.

The measured noise levels are shown in **Figure 4.1**.

**Figure 5.1: Graph of Noise Logging Results at Location A**



From the noise logging the statistical results have been summarised in **Table 4.2**.

**Table 5.2: Statistical Noise Levels at Location A**

| Parameter                    | Noise Levels dBA<br>[Maximum-Top 10%-(Average)-Bottom 10%-Minimum] |                      |                      |
|------------------------------|--------------------------------------------------------------------|----------------------|----------------------|
|                              | Day                                                                | Evening              | Night                |
| L <sub>max</sub>             | 108, 92, (84), 78, 73                                              | 99, 87, (81), 74, 69 | 95, 84, (75), 69, 38 |
| L <sub>1</sub>               | 86, 77, (75), 72, 70                                               | 86, 75, (72), 68, 65 | 79, 74, (68), 63, 38 |
| L <sub>10</sub>              | 75, 69, (68), 67, 63                                               | 68, 67, (64), 62, 58 | 70, 69, (59), 51, 37 |
| L <sub>eq</sub>              | 79, 67, (65), 63, 60                                               | 73, 65, (62), 58, 56 | 69, 66, (57), 50, 36 |
| L <sub>90</sub>              | 60, 57, (55), 52, 48                                               | 58, 54, (50), 45, 42 | 60, 56, (42), 33, 31 |
| L <sub>90</sub> less insects | 59, 57, (54), 52, 48                                               | 55, 53, (50), 45, 42 | 58, 56, (42), 33, 30 |

The daily statistical noise levels are summarised in **Table 4.3**.

**Table 5.3: Daily Statistical Noise Levels at Location A**

| Day and Date      | L <sub>eq</sub><br>(24 hour) | L <sub>10</sub><br>(18 hour) | L <sub>10</sub><br>(12 hour) | Maximum<br>L <sub>eq</sub> (1 hour) |       | L <sub>90</sub><br>(8 hour) | L <sub>90</sub><br>(18 hour) |
|-------------------|------------------------------|------------------------------|------------------------------|-------------------------------------|-------|-----------------------------|------------------------------|
|                   |                              |                              |                              | Day                                 | Night |                             |                              |
| Thursday 20/07/23 | 64                           | 66                           | 69                           | 69                                  | 67    | 43                          | 53                           |
| Friday 21/07/23   | 65                           | 67                           | 68                           | 74                                  | 62    | 42                          | 53                           |
| Saturday 22/07/23 | 64                           | 66                           | 67                           | 68                                  | 62    | 41                          | 52                           |
| Sunday 23/07/23   | 63                           | 65                           | 67                           | 68                                  | 67    | 41                          | 50                           |

| Day and Date       | L <sub>eq</sub><br>(24 hour) | L <sub>10</sub><br>(18 hour) | L <sub>10</sub><br>(12 hour) | Maximum<br>L <sub>eq</sub> (1 hour) |       | L <sub>90</sub><br>(8 hour) | L <sub>90</sub><br>(18 hour) |
|--------------------|------------------------------|------------------------------|------------------------------|-------------------------------------|-------|-----------------------------|------------------------------|
|                    |                              |                              |                              | Day                                 | Night |                             |                              |
| Monday 24/07/23    | 64                           | 66                           | 68                           | 67                                  | 66    | 40                          | 52                           |
| Tuesday 25/07/23   | 64                           | 66                           | 68                           | 69                                  | 67    | 42                          | 52                           |
| Wednesday 26/07/23 | 64                           | 66                           | 68                           | 68                                  | 55    | 37                          | 52                           |
| Average*(7 day)    | 64                           | 66                           | 68                           | 69                                  | 64    | 41                          | 52                           |

Note: \* The 7 day average is calculated as the average of five times the average weekday plus 2 times the average weekend day.

From **Table 5.3** it can be seen that the maximum day time L<sub>eq</sub>(1hour) values are above the L<sub>10</sub>(18hour). In our experience this would not be expected if traffic noise was the sole noise source, and therefore it is considered that the maximum L<sub>eq</sub>(1hour) values are affected by extraneous noise (e.g. birds, or other activities). Typically the maximum day L<sub>eq</sub>(1hour) is similar to the L<sub>10</sub>(18hour) value, and the maximum night L<sub>eq</sub>(1hour) is 3 dBA below the L<sub>10</sub>(18hour) value.

The L<sub>10</sub>(18hour) value was used to calibrate road traffic noise impact model.

## 5.4 Background Noise Levels

The background noise levels were relatively free of insect noise and were calculated using the lowest 10th percentile method. The background noise levels are shown in **Table 4.4**.

**Table 5.4: Background Noise Levels at Location A**

| Period                | Assessment Background Noise Level<br>(ABL) L <sub>90</sub> dBA<br>Note: Weekends are underlined | Rating Background Noise Level<br>(RBL) L <sub>90</sub> dBA |
|-----------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Day (7am to 6pm)      | 52, 53, <u>52</u> , <u>51</u> , 54, 53                                                          | 53                                                         |
| Evening (6pm to 10pm) | 47, 49, <u>49</u> , <u>44</u> , 44, 45                                                          | 45                                                         |
| Night (10pm to 7am)   | 35, 34, <u>33</u> , <u>33</u> , 32                                                              | 33                                                         |

## 5.5 Summary

From the results above the following comments are made:

- Road traffic is the dominant noise at this location.
- Seasonal insect noise was not observed, as the noise monitoring was undertaken in winter.
- Rating Background Noise Levels were identified as follows:
  - L<sub>90</sub> 53 dBA for day time, 7am to 6pm.
  - L<sub>90</sub> 45 dBA for evening time, 6pm to 10pm.
  - L<sub>90</sub> 33 dBA for night time, 10pm to 7am.

## 6. NOISE CRITERIA

### 6.1 Yarrabilba PDA

The site is located within the Logan City Council area and within the Yarrabilba Priority Development Area (PDA). Under the Yarrabilba PDA Development Scheme (29 July 2022), the subject site is located in an Urban Living zone. With respect to noise, the development scheme requires that:

- Residences and other sensitive uses are protected from the impacts of noise and dust from regional transport corridors (Section 3.3.9, Community safety and development constraints)).
- Any impacts associated with the use (e.g. noise, dust, emissions) will not affect residential or other sensitive uses (Section 3.4.2, Urban Living Zone)

Based on the above, there is a requirement to consider both noise impacts from transport corridors and noise impacts onto sensitive uses.

Although the subject site is located just outside the State transport noise corridor of Waterford Tamborine Road (See **Figure 4.1**), road traffic along Yarrabilba Drive is a dominant noise source impacting the site. Yarrabilba Drive is not currently identified as a local transport noise corridor, however, with increasing population and traffic in the area, it can be expected that Yarrabilba Drive will be included transport noise corridors in the near future. On this basis and given that the development scheme is not prescriptive, road traffic noise has been assessed to identify compliance with the Queensland Development Code (QDC) Mandatory Part 4.4 (MP4.4) 'Buildings in transport noise corridors' (refer to **Section 6.2**)

The development scheme does specify noise impacts from other off-site uses other than transport noise. However, as discussed earlier, it is noted that there are nearby commercial uses with a potential to impact on the residential uses of the sites. Given this, consideration has also been given to achieving internal acoustic quality objectives defined in the Queensland Environmental Protection (Noise) Policy (refer to **Section 6.2**).

With respect to potential noise impacts onto off-site sensitive uses, the risk of impacts is considered low (refer to **Section 4**). This matter is not assessed in detail in this report, however, it should be noted that any fixed plant should be selected and installed to meet the relevant noise limits defined in the Environmental Protection Act 1994 (Division 3 Default noise standards).

### 6.2 Road Traffic Noise Criteria

As noted, QDC MP4.4 is not currently applicable to the subject site as it Yarrabilba Drive is not a State or Council designated road noise corridor. Nonetheless, the principles and guidelines of QDC MP4.4 are relevant to all road traffic noise assessments, and therefore, the policy has been applied to the assessment of road traffic noise impacts for this project.

The Department of Housing and Public Works (HPW) has a number of mandatory Codes that must be complied with at building application stage. These are referred to as Queensland Development Codes (QDC). QDC Mandatory Part (MP) 4.4 relates to new buildings in transport noise corridors. This mandatory Code deals with buildings within residential developments close to gazetted roads and railways. MP 4.4 sets mandatory construction standards for new residential development, or additions to existing residential development, within a Transport Noise Corridor.

The noise level categories extend out to 57 dBA L<sub>A10(18 hour)</sub> for road traffic noise. The road noise categories and corresponding noise levels from Schedule 3, Table 1 of MP4.4 as follows:

- Road Noise (façade corrected):
  - Category 0: ≤ 57 dBA L<sub>A10(18 hour)</sub>
  - Category 1: 58 – 62 dBA L<sub>A10(18 hour)</sub>
  - Category 2: 63 – 67 dBA L<sub>A10(18 hour)</sub>
  - Category 3: 68 – 72 dBA L<sub>A10(18 hour)</sub>

- Category 4:  $\geq 73$  dBA  $L_{A10}(18 \text{ hour})$

## 6.3 Commercial Noise Immissions Criteria

The Queensland Environmental Protection (Noise) Policy has been referred to in assessing noise impacts from off-site commercial uses (i.e. noise immissions impacts).

The EPP Noise identifies environmental values to be enhanced or protected, states acoustic quality objectives, and provides a framework for making decisions about the acoustic environment. The objectives are in the form of noise levels, and are defined for various periods of the day, and use a number of acoustic parameters. The objectives are not target levels but rather maximum levels.

Schedule 1 of the EPP(Noise) includes the following acoustic quality objectives to be met at residential dwellings:

- Outdoors
  - Daytime and Evening: 50 dBA  $L_{Aeq,adj,1hr}$ , 55 dBA  $L_{A10,adj,1hr}$  and 65 dBA  $L_{A1,adj,1hr}$
- Indoors
  - Daytime and Evening: 35 dBA  $L_{Aeq,adj,1hr}$ , 40 dBA  $L_{A10,adj,1hr}$  and 45 dBA  $L_{A1,adj,1hr}$
  - Night: 30 dBA  $L_{Aeq,adj,1hr}$ , 35 dBA  $L_{A10,adj,1hr}$  and 40 dBA  $L_{A1,adj,1hr}$

For the purpose of the assessment, the internal  $L_{Aeq}$  objectives have been considered.

In the DES EcoAccess Guideline "Planning For Noise Control" documentation it is proposed that the noise reduction provided by a typical residential building façade is 7 dBA assuming open windows. That is, with an external noise source, a 7 dBA reduction in noise levels from outside a house to inside a house is expected when windows are fully open. Thus the indoor noise objectives noted above could be converted to the following external objectives (with windows open):

- Daytime and Evening: 42 dBA  $L_{Aeq,adj,1hr}$ , 47 dBA  $L_{A10,adj,1hr}$  and 52 dBA  $L_{A1,adj,1hr}$
- Night: 37 dBA  $L_{Aeq,adj,1hr}$ , 42 dBA  $L_{A10,adj,1hr}$  and 47 dBA  $L_{A1,adj,1hr}$

A sensitive receptor is defined as "an area or place where noise is measured".

## 6.4 Summary of Criteria

The proposed noise criteria for sensitive residential receptors within the proposed development are summarised as follows:

- For traffic noise impact, Department of Housing and Public Works – MP4.4 (Road)
  - The road noise categories and corresponding noise levels from Schedule 3, Table 1 of MP4.4 as follows:
    - Category 0:  $\leq 57$  dBA  $L_{A10}(18 \text{ hour})$
    - Category 1: 58 – 62 dBA  $L_{A10}(18 \text{ hour})$
    - Category 2: 63 – 67 dBA  $L_{A10}(18 \text{ hour})$
    - Category 3: 68 – 72 dBA  $L_{A10}(18 \text{ hour})$
    - Category 4:  $\geq 73$  dBA  $L_{A10}(18 \text{ hour})$
- For impact from other noise sources, Environmental Protection (Noise) Policy 2019.
  - Acoustic Quality Objectives (indoor, assuming windows open):
    - Daytime and Evening: 42 dBA  $L_{Aeq,adj,1hr}$
    - Night: 37 dBA  $L_{Aeq,adj,1hr}$

## 7. NOISE MODELLING

### 7.1 Introduction

Identified noise sources within the acoustic environment were grouped into two types, road traffic noise which includes noise from Yarrabilba Drive and Waterford Tamborine Road and commercial noise sources including mechanical plant noise from Coles, outdoor playground noise from the childcare and some labour activity from the nearby recycle business. Locations for these noise sources are shown in **Figure 2.1**.

The following sections outlined the noise modelling methodology, inputs and predicted noise results.

### 7.2 Road Traffic Noise Model

#### 7.2.1 Overview

Road traffic noise has been assessed from Yarrabilba Drive and Waterford Tamborine Road onto the proposed development. The relevant assessment criteria are outlined in **Section 6**.

The road traffic noise levels have been predicted using the CadnaA 2023 computer model, based on the United Kingdom Department of Transport (1988) procedure published as "Calculation of Road Traffic Noise" (CoRTN88). CoRTN is a commonly adopted road noise prediction method adopted in Queensland and is referred to in the Queensland Department of Transport and Main Roads Volume 1: Road Traffic Noise Code of Practice.

#### 7.2.2 Input Data

The following data has been used in the noise calculations:

- Noise source height of 0.5 m (as per CoRTN).
- Ground contours for the site obtained from QSpatial as 1 metre elevation lines.
- Receiver heights of 1.5m above the floor levels have been used in the noise model for receivers at the façade.
- Traffic speed is 60 km/hr on Yarrabilba Drive and 90 km/hr on Waterford Tamborine Road, as posted.
- Road width as per site inspection and Google Earth Pro images.
- The road surface for all the roads used in the noise model is dense graded asphalt (DGA).
- A -1.7 dB correction has been applied for calculations at a façade and -0.7 dB for calculations in the free-field as per the TMR Transport Noise Management Code of Practice.
- A +2.5 facade reflection allowance is included in the road traffic noise level predictions.

