TRANCHE 3 DA03 WEST, COBBITTY

Road traffic noise assessment

22 February 2024

Mirvac Homes Pty Ltd C/- The Orion Group

TM504-05F02 Tranche 3 DA03 West Road Traffic Noise Assessment (r1)

Document details

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1 Introduction

Renzo Tonin & Associates was engaged by Mirvac Homes to conduct a road traffic noise assessment for the Development Application ('DA') of the proposed Tranche 3 DA03 West residential subdivision at Cobbitty.

This assessment has been undertaken with reference to the Masterplan drawing prepared by The Orion Group (project no. KF113748, drawing no. SV-16, Rev. 04, dated 11/10/2023). The Masterplan drawing identifies that the proposed Tranche 3 DA03 West subdivision will create 40 new residential lots and associated local road network.

The main sources of noise that potentially impact the proposed residential lots of this subdivision are the road traffic along Cobbitty Road and the future extension of the Charles McIntosh Parkway.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. APPENDIX A contains a glossary of acoustic terms used in this report.

2 Project description

Land zoning maps from the State Environmental Planning Policy South West Growth Centre (2006) (map identification no. SEPP_SRGC_SW_LZN_004_020_20210120) identify that the Tranche 3 DA03 West subdivision is primarily zoned as R1 General Residential, with a small portion at the southern end of the subdivision site (adjacent to Cobbitty Road) being zoned as E4 Environmental Living.

The Tranche 3 DA03 West subdivision will create a total of 40 new residential lots and associated local road network. These residential lots will be bound by:

- Future Road No. 01 to the north;
- Tranche 3 DA01 and DA02b residential subdivisions to the north-east which were previously assessed[1,2] under separate DAs;
- An existing residential premises to the east at 581 Cobbitty Road, Cobbitty which is not part of the Mirvac Homes development;
- Future Road No. 02 which will run along the southern and western sides new residential lots;
- Further to the south is Cobbitty Road;
- Further to the west is a riparian landscape corridor (previously assessed[3] under DA 2023/129/1) and the future extension of the Charles McIntosh Parkway.

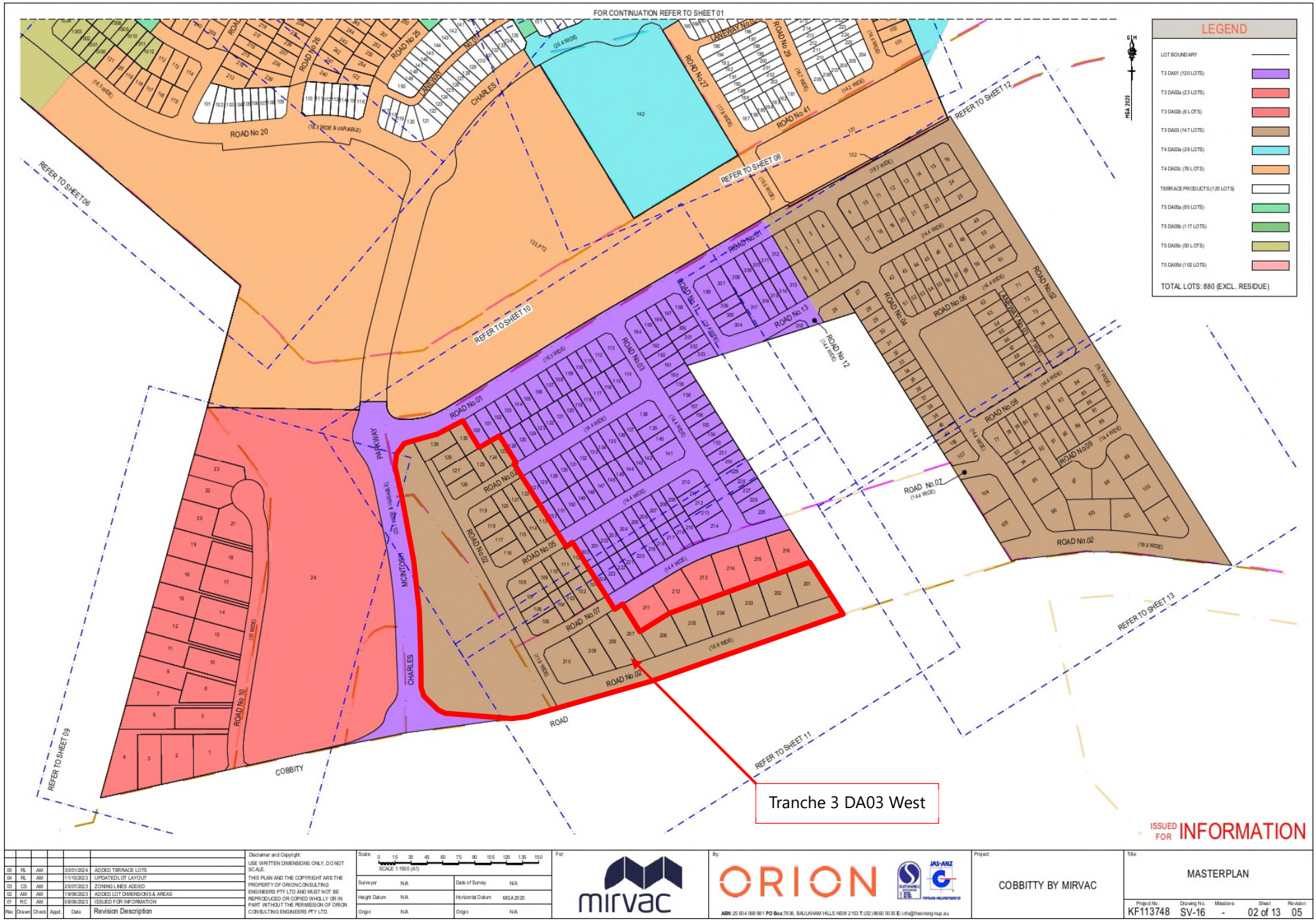
The layout of the Tranche 3 DA03 West subdivision is presented in Figure 1 below.