The following traffic data given in **Table 7.1** has been obtained from the Queensland Government State Planning Policy Interactive Mapping System, on 3 August 2023, for Waterford Tamborine Road. The 10-year horizon traffic count was estimated based on the growth data provided.

**Table 7.1: Traffic Count Information (Waterford Tamborine Road)**

| Year | Traffic Count (AADT) | Growth | Surface Type | Speed Limit | Percentage Heavy Vehicles % (PC Class 0B) |
|------|----------------------|--------|--------------|-------------|-------------------------------------------|
| 2015 | 3,485                | 5%     | DGA          | 90 km/h     | 10.91%                                    |
| 2025 | 5,677                | 5%     | DGA          | 90 km/h     | 10.91%                                    |

| Year             | Traffic Count (AADT) | Growth | Surface Type | Speed Limit | Percentage Heavy Vehicles % (PC Class 0B) |
|------------------|----------------------|--------|--------------|-------------|-------------------------------------------|
| 2033 (Estimated) | 8,378                | 5%     | DGA          | 90 km/h     | 10.91%                                    |

Traffic count information is not available for Yarrabilba Drive. In the absence of such data, the unattended noise monitoring data, specifically  $L_{A10,18\text{hour}}$  noise statistics obtained from noise monitoring location A, was used to back estimate the traffic volume on Yarrabilba Drive. The measured  $L_{A10,18\text{hour}}$  noise level was 66 dBA, and the traffic volume in the noise model was adjusted to obtain a similar  $L_{A10,18\text{hour}}$  noise level. Afterward, the 10-year horizon traffic volume was estimated with a 5% annual growth rate. Predicted traffic volumes for Yarrabilba Drive are outlined in **Table 7.2**.

**Table 7.2: Traffic Count Information (Yarrabilba Drive)**

| Year                  | Traffic Count (AADT) | Growth | Surface Type | Speed Limit | Percentage Heavy Vehicles % (PC Class 0B) |
|-----------------------|----------------------|--------|--------------|-------------|-------------------------------------------|
| 2023 (Back estimated) | 6,500                | 5%     | DGA          | 60 km/h     | 10.91%                                    |
| 2033 (Predicted)      | 10,587               | 5%     | DGA          | 60 km/h     | 10.91%                                    |

## 7.2.3 Predicted Traffic Noise Levels and MP4.4 Categories

Predicted traffic noise levels at facades of proposed residential units and MP4.4 Categories are shown in **Table 7.3**. Predicted traffic noise levels vary from 44 dBA  $L_{A10,18\text{hour}}$  at southern façade to 70 dBA  $L_{A10,18\text{hour}}$  at northern façade directly looking at Yarrabilba Drive. Based on predicted traffic noise levels, MP4.4 Categories for façade elements such as entry door, windows, glazing doors and walls, were estimated up to Category 3.

**Table 7.3: Predicted Façade Traffic Noise Levels and MP4.4 Categories - Facades**

| Receiver & Façade Orientation     | Predicted $L_{A10,18\text{hr}}$ Road Traffic Noise, dBA | MP4.4 Category |
|-----------------------------------|---------------------------------------------------------|----------------|
| Unit 01 Front Bedroom North/Weste | 70                                                      | 3              |
| Unit 01 Bedroom South             | 52                                                      | 0              |
| Unit 01 Bedrooms West             | 65                                                      | 2              |
| Unit 01 Entry South               | 45                                                      | 0              |
| Unit 01 Foyer South               | 52                                                      | 0              |
| Unit 01 Living Room North         | 68                                                      | 3              |
| Unit 02 Bedroom North             | 70                                                      | 3              |
| Unit 02 Bedroom South             | 46                                                      | 0              |
| Unit 02 Entry South               | 48                                                      | 0              |
| Unit 02 Living North              | 65                                                      | 2              |
| Unit 03 Bedroom North             | 69                                                      | 3              |
| Unit 03 Bedroom South             | 50                                                      | 0              |
| Unit 03 Entry South               | 49                                                      | 0              |
| Unit 03 Living Room North         | 66                                                      | 2              |
| Unit 04 Bedroom North             | 70                                                      | 3              |
| Unit 04 Bedroom South             | 50                                                      | 0              |

| Receiver & Façade Orientation    | Predicted $L_{A10,18hr}$ Road Traffic Noise, dBA | MP4.4 Category |
|----------------------------------|--------------------------------------------------|----------------|
| Unit 04 Entry South              | 50                                               | 0              |
| Unit 04 Living Room North        | 66                                               | 2              |
| Unit 05 Bedroom North            | 70                                               | 3              |
| Unit 05 Bedroom South            | 51                                               | 0              |
| Unit 05 Entry South              | 50                                               | 0              |
| Unit 05 Livingroom North         | 66                                               | 2              |
| Unit 06 Bedroom North            | 70                                               | 3              |
| Unit 06 Bedroom South            | 50                                               | 0              |
| Unit 06 Entry South              | 50                                               | 0              |
| Unit 06 Livingroom North         | 66                                               | 2              |
| Unit 07 Bedroom North            | 69                                               | 3              |
| Unit 07 Bedroom South            | 50                                               | 0              |
| Unit 07 Entry South              | 50                                               | 0              |
| Unit 07 Livingroom North         | 66                                               | 2              |
| Unit 08 Bedroom North            | 68                                               | 3              |
| Unit 08 Bedroom South            | 49                                               | 0              |
| Unit 08 Entry South              | 49                                               | 0              |
| Unit 08 Livingroom North         | 66                                               | 2              |
| Unit 09 Front Bedroom North/East | 69                                               | 3              |
| Unit 09 Bedroom South            | 47                                               | 0              |
| Unit 09 Bedrooms East            | 66                                               | 2              |
| Unit 09 Entry South              | 48                                               | 0              |
| Unit 09 Livingroom North         | 66                                               | 2              |
| Unit 10 Bedroom East             | 59                                               | 1              |
| Unit 10 Bedroom West             | 54                                               | 0              |
| Unit 10 Entry West               | 54                                               | 0              |
| Unit 10 Livingroom East          | 48                                               | 0              |
| Unit 11 Bedroom East             | 57                                               | 0              |
| Unit 11 Bedroom West             | 54                                               | 0              |
| Unit 11 Bedroom West             | 54                                               | 0              |
| Unit 11 Entry West               | 54                                               | 0              |
| Unit 11 Livingroom East          | 56                                               | 0              |
| Unit 12 Bedroom East             | 59                                               | 1              |
| Unit 12 Bedroom West             | 55                                               | 0              |
| Unit 12 Bedrooms South           | 50                                               | 0              |
| Unit 12 Entry West               | 54                                               | 0              |
| Unit 12 Livingroom East          | 51                                               | 0              |
| Unit 13 Front Bedroom North/West | 69                                               | 3              |
| Unit 13 Bedroom South            | 54                                               | 0              |
| Unit 13 Bedrooms West            | 65                                               | 2              |

| Receiver & Façade Orientation    | Predicted $L_{A10,18hr}$ Road Traffic Noise, dBA | MP4.4 Category |
|----------------------------------|--------------------------------------------------|----------------|
| Unit 13 Entry South              | 50                                               | 0              |
| Unit 13 Foyer South              | 54                                               | 0              |
| Unit 13 Living Room North        | 64                                               | 2              |
| Unit 14 Bedroom North            | 70                                               | 3              |
| Unit 14 Bedroom South            | 50                                               | 0              |
| Unit 14 Entry South              | 51                                               | 0              |
| Unit 14 Living North             | 65                                               | 2              |
| Unit 15 Bedroom North            | 69                                               | 3              |
| Unit 15 Bedroom South            | 52                                               | 0              |
| Unit 15 Entry South              | 52                                               | 0              |
| Unit 15 Living Room North        | 66                                               | 2              |
| Unit 16 Bedroom North            | 70                                               | 3              |
| Unit 16 Bedroom South            | 53                                               | 0              |
| Unit 16 Entry South              | 52                                               | 0              |
| Unit 16 Living Room North        | 67                                               | 2              |
| Unit 17 Bedroom North            | 69                                               | 3              |
| Unit 17 Bedroom South            | 53                                               | 0              |
| Unit 17 Entry South              | 52                                               | 0              |
| Unit 17 Livingroom North         | 67                                               | 2              |
| Unit 18 Bedroom North            | 70                                               | 3              |
| Unit 18 Bedroom South            | 52                                               | 0              |
| Unit 18 Entry South              | 52                                               | 0              |
| Unit 18 Livingroom North         | 67                                               | 2              |
| Unit 19 Bedroom North            | 69                                               | 3              |
| Unit 19 Bedroom South            | 52                                               | 0              |
| Unit 19 Entry South              | 52                                               | 0              |
| Unit 19 Livingroom North         | 67                                               | 2              |
| Unit 20 Bedroom North            | 68                                               | 3              |
| Unit 20 Bedroom South            | 52                                               | 0              |
| Unit 20 Entry South              | 51                                               | 0              |
| Unit 20 Livingroom North         | 66                                               | 2              |
| Unit 21 Front Bedroom North/East | 69                                               | 3              |
| Unit 21 Bedroom South            | 51                                               | 0              |
| Unit 21 Bedrooms East            | 66                                               | 2              |
| Unit 21 Entry South              | 51                                               | 0              |
| Unit 21 Livingroom North         | 68                                               | 3              |
| Unit 22 Bedroom East             | 60                                               | 1              |
| Unit 22 Bedroom West             | 54                                               | 0              |
| Unit 22 Entry West               | 54                                               | 0              |
| Unit 22 Livingroom East          | 54                                               | 0              |

| Receiver & Façade Orientation | Predicted $L_{A10,18hr}$ Road Traffic Noise, dBA | MP4.4 Category |
|-------------------------------|--------------------------------------------------|----------------|
| Unit 23 Bedroom East          | 58                                               | 1              |
| Unit 23 Entry West            | 54                                               | 0              |
| Unit 23 Livingroom East       | 57                                               | 0              |
| Unit 24 Bedroom East          | 59                                               | 1              |
| Unit 24 Bedroom West          | 54                                               | 0              |
| Unit 24 Bedrooms South        | 51                                               | 0              |
| Unit 24 Entry West            | 54                                               | 0              |
| Unit 24 Livingroom East       | 53                                               | 0              |
| Unit 25 Entry South           | 50                                               | 0              |
| Unit 25 Foyer South           | 54                                               | 0              |
| Unit 25 Bedroom South         | 54                                               | 0              |
| Unit 25 Bedrooms West         | 66                                               | 2              |
| Unit 25 Bedroom North         | 67                                               | 2              |
| Unit 25 Living Room North     | 64                                               | 2              |
| Unit 26 Entry South           | 51                                               | 0              |
| Unit 26 Bedroom South         | 52                                               | 0              |
| Unit 26 Bedroom North         | 69                                               | 3              |
| Unit 26 Living Room North     | 63                                               | 2              |
| Unit 27 Bedroom North         | 70                                               | 3              |
| Unit 27 Living Room North     | 61                                               | 1              |
| Unit 27 Entry South           | 53                                               | 0              |
| Unit 27 Bedroom South         | 53                                               | 0              |
| Unit 28 Entry South           | 53                                               | 0              |
| Unit 28 Bedroom South         | 53                                               | 0              |
| Unit 28 Bedroom North         | 69                                               | 3              |
| Unit 28 Living Room North     | 62                                               | 1              |
| Unit 29 Living Room North     | 61                                               | 1              |
| Unit 29 Bedroom North         | 70                                               | 3              |
| Unit 29 Bedroom South         | 53                                               | 0              |
| Unit 29 Entry South           | 53                                               | 0              |
| Unit 30 Entry South           | 53                                               | 0              |
| Unit 30 Bedroom South         | 52                                               | 0              |
| Unit 30 Bedroom North         | 68                                               | 3              |
| Unit 30 Living Room North     | 62                                               | 1              |
| Unit 31 Living Room North     | 61                                               | 1              |
| Unit 31 Bedroom North         | 68                                               | 3              |

| Receiver & Façade Orientation       | Predicted $L_{A10,18hr}$ Road Traffic Noise, dBA | MP4.4 Category |
|-------------------------------------|--------------------------------------------------|----------------|
| Unit 31 Bedroom South               | 52                                               | 0              |
| Unit 31 Entry South                 | 52                                               | 0              |
| Unit 32 Entry South                 | 51                                               | 0              |
| Unit 32 Bedroom South               | 51                                               | 0              |
| Unit 32 Bedroom East                | 66                                               | 2              |
| Unit 32 Front Bedroom (all facades) | 69                                               | 3              |
| Unit 32 Living Room North           | 60                                               | 1              |
| Unit 33 Entry West                  | 54                                               | 0              |
| Unit 33 Bedroom West                | 54                                               | 0              |
| Unit 33 Living Room East            | 52                                               | 0              |
| Unit 33 Bedroom East                | 61                                               | 1              |
| Unit 34 Bedroom East                | 61                                               | 1              |
| Unit 34 Living Room East            | 57                                               | 0              |
| Unit 34 Entry West                  | 54                                               | 0              |
| Unit 34 Bedroom West                | 54                                               | 0              |
| Unit 34 Bedroom South (East End)    | 52                                               | 0              |
| Unit 34 Bedroom South (West End)    | 53                                               | 0              |

Based on predicted façade noise levels and acoustic upgrade requirements outlined in **Table 7.3**, noise levels above roof parts covering rooms that require acoustic upgrades were calculated. Predicted noise levels at the roof and MP4.4 category requirements are given in **Table 7.4**.