[1] TM504-01F02 Road traffic noise investigation (r3), Renzo Tonin & Associates, dated 16 March 2022

[2] TM504-03F05 Tranche 3 Southern Lots Road Traffic Noise assessment (r1), Renzo Tonin & Associates, dated 28 June 2023

[3] TM504-04F01 Cobbitty Entry Landscape RFI (r3), Renzo Tonin & Associates, dated 16 June 2023

Figure 1: Proposed subdivision layout



3 Noise criteria

3.1 Oran Park Precinct Development Control Plan 2007

The proposed residential subdivision is within the Oran Park South West Growth Area. The State Environmental Planning Policy South West Growth Centre (2006) ('SEPP') refers to the Oran Park Precinct Development Control Plan 2007 ('DCP').

The DCP aims to reduce potential noise and vibration impacts by identifying the conditions where an acoustic assessment may be required. It also details which policies and guidelines should be used to inform the assessment.

Controls 1 and 2 in Section 6.9 of the DCP addresses road traffic noise and states:

1. *Residential development shall be designed to comply with Council's Environmental Noise Policy that incorporates DECC's Environmental Criteria for Road Traffic Noise. However, for residential developments adjoining sub-arterial and collector roads, where external traffic noise level limits will be exceeded at the facade of the residential premises nearest to the noise source, the development will be deemed to comply with Council's Environmental Noise Policy if:*

    - *The principal private open space area of the residential premises complies with the relevant noise limit, and*

    - *The internal noise levels identified in sub-clause (2) are achieved.*

2. *The internal noise level limits for residential development are:*

    For residential premises impacted by traffic noise from arterial, or sub-arterial roads;

    - *In a naturally ventilated – windows open condition (i.e. windows open up to 5% of the floor area, or attenuated natural ventilation open to 5% of the floor area), or mechanically ventilated windows closed condition:*

Sleeping areas	$L_{Aeq\ 15\ hour,\ Day}$	*40dB*
	$L_{Aeq\ 9\ hour,\ Night}$	*35dB*
Living areas	$L_{Aeq\ 15\ hour,\ Day}$	*45dB*
	$L_{Aeq\ 9\ hour,\ Night}$	*40dB*

    - *Where a naturally ventilated – windows open condition cannot be achieved, it is necessary to incorporate mechanical ventilation complaint with AS1668 and the Building Code of Australia. The noise levels shall be met with mechanical ventilation*

or air-condition systems not operating. The following LAeq noise levels shall not be exceeded when doors and windows are shut and mechanical ventilation or air conditioning is operating:

Sleeping areas	$L_{Aeq\ 15\ hour,\ Day}$	*43dB*
	$L_{Aeq\ 9\ hour,\ Night}$	*38dB*
Living areas	$L_{Aeq\ 15\ hour,\ Day}$	*46dB*
	$L_{Aeq\ 9\ hour,\ Night}$	*43dB*

Note: These levels correspond to the combined measured level of external sources and the ventilation system operating normally.

Acoustic amenity to residential principle private open space (PPOS) areas in Control 1 is addressed in Camden Council's Environmental Noise Policy 2018. This is elaborated in Section 3.2 below.

It is noted that the internal levels in Control 2 of the DCP for the windows closed condition are generally consistent with the noise limits contained within the Department of Planning's 'Development near Rail Corridors and Busy Roads – Interim Guideline', although they allow an additional 3dB for contribution from mechanical ventilation systems.

3.2 Camden Council Environmental Noise Policy 2018

3.2.1 External noise

'Road and Rail Noise' Control 3 in the Camden Council Environmental Noise Policy 2018 addresses acoustic amenity for PPOs areas . Control 3 states:

The principle private open space or an equivalent area of useable open space of a dwelling within a new release area is not to exceed 57dBA LAeq (15hr) from 7am to 10pm.

Note: For clarification purposes, a new release area, includes land mapped as Urban Release Area within the CLEP 2010 and includes Growth Area Precincts that have been rezoned.

For dwellings in areas outside of the new release areas, the principle private open space area is to be attenuated to 55dBA LAeq (15hr) from 1am to 10pm.

Council may consider an increased decibel level where it can be demonstrated that the objectives of this policy are met and the above criteria is not able to be reasonably or feasibly achieved.

Note: The residential noise level criterion includes +2.5dBA allowance for noise reflected from the facade ('facade correction').

As the proposed residential subdivision is located within the Oran Park South West Growth Area, the daytime 57dB(A) criteria applies. It is noted that no criteria are stated for other time periods.

3.2.2 Internal noise

'Road and Rail Noise' Control 2 in the Camden Council Environmental Noise Policy 2018 addresses internal noise criteria for residential dwellings adjacent to an existing or proposed railway line, arterial road, sub-arterial road or collector road. Control 2 states:

> *Both 'residential dwellings' and 'non-residential buildings' must comply with the internal noise criteria in 'Table 3.1' from the 'Department of Planning: Interim Guideline – Development Near Rail Corridors and Busy Roads'.*

Henceforth in this report, the *Development near Rail Corridors and Busy Roads – Interim Guideline* has been utilised to establish applicable internal road traffic noise criteria, as detailed in Section 3.3.

3.3 State Environmental Planning Policy (Transport and Infrastructure) 2021

The NSW State Environmental Planning Policy (Transport and Infrastructure) 2021 commenced on 1 March 2022 and consolidated a number of former state environmental planning policies. The former State Environmental Planning Policy (Infrastructure) 2007 (known as 'ISEPP') has been integrated into "Chapter 2 Infrastructure" of the Transport and Infrastructure SEPP.

Chapter 2 of the Transport and Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across NSW. The aim of the Chapter includes identifying the environmental assessment category into which different types of infrastructure and services development fall and identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure.

Pertinent to noise assessment, the Transport and Infrastructure SEPP includes the following sections:

> *2.120 Impact of road noise or vibration on non-road development*
>
> *1. This section applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of TfNSW) and that the consent authority considers is likely to be adversely affected by road noise or vibration:*
>
> *a. Residential accommodation,*
>
> *b. a place of public worship,*
>
> *c. a hospital,*
>
> *d. an educational establishment or centre-based child care facility.*

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

3. *If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:*

    a. *in any bedroom in the residential accommodation - 35 dB(A) at any time between 10 pm and 7am,*

    b. *anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway) - 40 dB(A) at any time.*

    c. *(3A) Subsection (3) does not apply to a building to which State Environmental Planning Policy (Housing) 2021, Chapter 3, Part 7 applies.*

4. *In this section, "freeway", "tollway" and "transitway" have the same meanings as they have in the Roads Act 1993.*

3.3.1 Department of Planning publication 'Development near rail corridors and busy roads – Interim guideline'

To support the ISEPP (which is now consolidated into the Transport and Infrastructure SEPP), the NSW Department of Planning released the *Development near Rail Corridors and Busy Roads – Interim Guideline* (December 2008). The Guideline assists in the planning, design and assessment of developments in, or adjacent to, major transport corridors in terms of noise, vibration and air quality. While the Transport and Infrastructure SEPP applies only to roads with an AADT greater than 20,000 vehicles, the guideline is also recommended for other road traffic noise affected sites.