**Table 7.4: Predicted Roof Traffic Noise Levels and MP4.4 Categories – Roof**

| Receiver                       | Predicted $L_{A10,18hr}$ Road Traffic Noise, dBA | MP4.4 Category |
|--------------------------------|--------------------------------------------------|----------------|
| U25 Front Bedroom Roof         | 64                                               | 2              |
| U25 Living Area Roof           | 63                                               | 2              |
| Unit 32 Front Bedroom Roof     | 67                                               | 2              |
| All other living/bedroom areas | -                                                | 1              |

## 7.3 Noise from Nearby Commercial/Retail Premises

### 7.3.1 Overview

Noise from off-site and on-site commercial uses were modelled, including:

- Off-site
  - Child care
  - Bottle recycling business
  - Coles supermarket fixed plant
- On-site
  - Car park activity
  - Loading bay activity

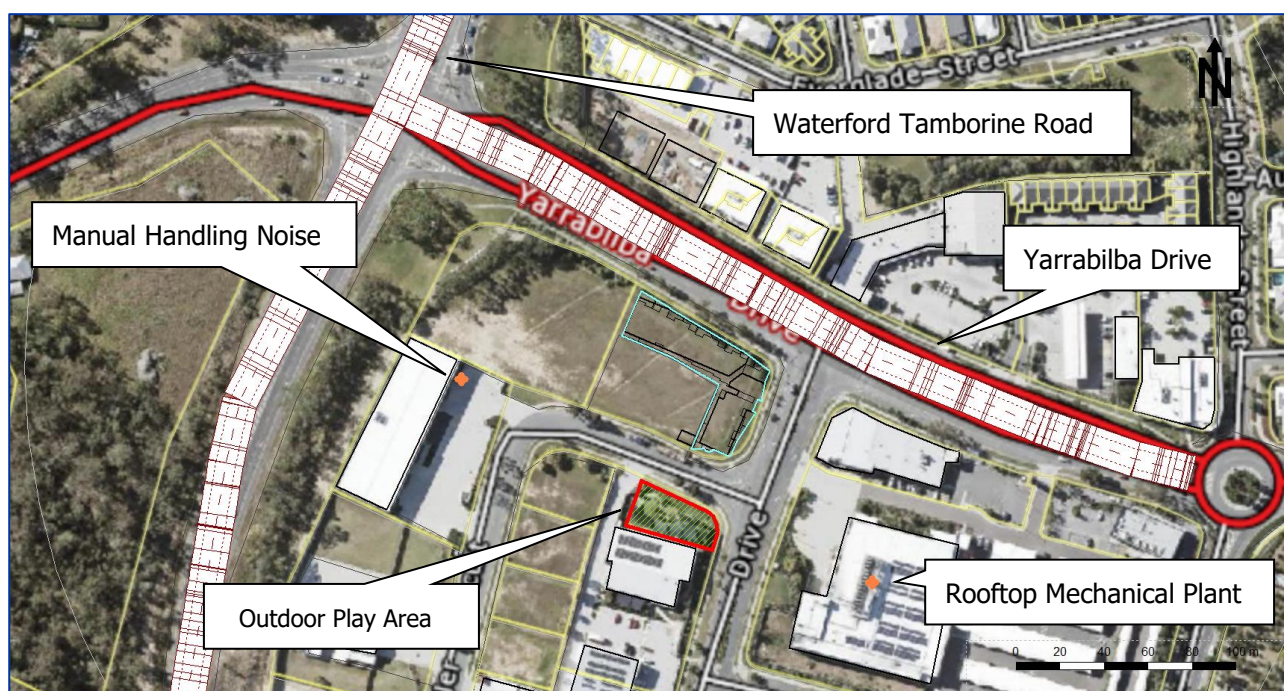
Noise levels have been predicted using the CadnaA 2023 computer model using the ISO 9613 calculation algorithms.

### 7.3.2 Data

The following data has been used in the noise calculations:

- Ground contours for the site obtained from QSpatial as 1 meter elevation lines.
- Receiver heights of 1.5m above the floor levels have been used in the noise model for receivers at the facade.
- Façade of the proposed building was assumed having a 1 dBA reflection loss.
- The noise source data used in the model is presented in **Table 7.5** and locations for noise sources are included in **Figure 7.1**.

**Figure 7.1: Locations for Modelled Noise Sources**



**Table 7.5: Noise Source Data**

| Noise Source                          | Octave Band Noise Data, dBA |       |       |       |      |      |      |      | Overall SWL, dBA |
|---------------------------------------|-----------------------------|-------|-------|-------|------|------|------|------|------------------|
|                                       | 63Hz                        | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz |                  |
| Rooftop Mechanical Plant <sup>a</sup> | 43                          | 59    | 71    | 83    | 88   | 86   | 82   | 76   | 92               |
| Outdoor Play Area <sup>b</sup>        | 69                          | 78    | 80    | 86    | 88   | 85   | 81   | 77   | 92               |
| Manual Handling Noise <sup>c</sup>    | -                           | -     | 95    | 95    | 95   | 95   | -    | -    | 100              |
| Car Door Closure <sup>d</sup>         | 91                          | 91    | 95    | 89    | 86   | 85   | 79   | 76   | 93               |
| Car Movement (per metre) <sup>e</sup> | 90                          | 90    | 94    | 88    | 95   | 84   | 78   | 75   | 92               |
| Refrigerated Truck <sup>f</sup>       | 92                          | 89    | 86    | 86    | 86   | 83   | 75   | 68   | 90               |

<sup>a</sup> continuous 7/24

<sup>b</sup> continuous during day period only

<sup>c</sup> 10% of time, during day period only

<sup>d</sup> 1 second active in an hour

<sup>e</sup> 52 car movement in an hour at 10 km/h

<sup>f</sup> The refrigerated truck has been modelled at the loading bay. Garbage collection activity will also occur – this is not specifically modelled, given it's infrequent/short-term nature. It is recommended that garbage collection occur during day-time (7am to 6 pm) hours to minimise impacts to on-site residents.

### 7.3.3 Predicted Commercial Noise Levels and Windows Acoustic Rating Requirements

All noise sources outlined in **Section 6.2.2** were assumed to be active only during the day time period, except mechanical plant on roof top of the Coles to the southeast. The mechanical plant was assumed to operate continuously during the day, evening and night periods.

Predicted noise impacts from nearby commercial, retail and educational premises are outlined in **Table 7.6** for the day, evening and night periods. Predicted noise levels vary from 22 dBA  $L_{Aeq,1hour}$  to 52 dBA  $L_{Aeq,1hour}$ , which is well below road traffic noise impact outlined in **Section 6.1.3**.

Most of the windows can be kept open to mitigate commercial noise.  $R_w$  acoustic ratings for facades are up to 17 (equivalent to an MP4.4 Noise Category 1). It is noted that there are a number of rooms/facades affected by commercial noise, which also have a Road Noise Category 0. Therefore, the worst-case acoustic requirements for addressing road traffic and commercial noise should be selected, as discussed in **Section 8**.

**Table 7.6: Predicted Façade Noise Levels and Required  $R_w$  Acoustic Ratings to Mitigate Commercial Noise**

| Receiver              | Predicted $L_{Aeq,1hour}$ Façade Noise, dBA |                 | Required Noise Reduction, dBA | Estimated Façade $R_w$ Ratings <sup>a</sup> |
|-----------------------|---------------------------------------------|-----------------|-------------------------------|---------------------------------------------|
|                       | Day                                         | Evening & Night |                               |                                             |
| Unit 01 Bedroom North | 44                                          | 36              | 2                             | N/A                                         |
| Unit 01 Bedroom South | 57                                          | 29              | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 01 Bedrooms West | 53                                          | 21              | 11                            | 17 (MP4.4 Cat 1)                            |
| Unit 01 Entry South   | 56                                          | 29              | 14                            | 20 (MP4.4 Cat 1)                            |

| Receiver                  | Predicted $L_{Aeq,1hour}$ Noise, dBA | Façade | Required Noise Reduction, dBA | Estimated Façade $R_w$ Ratings <sup>a</sup> |
|---------------------------|--------------------------------------|--------|-------------------------------|---------------------------------------------|
| Unit 01 Foyer South       | 57                                   | 31     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 01 Living Room North | 43                                   | 20     | 1                             | N/A                                         |
| Unit 02 Bedroom North     | 44                                   | 36     | 2                             | N/A                                         |
| Unit 02 Bedroom South     | 57                                   | 29     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 02 Entry South       | 58                                   | 29     | 16                            | 22 (MP4.4 Cat 1)                            |
| Unit 02 Living North      | 43                                   | 20     | 1                             | N/A                                         |
| Unit 03 Bedroom North     | 43                                   | 37     | 1                             | N/A                                         |
| Unit 03 Bedroom South     | 58                                   | 29     | 16                            | 22 (MP4.4 Cat 1)                            |
| Unit 03 Entry South       | 57                                   | 29     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 03 Living Room North | 44                                   | 37     | 2                             | N/A                                         |
| Unit 04 Bedroom North     | 44                                   | 37     | 2                             | N/A                                         |
| Unit 04 Bedroom South     | 59                                   | 29     | 17                            | 23 (MP4.4 Cat 1)                            |
| Unit 04 Entry South       | 58                                   | 29     | 16                            | 22 (MP4.4 Cat 1)                            |
| Unit 04 Living Room North | 42                                   | 27     | 0                             | N/A                                         |
| Unit 05 Bedroom North     | 43                                   | 27     | 1                             | N/A                                         |
| Unit 05 Bedroom South     | 60                                   | 28     | 18                            | 24 (MP4.4 Cat 1)                            |
| Unit 05 Entry South       | 59                                   | 28     | 17                            | 23 (MP4.4 Cat 1)                            |
| Unit 05 Livingroom North  | 43                                   | 27     | 1                             | N/A                                         |
| Unit 06 Bedroom North     | 43                                   | 28     | 1                             | N/A                                         |
| Unit 06 Bedroom South     | 60                                   | 27     | 18                            | 24 (MP4.4 Cat 1)                            |
| Unit 06 Entry South       | 60                                   | 26     | 18                            | 24 (MP4.4 Cat 1)                            |
| Unit 06 Livingroom North  | 43                                   | 24     | 1                             | N/A                                         |
| Unit 07 Bedroom North     | 43                                   | 26     | 1                             | N/A                                         |
| Unit 07 Bedroom South     | 56                                   | 26     | 14                            | 20 (MP4.4 Cat 1)                            |
| Unit 07 Entry South       | 60                                   | 26     | 18                            | 24 (MP4.4 Cat 1)                            |
| Unit 07 Livingroom North  | 43                                   | 24     | 1                             | N/A                                         |
| Unit 08 Bedroom North     | 43                                   | 28     | 1                             | N/A                                         |
| Unit 08 Bedroom South     | 52                                   | 25     | 10                            | 16 (MP4.4 Cat 1)                            |
| Unit 08 Entry South       | 49                                   | 25     | 7                             | N/A                                         |
| Unit 08 Livingroom North  | 43                                   | 26     | 1                             | N/A                                         |
| Unit 09 Bedroom North     | 44                                   | 24     | 2                             | N/A                                         |
| Unit 09 Bedroom South     | 44                                   | 26     | 2                             | N/A                                         |
| Unit 09 Bedrooms East     | 47                                   | 45     | 8                             | 14 (MP4.4 Cat 1)                            |
| Unit 09 Entry South       | 45                                   | 26     | 3                             | N/A                                         |
| Unit 09 Livingroom North  | 45                                   | 29     | 3                             | N/A                                         |
| Unit 10 Bedroom East      | 47                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |

| Receiver                  | Predicted $L_{Aeq,1hour}$ Noise, dBA | Façade | Required Noise Reduction, dBA | Estimated Façade $R_w$ Ratings <sup>a</sup> |
|---------------------------|--------------------------------------|--------|-------------------------------|---------------------------------------------|
| Unit 10 Bedroom West      | 57                                   | 24     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 10 Entry West        | 57                                   | 24     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 10 Livingroom East   | 46                                   | 45     | 8                             | 14 (MP4.4 Cat 1)                            |
| Unit 11 Bedroom East      | 48                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 11 Bedroom West      | 55                                   | 28     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 11 Bedroom West      | 57                                   | 25     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 11 Entry West        | 56                                   | 25     | 14                            | 20 (MP4.4 Cat 1)                            |
| Unit 11 Livingroom East   | 47                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 12 Bedroom East      | 51                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 12 Bedroom West      | 57                                   | 32     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 12 Bedrooms South    | 55                                   | 46     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 12 Entry West        | 57                                   | 25     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 12 Livingroom East   | 47                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 13 Bedroom North     | 45                                   | 39     | 3                             | N/A                                         |
| Unit 13 Bedroom South     | 57                                   | 37     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 13 Bedrooms West     | 53                                   | 36     | 11                            | 17 (MP4.4 Cat 1)                            |
| Unit 13 Entry South       | 55                                   | 36     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 13 Foyer South       | 57                                   | 37     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 13 Living Room North | 43                                   | 35     | 1                             | N/A                                         |
| Unit 14 Bedroom North     | 45                                   | 39     | 3                             | N/A                                         |
| Unit 14 Bedroom South     | 55                                   | 36     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 14 Entry South       | 57                                   | 36     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 14 Living North      | 43                                   | 35     | 1                             | N/A                                         |
| Unit 15 Bedroom North     | 44                                   | 38     | 2                             | N/A                                         |
| Unit 15 Bedroom South     | 57                                   | 38     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 15 Entry South       | 56                                   | 38     | 14                            | 20 (MP4.4 Cat 1)                            |
| Unit 15 Living Room North | 44                                   | 40     | 3                             | N/A                                         |
| Unit 16 Bedroom North     | 44                                   | 38     | 2                             | N/A                                         |
| Unit 16 Bedroom South     | 57                                   | 38     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 16 Entry South       | 57                                   | 38     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 16 Living Room North | 43                                   | 31     | 1                             | N/A                                         |
| Unit 17 Bedroom North     | 43                                   | 31     | 1                             | N/A                                         |
| Unit 17 Bedroom South     | 58                                   | 37     | 16                            | 22 (MP4.4 Cat 1)                            |
| Unit 17 Entry South       | 57                                   | 38     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 17 Livingroom North  | 43                                   | 31     | 1                             | N/A                                         |
| Unit 18 Bedroom North     | 43                                   | 31     | 1                             | N/A                                         |