3.3.2 Clarification of Transport and Infrastructure SEPP noise limits

The Guideline clarifies the time period of measurement and assessment. Section 3.4 '*What Noise and Vibration Concepts are Relevant*' and Table 3.1 of Section 3.6.1 confirms that noise assessment is based over the following time periods:

- Daytime 7:00am - 10:00pm $L_{Aeq(15hr)}$
- Night-time 10:00pm - 7:00am $L_{Aeq(9hr)}$

The noise criteria nominated in the Transport and Infrastructure SEPP apply to internal noise levels with windows and doors closed. However as the preliminary noise assessment is based on predictions at external locations, equivalent external noise criteria has been established. The equivalent external noise criterion is used to determine which areas of the development may require acoustic treatment in order to meet the internal noise requirements of the Transport and Infrastructure SEPP. The equivalent external goals have been determined on the following basis:

- The Guideline states: "*If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia*." The internal criteria with windows open is therefore 10dB(A) above the criteria explicitly outlined in the Transport and Infrastructure SEPP.
- The generally accepted noise reduction through an open window from a free-field external position is 10dB(A). Windows/doors are assumed to be open no more than 5% of room floor area, in accordance with the Building Code of Australia (BCA) ventilation requirements.

Table 3-1 presents the Transport and Infrastructure SEPP internal noise criteria along with the equivalent external noise criteria for residential premises.

Table 3-1: Transport and Infrastructure SEPP noise criteria for new residential development

Room	Location	$L_{Aeq,\ 15hr}$ Day 7am – 10pm	$L_{Aeq\ 9hr}$ Night 10pm – 7am
Living rooms*	Internal, windows closed	40	40
	Internal, windows open	50	50
	External free-field (allowing windows to remain open)^	60	60
Bedrooms*	Internal, windows closed	40	35
	Internal, windows open	50	45
	External free-field (allowing windows to remain open)^	60	55

Notes: * Requisite for 20,000AADT Roads only under Transport and Infrastructure SEPP 2021.

^ Guideline states that where internal noise criteria are exceeded by more than 10dB(A) with windows open mechanical ventilation is required. External goals have been calculated on the basis of nominal 10dB(A) reduction through an open window to a free-field position. Windows open to 5% of floor area in accordance with the BCA 2011 requirements.

4 Road traffic noise assessment

4.1 Traffic flow and composition

To conduct an acoustic assessment for the site, traffic flows along Cobbitty Road and the future extension of Charles McIntosh Parkway are required.

Peak hour traffic flows along Cobbitty Road were obtained from SCT Consulting ('SCT'). Based on traffic modelling for The Northern Road upgrade Environmental Impact Statement which forecasts traffic to Year 2036, SCT have determined the section of Cobbitty Road in proximity to Charles McIntosh Parkway (i.e. immediately to the south of the subject subdivision development) could carry up to 600 vehicles per hour in each direction during the peak hours.

With respect to the future extension of Charles McIntosh Parkway (to the west of the subject subdivision development), the Year 2036 forecast from The Northern Road upgrade Environmental Impact Statement predicts worst-case AM peak hour traffic volumes of 853 southbound vehicles (towards Cobbitty Road) and 594 northbound vehicles (from Cobbitty Road). We are advised by SCT that Charles McIntosh Parkway is a sub-arterial road and that the previous traffic modelling is still relevant (ie. no change to the forecasted traffic volumes).

To determine the daytime (15 hour) and night-time (9 hour) road traffic noise source levels, the following traffic distributions are assumed:

- Peak hour traffic volumes are 10% of the 24hr volume;
- The 15hr daytime volumes is 85% of the 24h volumes;
- Percentage of heavy vehicles in the traffic mix is 5%.

From the peak traffic volumes by SCT and the assumptions described above, Table 4-1 presents the calculated day and night-time traffic volumes which have been used for the acoustic assessment. These traffic volumes are consistent with previous assessment conducted by Renzo Tonin & Associates for other residential subdivision DAs in Cobbitty. It is noted that variation in the actual traffic volume, in particular heavy vehicle percentages, will affect the traffic noise exposure. A sensitivity assessment could be undertaken during the detailed design phase of the development to further refine the predicted traffic noise exposure.

Table 4-1: Traffic volumes and compositions

Road	Direction	Day (7am – 10pm)	Night (10pm – 7am)	% Heavy vehicles[1]	Speed, km/h
		15hr volume	9hr volume		
Cobbitty Road	Eastbound	5100	900	5	80[2]
	Westbound	5100	900		
	Northbound	5049	591	5	60[3]

Road	Direction	Day (7am – 10pm)	Night (10pm – 7am)	% Heavy vehicles[1]	Speed, km/h
		15hr volume	9hr volume		
Charles McIntosh Parkway	Southbound	7251	1280		

Notes: 1. Assumed heavy vehicle percentage
2. Posted speed limit
3. Assumed vehicle speed

While both the day and night-time road traffic noise criteria are to be satisfied, the daytime noise criteria are more likely to be exceeded in a developed residential area which corresponds to the assumed distribution of traffic over a 24-hour period. Night-time road traffic noise levels would only create a greater impact than the daytime period in situations where the night-time traffic has a significantly higher mix of heavy vehicles than the day.

4.2 Road noise prediction model

Noise predictions are based on a method developed by the United Kingdom Department of Environment titled 'Calculation of Road Traffic Noise (1988)' and known as the CoRTN (1988) method. This method has been adapted to Australian conditions and extensively tested by the Australian Road Research Board and as a result, it is recognised and accepted by the Environment Protection Authority. The model predicts noise levels for steady flowing traffic and noise from high truck exhausts is also taken into account.

The CoRTN algorithms are contained within the CadnaA noise modelling software which has been used to calculate traffic noise levels at receivers. A summary of the noise model input parameters is detailed in Table 4-2.

Table 4-2: Summary of modelling inputs

Parameters	Inputs
Traffic volumes and mix	Day and night volumes determined from peak traffic data obtained from SCT Consulting and set out in Table 4-1
Vehicle speed	• Cobbitty Road – 80km/h (posted speed limit) • Future extension of Charles McIntosh Parkway – 60km/h (assumed)
Ground topography/gradient of roadways	1m digital elevation models from NSW Spatial Services
Source height	Noise emission distributed over three source heights as detailed within CoRTN: • 0.5m for light vehicle exhaust, engine and tyre noise, and heavy vehicle tyre noise • 1.5m for heavy vehicle engines • 3.6m for heavy vehicle exhausts
Ground absorption	0.5
Receiver heights	• 1.5m above ground level for ground floor level receivers • 4.5m above ground level for first floor level receivers

Parameters	Inputs
Road surface	Assumed to be dense graded asphalt (ie. no acoustic corrections applied)

4.3 Noise modelling assumptions

The following assumptions were adopted for the noise modelling:

- Each building is assumed to be a two-storey building with a height of 6m above the natural ground level.
- Residential floor areas and window sizes are assumed to not exceed those outlined in Appendix B of the Department of Planning 'Development near Rail Corridors and Busy roads – Interim Guideline'.

4.4 Noise modelling results

Noise predictions have been calculated for both the day and night-time periods with respect to the ground and first floor level facades of the future residential dwellings within the subdivision development.

To provide examples of the noise prediction results, APPENDIX B shows coloured noise contour maps of the daytime traffic noise levels across the subdivision site (from Cobbitty Road and Charles McIntosh Parkway). The noise contours have been presented at elevations of 1.5m and 4.5m above ground level to represent ground and first floor level receivers respectively.

The results of the noise modelling were used to calculate the internal noise levels within the future dwellings, based on standard building design assumptions contained in Appendix B of the Department of Planning 'Development near Rail Corridors and Busy Roads – Interim Guideline'.

For facades that are exposed to traffic noise levels above the external Transport and Infrastructure SEPP noise criteria, appropriate design of the building envelope (eg. external walls, doors and windows) will be required to satisfy the internal noise criteria.

4.5 Building treatments

APPENDIX C presents indicative acoustic treatment categories that would be required to meet the Transport and Infrastructure SEPP criteria inside the future residential dwellings. The results assume no acoustic shielding from fences along the boundaries of the future residential dwellings as a conservative approach.

Typical construction details for each treatment category are provided in Table 5-1. These construction details are broadly in line with the standard measures recommended in Appendix C of the 'Development near Rail Corridors and Busy Roads – Interim Guideline'.