| Receiver                  | Predicted $L_{Aeq,1hour}$ Noise, dBA | Façade | Required Noise Reduction, dBA | Estimated Façade $R_w$ Ratings <sup>a</sup> |
|---------------------------|--------------------------------------|--------|-------------------------------|---------------------------------------------|
| Unit 18 Bedroom South     | 58                                   | 32     | 16                            | 22 (MP4.4 Cat 1)                            |
| Unit 18 Entry South       | 58                                   | 32     | 16                            | 22 (MP4.4 Cat 1)                            |
| Unit 18 Livingroom North  | 43                                   | 26     | 1                             | N/A                                         |
| Unit 19 Bedroom North     | 43                                   | 28     | 1                             | N/A                                         |
| Unit 19 Bedroom South     | 54                                   | 31     | 12                            | 18 (MP4.4 Cat 1)                            |
| Unit 19 Entry South       | 58                                   | 32     | 16                            | 22 (MP4.4 Cat 1)                            |
| Unit 19 Livingroom North  | 43                                   | 27     | 1                             | N/A                                         |
| Unit 20 Bedroom North     | 43                                   | 29     | 1                             | N/A                                         |
| Unit 20 Bedroom South     | 52                                   | 31     | 10                            | 16 (MP4.4 Cat 1)                            |
| Unit 20 Entry South       | 48                                   | 30     | 6                             | N/A                                         |
| Unit 20 Livingroom North  | 43                                   | 29     | 1                             | N/A                                         |
| Unit 21 Bedroom North     | 45                                   | 36     | 3                             | N/A                                         |
| Unit 21 Bedroom South     | 43                                   | 31     | 1                             | N/A                                         |
| Unit 21 Bedrooms East     | 47                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 21 Entry South       | 44                                   | 32     | 2                             | N/A                                         |
| Unit 21 Livingroom North  | 44                                   | 31     | 2                             | N/A                                         |
| Unit 22 Bedroom East      | 47                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 22 Bedroom West      | 55                                   | 27     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 22 Entry West        | 55                                   | 26     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 22 Livingroom East   | 47                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 23 Bedroom East      | 48                                   | 47     | 10                            | 16 (MP4.4 Cat 1)                            |
| Unit 23 Entry West        | 55                                   | 28     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 23 Livingroom East   | 47                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 24 Bedroom East      | 51                                   | 47     | 10                            | 16 (MP4.4 Cat 1)                            |
| Unit 24 Bedroom West      | 57                                   | 33     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 24 Bedrooms South    | 55                                   | 46     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 24 Entry West        | 56                                   | 29     | 14                            | 20 (MP4.4 Cat 1)                            |
| Unit 24 Livingroom East   | 48                                   | 47     | 10                            | 16 (MP4.4 Cat 1)                            |
| Unit 25 Entry South       | 57                                   | 38     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 25 Foyer South       | 57                                   | 37     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 25 Bedroom South     | 57                                   | 37     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 25 Bedroom West      | 52                                   | 24     | 10                            | 16 (MP4.4 Cat 1)                            |
| Unit 25 Bedroom North     | 45                                   | 29     | 3                             | N/A                                         |
| Unit 25 Living Room North | 43                                   | 28     | 1                             | N/A                                         |
| Unit 26 Entry South       | 56                                   | 38     | 14                            | 20 (MP4.4 Cat 1)                            |
| Unit 26 Bedroom South     | 57                                   | 38     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 26 Bedroom North     | 45                                   | 28     | 3                             | N/A                                         |

| Receiver                  | Predicted $L_{Aeq,1hour}$ Noise, dBA | Façade | Required Noise Reduction, dBA | Estimated Façade $R_w$ Ratings <sup>a</sup> |
|---------------------------|--------------------------------------|--------|-------------------------------|---------------------------------------------|
| Unit 26 Living Room North | 42                                   | 25     | 0                             | N/A                                         |
| Unit 27 Bedroom North     | 45                                   | 28     | 3                             | N/A                                         |
| Unit 27 Living Room North | 45                                   | 30     | 3                             | N/A                                         |
| Unit 27 Entry South       | 55                                   | 38     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 27 Bedroom South     | 57                                   | 34     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 28 Entry South       | 55                                   | 27     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 28 Bedroom South     | 57                                   | 38     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 28 Bedroom North     | 43                                   | 30     | 1                             | N/A                                         |
| Unit 28 Living Room North | 43                                   | 31     | 1                             | N/A                                         |
| Unit 29 Living Room North | 42                                   | 30     | 0                             | N/A                                         |
| Unit 29 Bedroom North     | 43                                   | 30     | 1                             | N/A                                         |
| Unit 29 Bedroom South     | 57                                   | 37     | 15                            | 21 (MP4.4 Cat 1)                            |
| Unit 29 Entry South       | 55                                   | 35     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 30 Entry South       | 54                                   | 29     | 12                            | 18 (MP4.4 Cat 1)                            |
| Unit 30 Bedroom South     | 54                                   | 35     | 12                            | 18 (MP4.4 Cat 1)                            |
| Unit 30 Bedroom North     | 42                                   | 30     | 0                             | N/A                                         |
| Unit 30 Living Room North | 42                                   | 30     | 0                             | N/A                                         |
| Unit 31 Living Room North | 42                                   | 29     | -1                            | N/A                                         |
| Unit 31 Bedroom North     | 42                                   | 30     | 0                             | N/A                                         |
| Unit 31 Bedroom South     | 52                                   | 35     | 10                            | 16 (MP4.4 Cat 1)                            |
| Unit 31 Entry South       | 50                                   | 35     | 8                             | 14 (MP4.4 Cat 1)                            |
| Unit 32 Entry South       | 45                                   | 42     | 5                             | N/A                                         |
| Unit 32 Bedroom South     | 47                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 32 Bedroom East      | 46                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 32 Bedroom North     | 43                                   | 40     | 3                             | N/A                                         |
| Unit 32 Living Room North | 41                                   | 31     | -1                            | N/A                                         |
| Unit 33 Entry West        | 55                                   | 30     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 33 Bedroom West      | 55                                   | 30     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 33 Living Room East  | 47                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 33 Bedroom East      | 47                                   | 46     | 9                             | 15 (MP4.4 Cat 1)                            |
| Unit 34 Bedroom East      | 49                                   | 47     | 10                            | 16 (MP4.4 Cat 1)                            |
| Unit 34 Living Room East  | 47                                   | 47     | 10                            | 16 (MP4.4 Cat 1)                            |
| Unit 34 Entry West        | 55                                   | 32     | 13                            | 19 (MP4.4 Cat 1)                            |

| Receiver                         | Predicted $L_{Aeq,1hour}$ Noise, dBA | Façade | Required Noise Reduction, dBA | Estimated Façade $R_w$ Ratings <sup>a</sup> |
|----------------------------------|--------------------------------------|--------|-------------------------------|---------------------------------------------|
| Unit 34 Bedroom West             | 55                                   | 34     | 13                            | 19 (MP4.4 Cat 1)                            |
| Unit 34 Bedroom South (East End) | 51                                   | 47     | 10                            | 16 (MP4.4 Cat 1)                            |
| Unit 34 Bedroom South (West End) | 52                                   | 44     | 10                            | 16 (MP4.4 Cat 1)                            |

Note a: N/A – not applicable. There are no acoustic requirements to mitigated commercial noise impacts. Windows can stay open and a suitable internal noise level can still be achieved. However, it is noted that acoustic requirements should take into account road traffic noise impacts (in addition to commercial noise). Refer to Section 8, which provides a summary of requirements to mitigate road noise and commercial noise.

## 8. SUMMARY OF ACOUSTIC REQUIREMENTS

Two different noise impact assessments have been conducted for the proposed mixed use at 1-7 Adler Circuit, Yarrabilba, considering traffic noise impacts and noise impacts from other nearby retail/commercial/educational activities. Predicted noise levels and acoustic requirements for building façades of residential units are outlined in **Section 7.1.3** for road traffic noise and in **Section 7.2.3** for nearby commercial, retail and educational premises.

This section presents the final construction category requirements after comparing commercial noise and road traffic noise requirements.

The following key points were identified:

- Standard construction materials (e.g. 4 mm single glazing) are suitable to mitigate noise from nearby retail, commercial and educational uses; however, it was identified that some rooms must have their windows closed in order to achieve appropriate internal noise levels. Therefore, these rooms/units were deemed to have equivalent construction material requirements as MP4.4 Category 1.
- It was identified that road traffic noise from Yarrabilba Drive and Waterford Tamborine Road is dominant, and acoustic upgrade for building envelope, only for residential units, are required up to MP4.4 Category 3.
- The final MP4.4 category requirements are outlined in **Table 8.1**, and illustrated in **Appendix C**.
- In accordance with MP4.4 the construction requirements are to be either (i) using construction materials nominated in MP4.4, as described in **Appendix D**; or (ii) using construction materials and methods that meet the minimum acoustic rating ( $R_w$ ) requirements in MP4.4, as shown in **Appendix D**, based on the manufacturer's specifications.
- Supplier data should be sought to ensure the minimum acoustic ratings are achieved.
- In order to achieve design  $R_w$  ratings it is essential that the acoustically treated areas are constructed in a manner conducive to maximising sound attenuation. For example there must be no air gaps around windows or at the eaves, which could act as noise pathways.
- To achieve appropriate internal noise levels, windows must remain closed. Therefore, some form of ventilation should be provided to noise affected rooms to allow windows to remain closed while allowing for sufficient ventilation for the occupant. Advice from a ventilation specialist or consultant is recommended regarding this aspect of design.

**Table 8.1** presents a summary of the acoustic requirements for each room/unit.

**Table 8.1: MP4.4 Noise Category Requirements to Mitigate Road Traffic and Other Noise Sources – Façade and Roof**

| Receiver                         | MP4.4 Noise Category                                                  |
|----------------------------------|-----------------------------------------------------------------------|
| <b>Building Façade</b>           |                                                                       |
| Unit 01 Front Bedroom North/West | Category 3                                                            |
| Unit 01 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 01 Bedrooms West            | Category 2                                                            |
| Unit 01 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 01 Foyer South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 01 Living Room North        | Category 3                                                            |
| Unit 02 Bedroom North            | Category 3                                                            |
| Unit 02 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 02 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 02 Living North             | Category 2                                                            |
| Unit 03 Bedroom North            | Category 3                                                            |
| Unit 03 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 03 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 03 Living Room North        | Category 2                                                            |
| Unit 04 Bedroom North            | Category 3                                                            |
| Unit 04 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 04 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 04 Living Room North        | Category 2                                                            |
| Unit 05 Bedroom North            | Category 3                                                            |
| Unit 05 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 05 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 05 Livingroom North         | Category 2                                                            |
| Unit 06 Bedroom North            | Category 3                                                            |
| Unit 06 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 06 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 06 Livingroom North         | Category 2                                                            |
| Unit 07 Bedroom North            | Category 3                                                            |
| Unit 07 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 07 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 07 Livingroom North         | Category 2                                                            |
| Unit 08 Bedroom North            | Category 3                                                            |
| Unit 08 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 08 Entry South              | Category 0                                                            |
| Unit 08 Livingroom North         | Category 2                                                            |
| Unit 09 Front Bedroom North/East | Category 3                                                            |
| Unit 09 Bedroom South            | Category 0                                                            |
| Unit 09 Bedrooms East            | Category 2                                                            |

| Receiver                         | MP4.4 Noise Category                                                  |
|----------------------------------|-----------------------------------------------------------------------|
| Unit 09 Entry South              | Category 0                                                            |
| Unit 09 Livingroom North         | Category 2                                                            |
| Unit 10 Bedroom East             | Category 1                                                            |
| Unit 10 Bedroom West             | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 10 Entry West               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 10 Livingroom East          | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 11 Bedroom East             | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 11 Bedroom West             | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 11 Bedroom West             | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 11 Entry West               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 11 Livingroom East          | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 12 Bedroom East             | Category 1                                                            |
| Unit 12 Bedroom West             | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 12 Bedrooms South           | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 12 Entry West               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 12 Livingroom East          | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 13 Front Bedroom North/West | Category 3                                                            |
| Unit 13 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 13 Bedrooms West            | Category 2                                                            |
| Unit 13 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 13 Foyer South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 13 Living Room North        | Category 2                                                            |
| Unit 14 Bedroom North            | Category 3                                                            |
| Unit 14 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 14 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 14 Living North             | Category 2                                                            |
| Unit 15 Bedroom North            | Category 3                                                            |
| Unit 15 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 15 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 15 Living Room North        | Category 2                                                            |
| Unit 16 Bedroom North            | Category 3                                                            |
| Unit 16 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 16 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 16 Living Room North        | Category 2                                                            |
| Unit 17 Bedroom North            | Category 3                                                            |
| Unit 17 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 17 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 17 Livingroom North         | Category 2                                                            |
| Unit 18 Bedroom North            | Category 3                                                            |
| Unit 18 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |

| Receiver                         | MP4.4 Noise Category                                                  |
|----------------------------------|-----------------------------------------------------------------------|
| Unit 18 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 18 Livingroom North         | Category 2                                                            |
| Unit 19 Bedroom North            | Category 3                                                            |
| Unit 19 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 19 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 19 Livingroom North         | Category 2                                                            |
| Unit 20 Bedroom North            | Category 3                                                            |
| Unit 20 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 20 Entry South              | Category 0                                                            |
| Unit 20 Livingroom North         | Category 2                                                            |
| Unit 21 Front Bedroom North/East | Category 3                                                            |
| Unit 21 Bedroom South            | Category 0                                                            |
| Unit 21 Bedrooms East            | Category 2                                                            |
| Unit 21 Entry South              | Category 0                                                            |
| Unit 21 Livingroom North         | Category 3                                                            |
| Unit 22 Bedroom East             | Category 1                                                            |
| Unit 22 Bedroom West             | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 22 Entry West               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 22 Livingroom East          | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 23 Bedroom East             | Category 1                                                            |
| Unit 23 Entry West               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 23 Livingroom East          | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 24 Bedroom East             | Category 1                                                            |
| Unit 24 Bedroom West             | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 24 Bedrooms South           | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 24 Entry West               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 24 Livingroom East          | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 25 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 25 Foyer South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 25 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 25 Bedroom West             | Category 2                                                            |
| Unit 25 Bedroom North            | Category 2                                                            |
| Unit 25 Living Room North        | Category 2                                                            |
| Unit 26 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 26 Bedroom South            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 26 Bedroom North            | Category 3                                                            |
| Unit 26 Living Room North        | Category 2                                                            |
| Unit 27 Bedroom North            | Category 3                                                            |
| Unit 27 Living Room North        | Category 1                                                            |
| Unit 27 Entry South              | Category 1, defined by nearby retail, commercial and educational uses |

| Receiver                            | MP4.4 Noise Category                                                  |
|-------------------------------------|-----------------------------------------------------------------------|
| Unit 27 Bedroom South               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 28 Entry South                 | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 28 Bedroom South               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 28 Bedroom North               | Category 3                                                            |
| Unit 28 Living Room North           | Category 1                                                            |
| Unit 29 Living Room North           | Category 1                                                            |
| Unit 29 Bedroom North               | Category 3                                                            |
| Unit 29 Bedroom South               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 29 Entry South                 | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 30 Entry South                 | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 30 Bedroom South               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 30 Bedroom North               | Category 3                                                            |
| Unit 30 Living Room North           | Category 1                                                            |
| Unit 31 Living Room North           | Category 1                                                            |
| Unit 31 Bedroom North               | Category 3                                                            |
| Unit 31 Bedroom South               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 31 Entry South                 | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 32 Entry South                 | Category 0                                                            |
| Unit 32 Bedroom South               | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 32 Bedroom East                | Category 2                                                            |
| Unit 32 Front Bedroom (All Facades) | Category 3                                                            |
| Unit 32 Living Room North           | Category 1                                                            |
| Unit 33 Entry West                  | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 33 Bedroom West                | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 33 Living Room East            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 33 Bedroom East                | Category 1                                                            |
| Unit 34 Bedroom East                | Category 1                                                            |
| Unit 34 Living Room East            | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 34 Entry West                  | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 34 Bedroom West                | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 34 Bedroom South (East End)    | Category 1, defined by nearby retail, commercial and educational uses |
| Unit 34 Bedroom South (West End)    | Category 1, defined by nearby retail, commercial and educational uses |
| <b>Building Roof</b>                |                                                                       |
| U25 Front Bedroom Roof              | 2                                                                     |
| U25 Living Area Roof                | 2                                                                     |
| Unit 32 Front Bedroom Roof          | 2                                                                     |
| All other living/bedroom areas      | 1                                                                     |

## 9. RECOMMENDATIONS AND CONCLUSION

A noise impact assessment has been conducted for the proposed mixed use at 1-7 Adler Circuit, Yarrabilba, considering traffic noise and noise from other nearby activities including retail, commercial and educational uses. The results and recommendations of the assessment are as follows:

- Acoustic measurements have been undertaken and the results are shown in **Section 5**. Based on the noise monitoring results, road traffic noise is the dominant noise at the project location; however, noise from surrounding commercial and educational activities are also audible.
- The acoustic criteria are outlined in **Section 6**. As the site is located within the Logan City Council area and the Yarrabilba Priority Development Area (PDA), there is a requirement to consider both noise impacts from transport corridors and noise impacts onto sensitive uses. The following noise criteria were adopted:
  - For traffic noise impact, Department of Housing and Public Works – QDC MP4.4.
  - For impact from other noise sources, internal acoustic quality objectives from the Environmental Protection (Noise) Policy 2019.
- A road traffic noise assessment has been undertaken and the results are shown in **Section 7.2**. Predicted traffic noise levels vary from 44 dBA  $L_{A10,18\text{hour}}$  at the southern façade to 70 dBA  $L_{A10,18\text{hour}}$  at the northern façade directly looking at Yarrabilba Drive.
- A noise assessment for commercial, retail and educational uses has been undertaken and the results are shown in **Section 7.3**. Predicted noise levels vary from 22 dBA  $L_{Aeq,1\text{hour}}$  to 52 dBA  $L_{Aeq,1\text{hour}}$ .
- A summary of acoustic requirements to mitigate both road traffic and other noise sources is provided in **Section 8**. The highest MP4.4 noise category requirement from either traffic noise or other noise sources is proposed to be the resultant noise mitigation requirement.
  - MP4.4 category requirements are outlined in **Table 8.1**, and illustrated in **Appendix C**. MP4.4 Categories for roof and façade elements such as entry doors, windows, glazing doors and walls, were estimated up to Category 3.
  - In accordance with MP4.4 the construction requirements are to be either (i) using construction materials nominated in MP4.4, as described in **Appendix D**; or (ii) using construction materials and methods that meet the minimum acoustic rating ( $R_w$ ) requirements in MP4.4, as shown in **Appendix D**, based on the manufacturer's specifications.
  - Supplier data should be sought to ensure the minimum acoustic ratings are achieved.
  - In order to achieve design  $R_w$  ratings it is essential that the acoustically treated areas are constructed in a manner conducive to maximising sound attenuation. For example there must be no air gaps around windows or at the eaves, which could act as noise pathways.
  - To achieve appropriate internal noise levels, windows must remain closed. Therefore, some form of ventilation should be provided to noise affected rooms to allow windows to remain closed while allowing for sufficient ventilation for the occupant. Advice from a ventilation specialist or consultant is recommended regarding this aspect of design.
- In addition to the acoustic construction detailed above, the following measures are also recommended:
  - During the detailed design phase of the project, the construction materials of ground floor ceiling (and Level 1 floor materials) should be investigated further and selected to minimise the potential for noise intrusion from ground floor commercial uses to the above Level 1 residential units.
  - Restrict garbage collection activity occur to the day-time hours (7 am to 6 pm) to minimise noise impacts onto on-site residential uses.

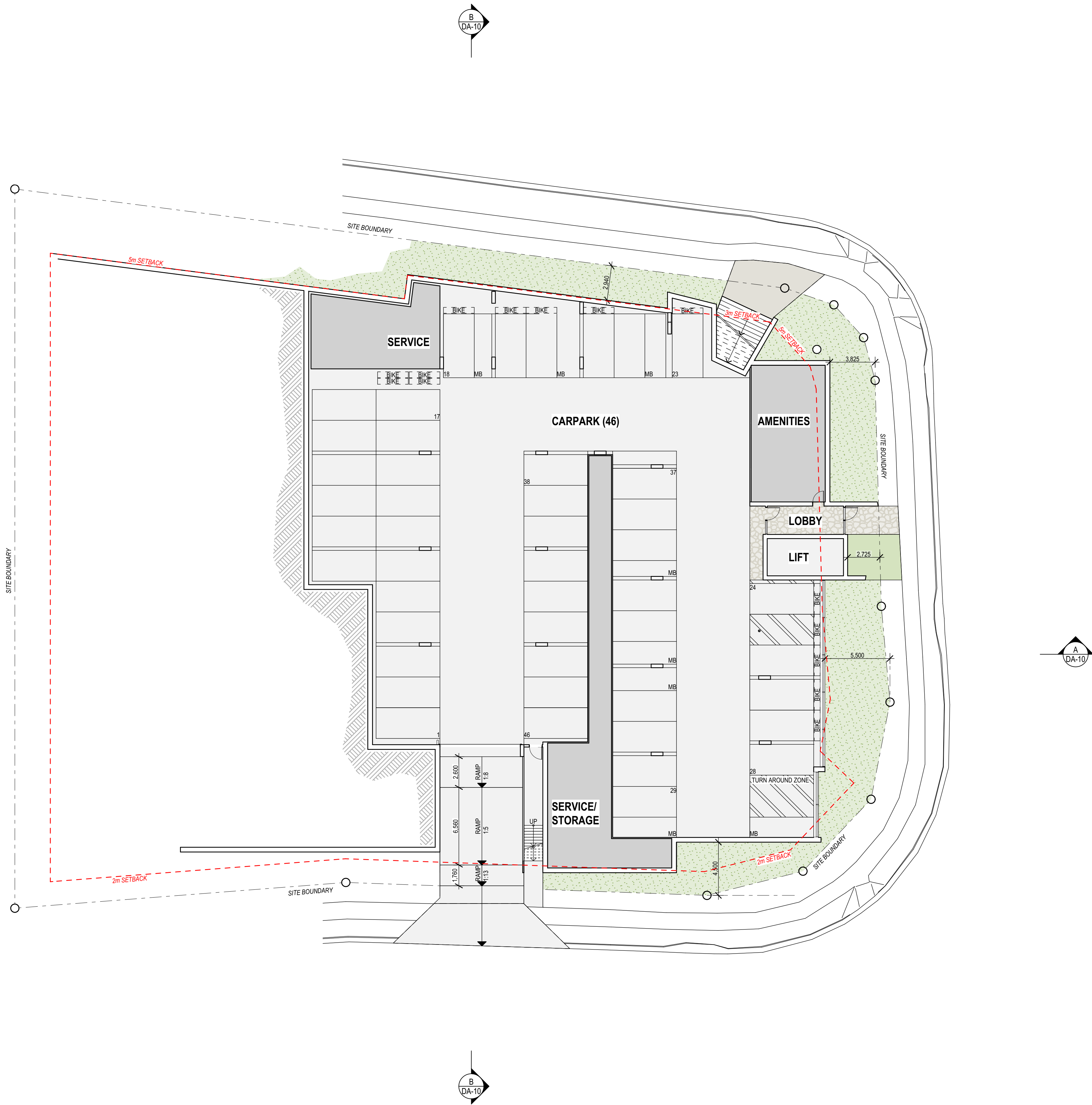
Implementation of the above recommendations is predicted to result in compliance with relevant noise criteria.

## APPENDIX A GLOSSARY

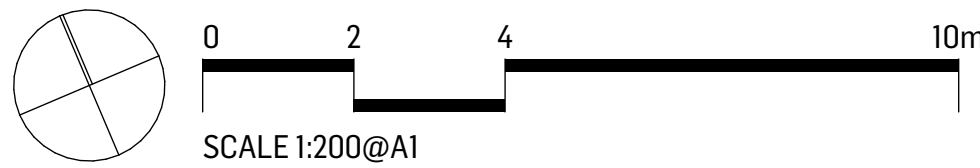
| Parameter or Term         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| dB                        | The decibel (dB) is the unit measure of sound. Most noises occur in a range of 20 dB (quiet rural area at night) to 120 dB (nightclub dance floor or concert).                                                                                                                                                                                                                                                                                                                                                                                                   |
| dBA                       | Noise levels are most commonly expressed in terms of the 'A' weighted decibel scale, dBA. This scale closely approximates the response of the human ear, thus providing a measure of the subjective loudness of noise and enabling the intensity of noises with different frequency characteristics (e.g. pitch and tone) to be compared.                                                                                                                                                                                                                        |
| Day                       | The period between 7am and 6pm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Evening                   | The period between 6pm and 10pm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Night                     | The period between 10pm and 7am.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Free-field                | The description of a noise receiver or source location which is away from any significantly reflective objects (e.g. buildings, walls).                                                                                                                                                                                                                                                                                                                                                                                                                          |
| L <sub>1</sub>            | The noise level exceeded for 1% of the measurement period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| L <sub>10</sub>           | The noise level exceeded for 10% of the measurement period. It is sometimes referred to as the average maximum noise level.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| L <sub>90</sub>           | The noise level exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| L <sub>eq</sub>           | The equivalent continuous sound level, which is the constant sound level over a given time period, which is equivalent in total sound energy to the time-varying sound level, measured over the same time period.                                                                                                                                                                                                                                                                                                                                                |
| L <sub>eq,1hour</sub>     | As for L <sub>eq</sub> except the measurement intervals are defined as 1 hour duration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| L <sub>max</sub>          | Maximum A-weighted sound pressure level.<br>Brisbane City Council 2014 City Plan and Moreton Bay Regional Council Noise Policy additional definition:<br>L <sub>max</sub> assessment only applies to 'specified noise sources' which are defined as - (a) impact noises; (b) hammering; (c) loading/unloading; (d) dropping items; (e) beepers, alarms, bells, phones, sirens; (f) power tools; (g) valve releases; (h) air brakes; and (i) door slamming. People noise and vehicle pass-by noise (engine, exhaust, induction, tyres) are specifically excluded. |
| L <sub>eq</sub> (24 hour) | The average L <sub>eq</sub> noise level over the 24-hour period from midnight to midnight.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| L <sub>10</sub> (18 hour) | The arithmetic average of the one-hour L <sub>10</sub> values between 6am and midnight. This parameter is used in the assessment of road traffic noise.                                                                                                                                                                                                                                                                                                                                                                                                          |
| R <sub>w</sub>            | Weighted Sound Reduction Index – is a single number evaluation of the property of a partition to attenuate sounds. For the majority of partitions, the value of R <sub>w</sub> will be similar to the value for STC. Partitions with particularly poor performance at 100 Hz may have lower values for R <sub>w</sub> than for STC. Conversely, partitions with poor performance at 4000 Hz may have higher R <sub>w</sub> than for STC. (As per AS1276.1-1999).                                                                                                 |
| Habitable Rooms           | According to the "Building Code of Australia" a Habitable Room is: "a room used for normal domestic activities and<br>Includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre, and sunroom, but<br>Excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods."                  |
| Sensitive Uses            | Brisbane City Council 2014 City Plan definition:<br>A use that is child care centre, community care centre, community residence, dual occupancy, dwelling house, dwelling unit, educational establishment, health care services, hospital, multiple dwelling, relocatable home park, residential care facility, retirement facility, rooming accommodation, short term accommodation or tourist park.                                                                                                                                                            |