4.6 Mechanical ventilation

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

To meet this requirement the following buildings will require mechanical ventilation to allow windows to remain closed if so desired by the resident:

- Habitable rooms along the southern facade of Lots 201 - 210 which face Cobbitty Road
- Habitable rooms along the western facade of Lot 129 which face the future extension of Charles McIntosh Parkway

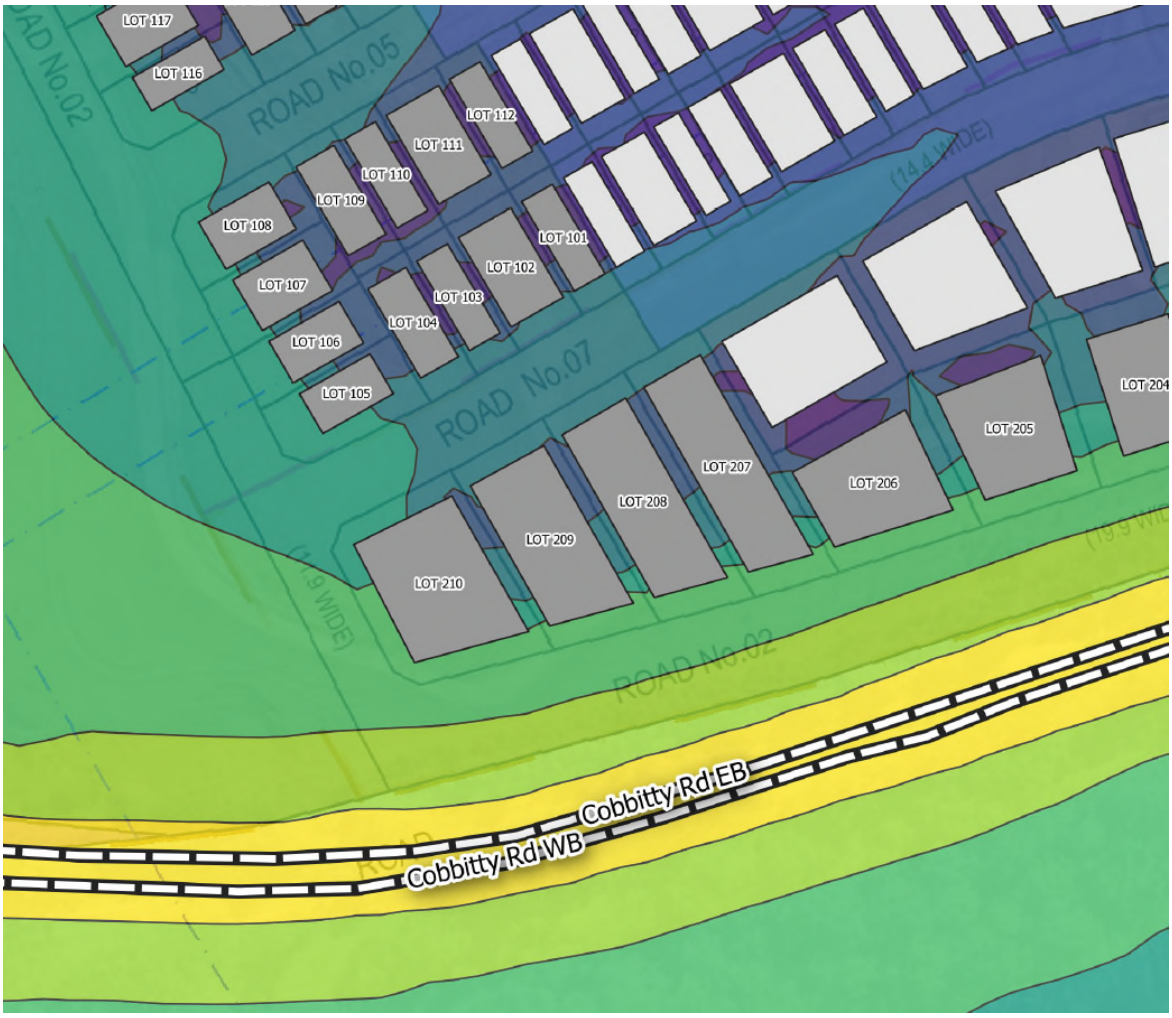
For these buildings where mechanical ventilation is required, consideration should be given when designing mechanical ventilation to ensure the cumulative noise level of mechanical ventilation and road traffic inside the dwelling complies with the requirements of the Oran Park Precinct Development Control Plan 2007 (as discussed in Section 3.13.2.2 of this report). Consideration should also be given when designing mechanical ventilation to ensure that it does not provide a new noise leakage path into the dwelling and does not create a nuisance to neighbouring residential premises.

4.7 PPOS

In general, acoustic amenity to PPOS areas are dependent on the orientation of future dwellings. Assuming that the PPOS areas are located at the rear of the residential lots, the ground level noise contours in APPENDIX B show predicted traffic noise levels in the PPOS areas that are less than 50dB(A) and satisfy the 57dB(A) external noise criterion due to acoustic shielding by the future dwellings.