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## **APPENDIX B      PROJECT DRAWINGS**



FLOOR PLAN - BASEMENT  
SCALE 1:200

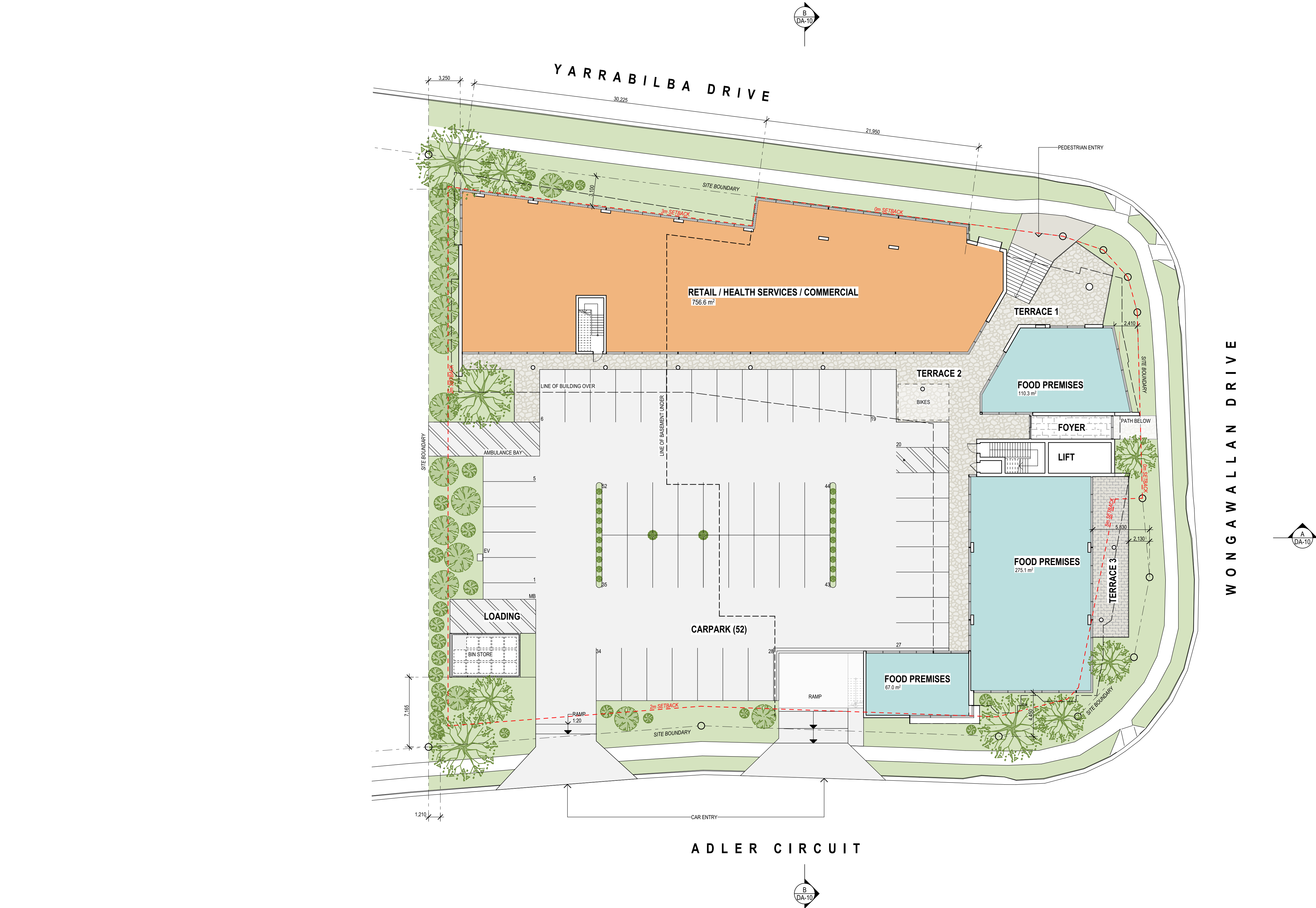


| ISSUE | DATE       | BY | DESCRIPTION             | CHKD |
|-------|------------|----|-------------------------|------|
| A     | 28.07.2023 | CL | DEVELOPMENT APPLICATION | JO   |
| B     | 03.08.2023 | CL | AMENDMENT               | JO   |
| C     | 29.02.2024 | CL | AMENDMENT               | JO   |
| D     | 01.05.2024 | SC | AMENDMENT               | JO   |

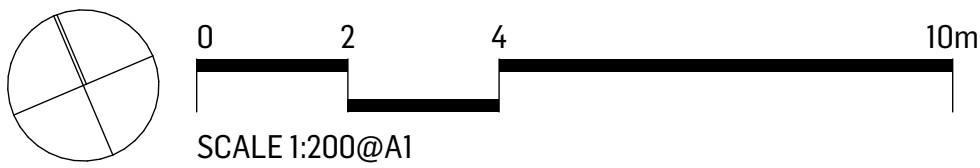
# YARRABILBA MIXED USE

DRAWING  
**FLOOR PLAN - BASEMENT**  
PROJECT NO. **2789-427** DRAWING NO. **DA-02** ISSUE **D**





FLOOR PLAN - GROUND  
SCALE 1:200



| ISSUE | DATE       | BY | DESCRIPTION             | CHKD |
|-------|------------|----|-------------------------|------|
| A     | 28.07.2023 | CL | DEVELOPMENT APPLICATION | JO   |
| B     | 03.08.2023 | CL | AMENDMENT               | JO   |
| C     | 15.08.2023 | CL | AMENDMENT               | JO   |
| D     | 29.02.2024 | CL | AMENDMENT               | JO   |
| E     | 01.05.2024 | SC | AMENDMENT               | JO   |

# YARRABILBA MIXED USE

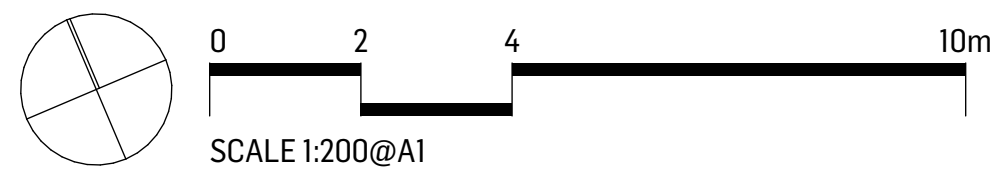
DRAWING  
**FLOOR PLAN - GROUND**

PROJECT NO. **2789-427** DRAWING NO. **DA-03** ISSUE **E**





FLOOR PLAN - LEVEL 1  
SCALE 1:200



| ISSUE | DATE       | BY | DESCRIPTION             | CHKD |
|-------|------------|----|-------------------------|------|
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| D     | 01.05.2024 | SC | AMENDMENT               | JO   |

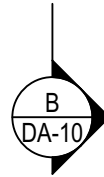
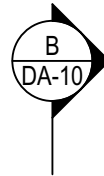
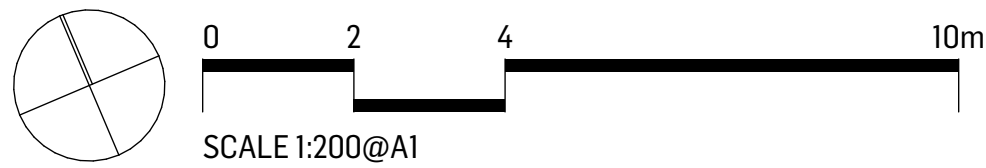
## YARRABILBA MIXED USE

DRAWING  
**FLOOR PLAN - LEVEL 1**

PROJECT NO. **2789-427** DRAWING NO. **DA-04** ISSUE **D**



FLOOR PLAN - LEVEL 2  
SCALE 1:200



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|-------|------------|----|-------------------------|------|
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| B     | 29.02.2024 | CL | AMENDMENT               | JO   |
| C     | 01.05.2024 | SC | AMENDMENT               | JO   |

## YARRABILBA MIXED USE

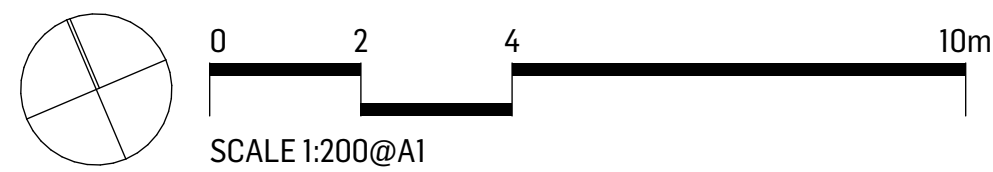
DRAWING  
**FLOOR PLAN - LEVEL 2**

PROJECT NO. **2789-427** DRAWING NO. **DA-05** ISSUE **C**





FLOOR PLAN - LEVEL 3  
SCALE 1:200



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| B     | 29.02.2024 | CL | AMENDMENT               | JO   |
| C     | 01.05.2024 | SC | AMENDMENT               | JO   |

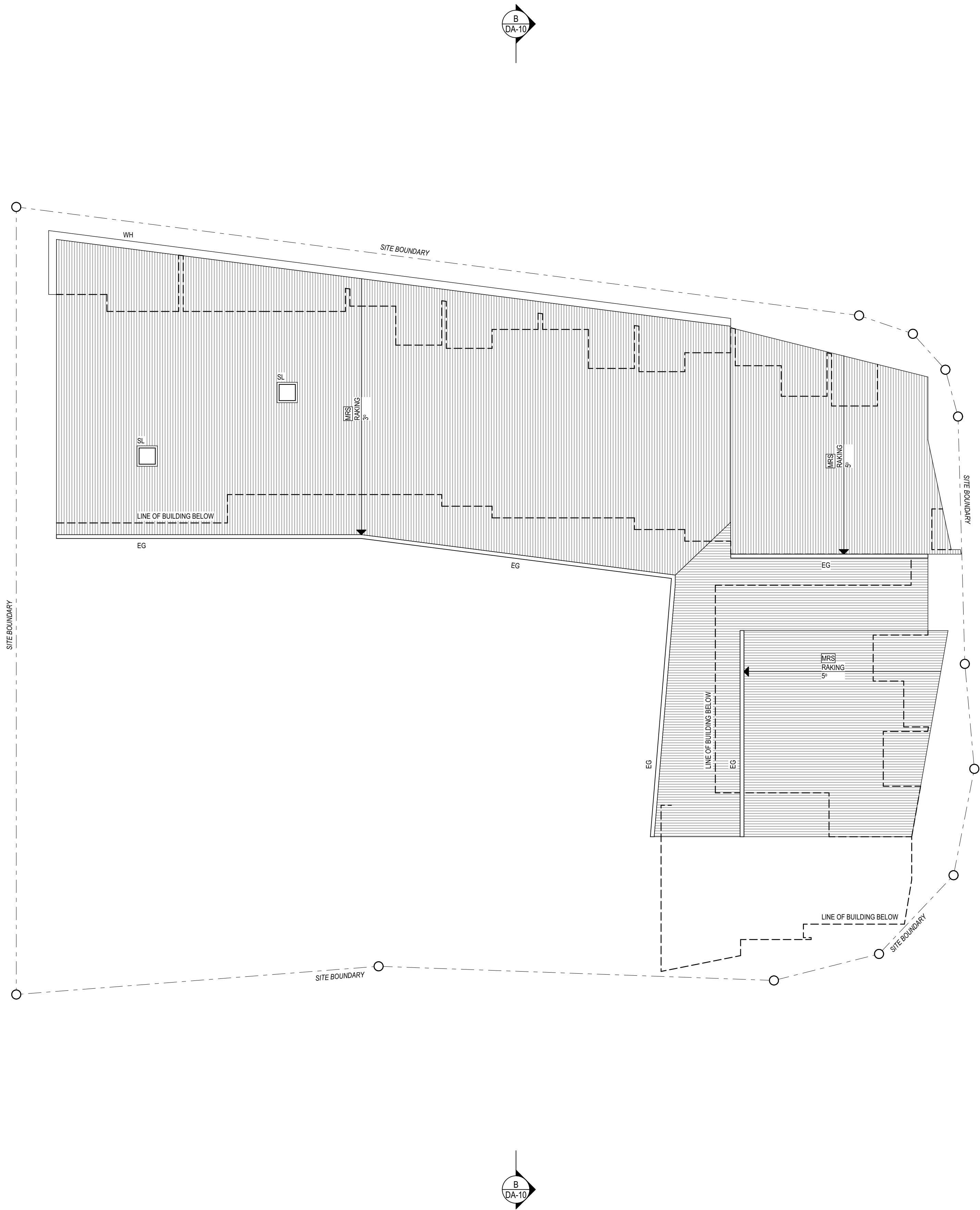
## YARRABILBA MIXED USE

DRAWING  
**FLOOR PLAN - LEVEL 3**

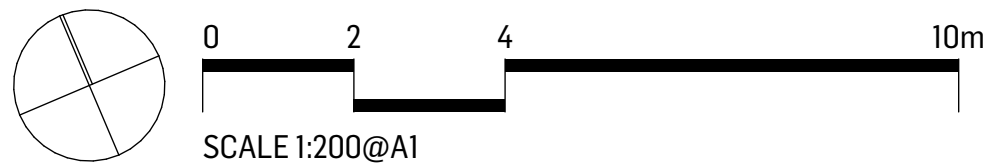
PROJECT NO. **2789-427** DRAWING NO. **DA-06** ISSUE **C**



- LEGEND**
- BAL-1 BATTEN BALUSTRADE
  - BAL-2 GLASS BALUSTRADE
  - BAL-3 SOLID BALUSTRADE
  - RENDERED
  - PAINT FINISH
  - CL-1 FIBRE CEMENT SHEETING
  - PAINT FINISH
  - CONC CONCRETE FINISH
  - EG EAVES GUTTER
  - EGL EXISTING GROUND LINE
  - MIN MINIMUM
  - MRS METAL ROOF SHEETING
  - MWS METAL WALL SHEETING
  - SCR-1 BATTEN SCREEN
  - SCR-2 FIXED BLADES SCREEN
  - SL SKYLIGHT
  - RND RENDERED
  - PAINT FINISH
  - WH WINDOW HOOD



ROOF PLAN  
SCALE 1:200



| ISSUE | DATE       | BY | DESCRIPTION             | CHKD |
|-------|------------|----|-------------------------|------|
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| B     | 29.02.2024 | CL | AMENDMENT               | JO   |
| C     | 01.05.2024 | SC | AMENDMENT               | JO   |

## YARRABILBA MIXED USE

DRAWING  
**ROOF PLAN**

PROJECT NO.  
**2789-427**

DRAWING NO.  
**DA-07**

ISSUE  
**C**



- LEGEND**
- BAL-1 BATTEN BALUSTRADE
  - BAL-2 GLASS BALUSTRADE
  - BAL-3 SOLID BALUSTRADE
  - RENDERED
  - PAINT FINISH
  - CL-1 FIBRE CEMENT SHEETING
  - PAINT FINISH
  - CONC CONCRETE FINISH
  - EG EAVES GUTTER
  - EGL EXISTING GROUND LINE
  - MIN MINIMUM
  - MRS METAL ROOF SHEETING
  - MWS METAL WALL SHEETING
  - SCR-1 BATTEN SCREEN
  - SCR-2 FIXED BLADES SCREEN
  - SL SKYLIGHT
  - RND RENDERED
  - PAINT FINISH
  - WH WINDOW HOOD



ELEVATION - NORTH  
SCALE 1:200



ELEVATION - EAST  
SCALE 1:200



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| C     | 01.05.2024 | SC | AMENDMENT               | JO   |

## YARRABILBA MIXED USE

DRAWING

**ELEVATIONS**

PROJECT NO.

**2789-427**

DRAWING NO.

**DA-08**

ISSUE

**C**



- LEGEND**
- BAL-1 BATTEN BALUSTRADE
  - BAL-2 GLASS BALUSTRADE
  - BAL-3 SOLID BALUSTRADE
  - RENDERED
  - PAINT FINISH
  - CL-1 FIBRE CEMENT SHEETING
  - PAINT FINISH
  - CONC CONCRETE FINISH
  - EG EAVES GUTTER
  - EGL EXISTING GROUND LINE
  - MIN MINIMUM
  - MRS METAL ROOF SHEETING
  - MWS METAL WALL SHEETING
  - SCR-1 BATTEN SCREEN
  - SCR-2 FIXED BLADES SCREEN
  - SL SKYLIGHT
  - RND RENDERED
  - PAINT FINISH
  - WH WINDOW HOOD



ELEVATION - SOUTH  
SCALE 1:200



ELEVATION - WEST  
SCALE 1:200

| ISSUE | DATE       | BY | DESCRIPTION             | CHKD |
|-------|------------|----|-------------------------|------|
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| B     | 15.08.2023 | CL | DEVELOPMENT APPLICATION | JO   |
| C     | 01.05.2024 | SC | AMENDMENT               | JO   |

## YARRABILBA MIXED USE

DRAWING

### ELEVATIONS

PROJECT NO.

**2789-427**

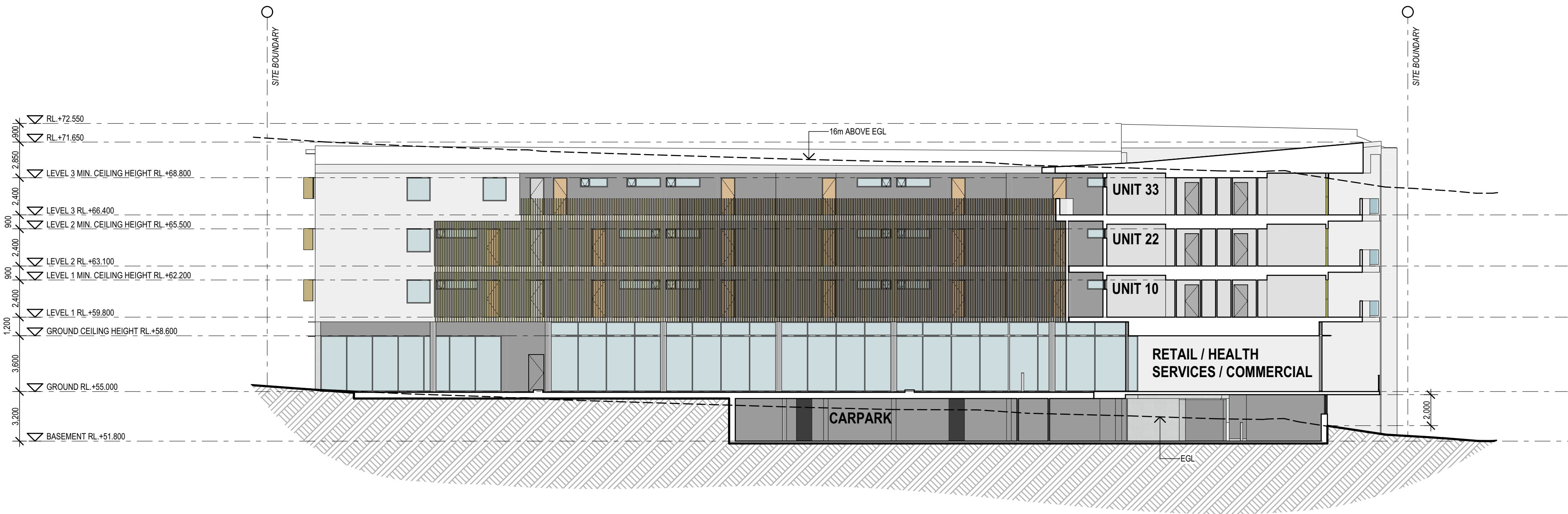
DRAWING NO.

**DA-09**

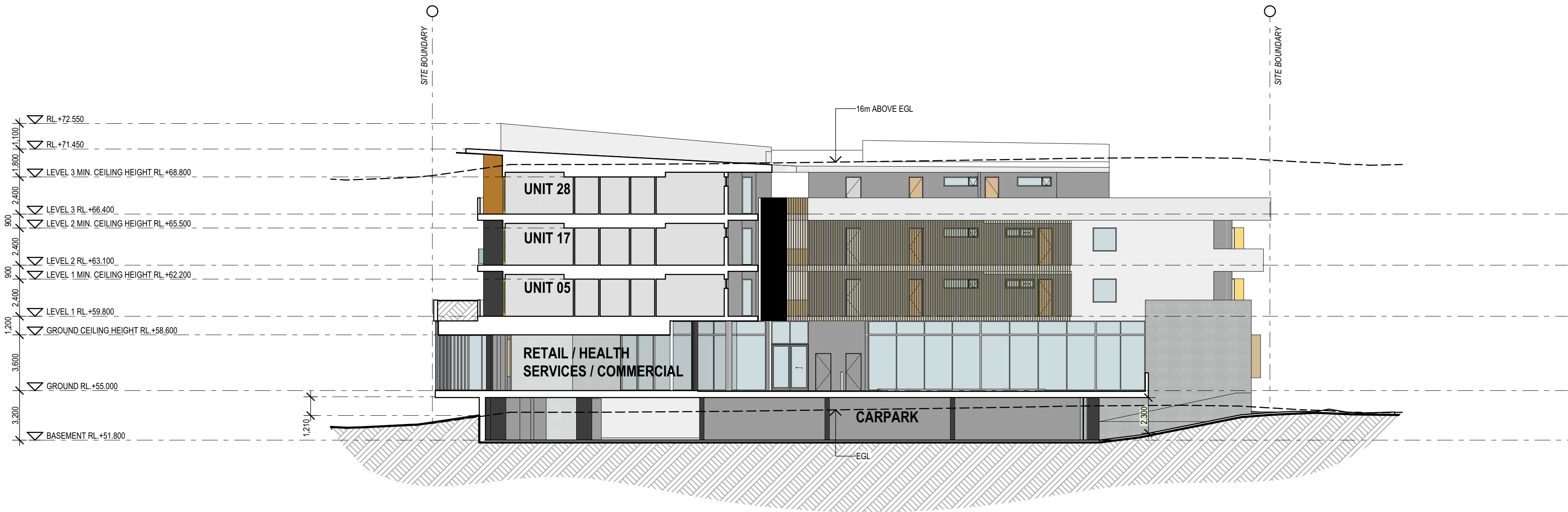
ISSUE

**C**





A SECTION  
SCALE 1:200



B SECTION  
SCALE 1:200

- LEGEND**
- BAL-1 BATTEN BALUSTRADE
  - BAL-2 GLASS BALUSTRADE
  - BAL-3 SOLID BALUSTRADE
  - RENDERED
  - PAINT FINISH
  - CL-1 FIBRE CEMENT SHEETING
  - PAINT FINISH
  - CONC CONCRETE FINISH
  - EG EAVES GUTTER
  - EGL EXISTING GROUND LINE
  - MIN MINIMUM
  - MRS METAL ROOF SHEETING
  - MWS METAL WALL SHEETING
  - SCR-1 BATTEN SCREEN
  - SCR-2 FIXED BLADES SCREEN
  - SL SKYLIGHT
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  - PAINT FINISH
  - WH WINDOW HOOD



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# YARRABILBA MIXED USE

DRAWING  
**SECTIONS**

PROJECT NO.  
**2789-427**

DRAWING NO.  
**DA-10**

ISSUE  
**D**





| ISSUE | DATE       | BY | DESCRIPTION             | CHKD |
|-------|------------|----|-------------------------|------|
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| B     | 29.02.2024 | CL | AMENDMENT               | JO   |
| C     | 01.05.2024 | SC | AMENDMENT               | JO   |

**YARRABILBA MIXED USE**

DRAWING  
**3D VIEWS**  
PROJECT NO.  
**2789-427**

DRAWING NO.  
**DA-11**

ISSUE  
**C**





| ISSUE | DATE       | BY | DESCRIPTION | CHKD |
|-------|------------|----|-------------|------|
| A     | 29.02.2024 | CL | AMENDMENT   | JO   |
| B     | 01.05.2024 | SC | AMENDMENT   | JO   |

**YARRABILBA MIXED USE**

DRAWING  
**3D VIEWS**  
PROJECT NO.  
**2789-427**

DRAWING NO.  
**DA-12**

ISSUE  
**B**



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## **APPENDIX C      MP4.4 ACOUSTIC MARKUPS**

MP4.4 Category

- Category 0
- Category 1
- Category 2
- Category 3
- Category 4

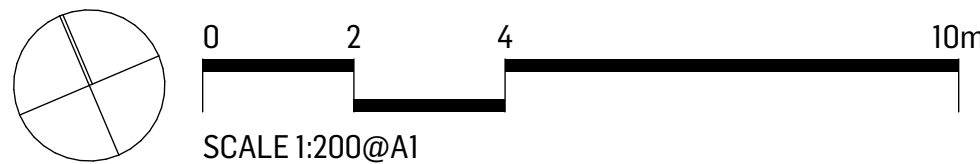


FLOOR PLAN - LEVEL 1  
SCALE 1:200

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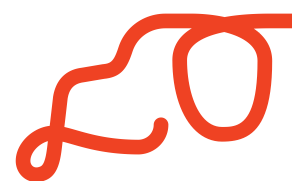


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YARRABILBA MIXED USE

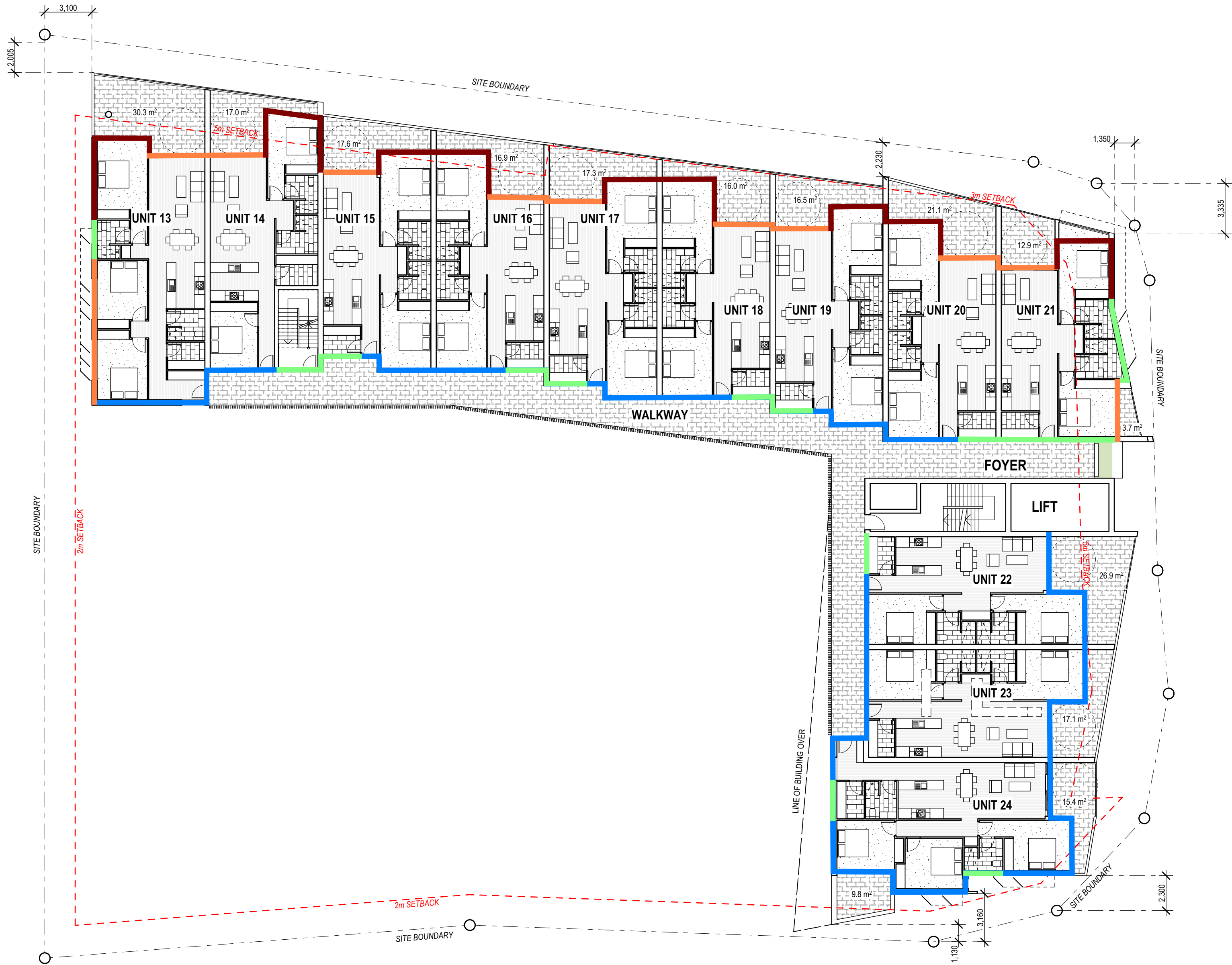
DRAWING  
FLOOR PLAN - LEVEL 1

PROJECT NO. 2789-427  
DRAWING NO. DA-04  
ISSUE D



MP4.4 Category

- Category 0
- Category 1
- Category 2
- Category 3
- Category 4

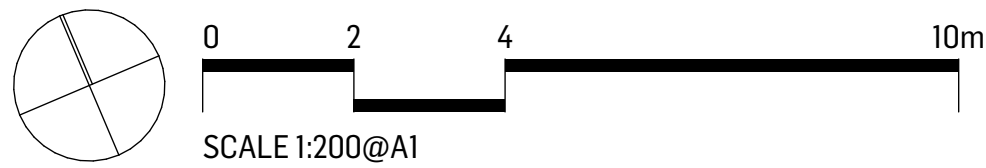


FLOOR PLAN - LEVEL 2  
SCALE 1:200

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YARRABILBA MIXED USE

DRAWING  
FLOOR PLAN - LEVEL 2

PROJECT NO. 2789-427  
DRAWING NO. DA-05  
ISSUE C

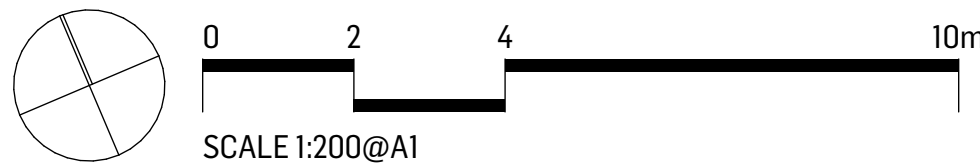


MP4.4 Category

- Category 0
- Category 1
- Category 2
- Category 3
- Category 4



FLOOR PLAN - LEVEL 3  
SCALE 1:200

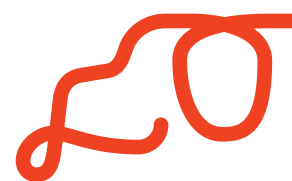


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YARRABILBA MIXED USE

DRAWING  
FLOOR PLAN - LEVEL 3

PROJECT NO. 2789-427  
DRAWING NO. DA-06  
ISSUE C



All roof areas of bedrooms and living areas are to be Category 1 construction,  
Except areas highlighted in **Orange** are Category 2

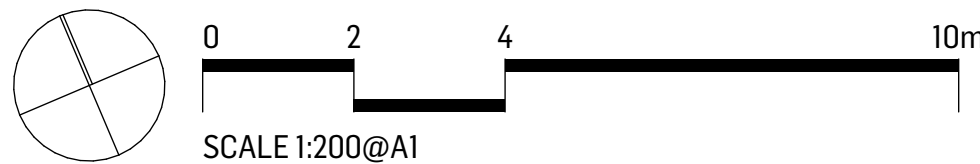


FLOOR PLAN - LEVEL 3  
SCALE 1:200

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## YARRABILBA MIXED USE

DRAWING  
**FLOOR PLAN - LEVEL 3**

PROJECT NO. **2789-427** DRAWING NO. **DA-06** ISSUE **C**



## APPENDIX D MP4.4 CONSTRUCTION REQUIREMENTS

| Component of Buildings External Envelope | Minimum Acoustic Rating ( $R_w$ )                                                                    | Acceptable Forms of Construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Noise Category 4</b>                  |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Glazing                                  | 43                                                                                                   | Double glazing consisting of two panes of minimum 5mm thick glass with at least 100mm air gap and full perimeter acoustically rated seals.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| External walls                           | 52                                                                                                   | Two leaves of clay brick masonry, at least 270mm in total, with subfloor vents fitted with noise attenuators.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Roof                                     | 45                                                                                                   | Concrete or terracotta tile or sheet metal roof with sarking, acoustically rated plasterboard ceiling at least 13mm thick fixed to ceiling joists, cellulose fibre insulation at least 100mm thick with a density of at least 45kg/m <sup>3</sup> in the cavity.<br>OR<br>Concrete or terracotta tile or sheet metal roof with sarking, 2 layers of acoustically rated plasterboard at least 16mm thick fixed to ceiling joists, glass wool insulation at least 50mm thick with a density of at least 11kg/m <sup>3</sup> or polyester insulation at least 50mm thick with a density of at least 20kg/m <sup>3</sup> in the cavity. |
| Floors                                   | 51                                                                                                   | Concrete slab at least 150mm thick.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Entry doors                              | 35                                                                                                   | Solid core timber not less than 45mm thick, fixed so as to overlap the frame or rebate of the frame by not less than 10mm, with full perimeter acoustically rated seals.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Noise Category 3</b>                  |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Glazing                                  | 38<br>(where total area of glazing for a habitable room is greater than 1.8m <sup>2</sup> )          | Minimum 14.38mm thick laminated glass, with full perimeter acoustically rated seals;<br>OR<br>Double glazing consisting of one pane of minimum 5mm thick glass and one pane of minimum 6mm thick glass with at least 44mm air gap, and full perimeter acoustically rated seals                                                                                                                                                                                                                                                                                                                                                      |
|                                          | 35<br>(where total area of glazing for a habitable room is less than or equal to 1.8m <sup>2</sup> ) | Minimum 10.38mm thick laminated glass, with full perimeter acoustically rated seals.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Component of Buildings External Envelope | Minimum Acoustic Rating ( $R_w$ ) | Acceptable Forms of Construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| External walls                           | 47                                | <p>Two leaves of clay brick masonry at least 110mm thick with:</p> <ul style="list-style-type: none"> <li>(i) cavity not less than 50mm between leaves; and</li> <li>(ii) 50mm thick mineral insulation or 50mm thick glass wool insulation with a density of <math>11\text{kg/m}^3</math> or 50mm thick polyester insulation with a density of <math>20\text{kg/m}^3</math> in the cavity.</li> </ul> <p>OR</p> <p>Two leaves of clay brick masonry at least 110mm thick with:</p> <ul style="list-style-type: none"> <li>(i) cavity not less than 50mm between leaves; and</li> <li>(ii) at least 13mm thick cement render on each face</li> </ul> <p>OR</p> <p>Single leaf of clay brick masonry at least 110mm thick with:</p> <ul style="list-style-type: none"> <li>(i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and</li> <li>(ii) Mineral insulation or glass wool insulation at least 50mm thick with a density of at least <math>11\text{ kg/m}^3</math> positioned between studs; and</li> <li>(iii) One layer of plasterboard at least 13mm thick fixed to outside face of studs.</li> </ul> <p>OR</p> <p>Single leaf of minimum 150mm thick masonry of hollow, dense concrete blocks, with mortar joints laid to prevent moisture bridging.</p> |
| Roof                                     | 41                                | <p>Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling joists, glass wool insulation at least 50mm thick with a density of at least <math>11\text{kg/m}^3</math> or polyester insulation at least 50mm thick with a density of at least <math>20\text{kg/m}^3</math> in the cavity.</p> <p>OR</p> <p>Concrete suspended slab at least 100mm thick.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Floors                                   | 45                                | <p>Concrete slab at least 100mm thick</p> <p>OR</p> <p>Tongued and grooved boards at least 19mm thick with:</p> <ul style="list-style-type: none"> <li>(i) timber joists not less than 175mm x 50mm; and</li> <li>(ii) mineral insulation or glass wool insulation at least 75mm thick with a density of at least <math>11\text{kg/m}^3</math> positioned between joists and laid on plasterboard at least 10mm thick fixed to underside of joists; and</li> <li>(iii) mineral insulation or glass wool insulation at least 25mm thick with a density of at least <math>11\text{kg/m}^3</math> laid over entire floor, including tops of joists before flooring is laid; and</li> <li>(iv) secured to battens at least 75mm x 50mm; and</li> <li>(v) the assembled flooring laid over the joists, but not fixed to them, with battens lying between the joists.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Entry doors                              | 33                                | <p>Fixed so as to overlap the frame or rebate of the frame by not less than 10mm, fitted with full perimeter acoustically rated seals and constructed of -</p> <ul style="list-style-type: none"> <li>(i) solid core, wood, particleboard or blockboard not less than 45mm thick; and/or</li> <li>(ii) acoustically laminated glass not less than 10.38mm thick.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Component of Buildings External Envelope | Minimum Acoustic Rating ( $R_w$ )                                                                    | Acceptable Forms of Construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Noise Category 2</b>                  |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Glazing                                  | 35<br>(where total area of glazing for a habitable room is greater than 1.8m <sup>2</sup> )          | Minimum 10.38mm thick laminated glass, with full perimeter acoustically rated seals.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                          | 32<br>(where total area of glazing for a habitable room is less than or equal to 1.8m <sup>2</sup> ) | Minimum 6.38mm thick laminated glass with full perimeter acoustically rated seals.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| External walls                           | 41                                                                                                   | <p>Two leaves of clay brick masonry at least 110mm thick with cavity not less than 50mm between leaves</p> <p>OR</p> <p>Single leaf of clay brick masonry at least 110mm thick with:</p> <ul style="list-style-type: none"> <li>(i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and</li> <li>(ii) mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m<sup>3</sup> positioned between studs; and</li> <li>(iii) One layer of plasterboard at least 10mm thick fixed to outside face of studs</li> </ul> <p>OR</p> <p>Single leaf of brick masonry at least 110mm thick with at least 13mm thick render on each face</p> <p>OR</p> <p>Concrete brickwork at least 110mm thick</p> <p>OR</p> <p>In-situ concrete at least 100mm thick</p> <p>OR</p> <p>Precast concrete at least 100mm thick and without joints.</p> |
| Roof                                     | 38                                                                                                   | Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity, mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m <sup>3</sup> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Floors                                   | 45                                                                                                   | <p>Concrete slab at least 100mm thick</p> <p>OR</p> <p>Tongued and grooved boards at least 19mm thick with:</p> <ul style="list-style-type: none"> <li>(i) timber joists not less than 175mm x 50mm; and</li> <li>(ii) mineral insulation or glass wool insulation at least 75mm thick with a density of at least 11kg/m<sup>3</sup> positioned between joists and laid on plasterboard at least 10mm thick fixed to underside of joists; and</li> <li>(iii) mineral insulation or glass wool insulation at least 25mm thick with a density of at least 11kg/m<sup>3</sup> laid over entire floor, including tops of joists before flooring is laid; and</li> <li>(iv) secured to battens at least 75mm x 50mm; and</li> <li>(v) the assembled flooring laid over the joists, but not fixed to them, with battens lying between the joists.</li> </ul>                                                                                            |

| Component of Buildings External Envelope                                                   | Minimum Acoustic Rating ( $R_w$ )                                                                    | Acceptable Forms of Construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Entry doors                                                                                | 33                                                                                                   | Fixed so as to overlap the frame or rebate of the frame by not less than 10mm, fitted with full perimeter acoustically rated seals and constructed of -<br>(i) solid core, wood, particleboard or blockboard not less than 45mm thick; and/or<br>(ii) acoustically laminated glass not less than 10.38mm thick.                                                                                                                                                                                   |
| <b>Noise Category 1</b>                                                                    |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Glazing                                                                                    | 27<br>(where total area of glazing for a habitable room is greater than 1.8m <sup>2</sup> )          | Minimum 4mm thick glass with full perimeter acoustically rated seals                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                            | 24<br>(where total area of glazing for a habitable room is less than or equal to 1.8m <sup>2</sup> ) | Minimum 4mm thick glass with standard weather seals                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| External walls                                                                             | 35                                                                                                   | Single leaf of clay brick masonry at least 110mm thick with:<br>(i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and<br>(ii) One layer of plasterboard at least 10mm thick fixed to outside face of studs<br>OR<br>Minimum 6mm thick fibre cement sheeting or weatherboards or plank cladding externally, minimum 90mm deep timber stud or 92mm metal stud, standard plasterboard at least 13mm thick internally. |
| Roof                                                                                       | 35                                                                                                   | Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity.                                                                                                                                                                                                                                                                                                                                                                   |
| Entry doors                                                                                | 28                                                                                                   | Fixed so as to overlap the frame or rebate of the frame, constructed of -<br>(i) Wood, particleboard or blockboard not less than 33mm thick; or<br>(ii) Compressed fibre reinforced sheeting not less than 9mm thick; or<br>(iii) Other suitable material with a mass per unit area not less than 24.4kg/m <sup>2</sup> ; or<br>(iv) Solid core timber door not less than 35mm thick fitted with full perimeter acoustically rated seals.                                                         |
| <b>Noise Category 0</b>                                                                    |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| No additional acoustic treatment required – standard building assessment provisions apply. |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |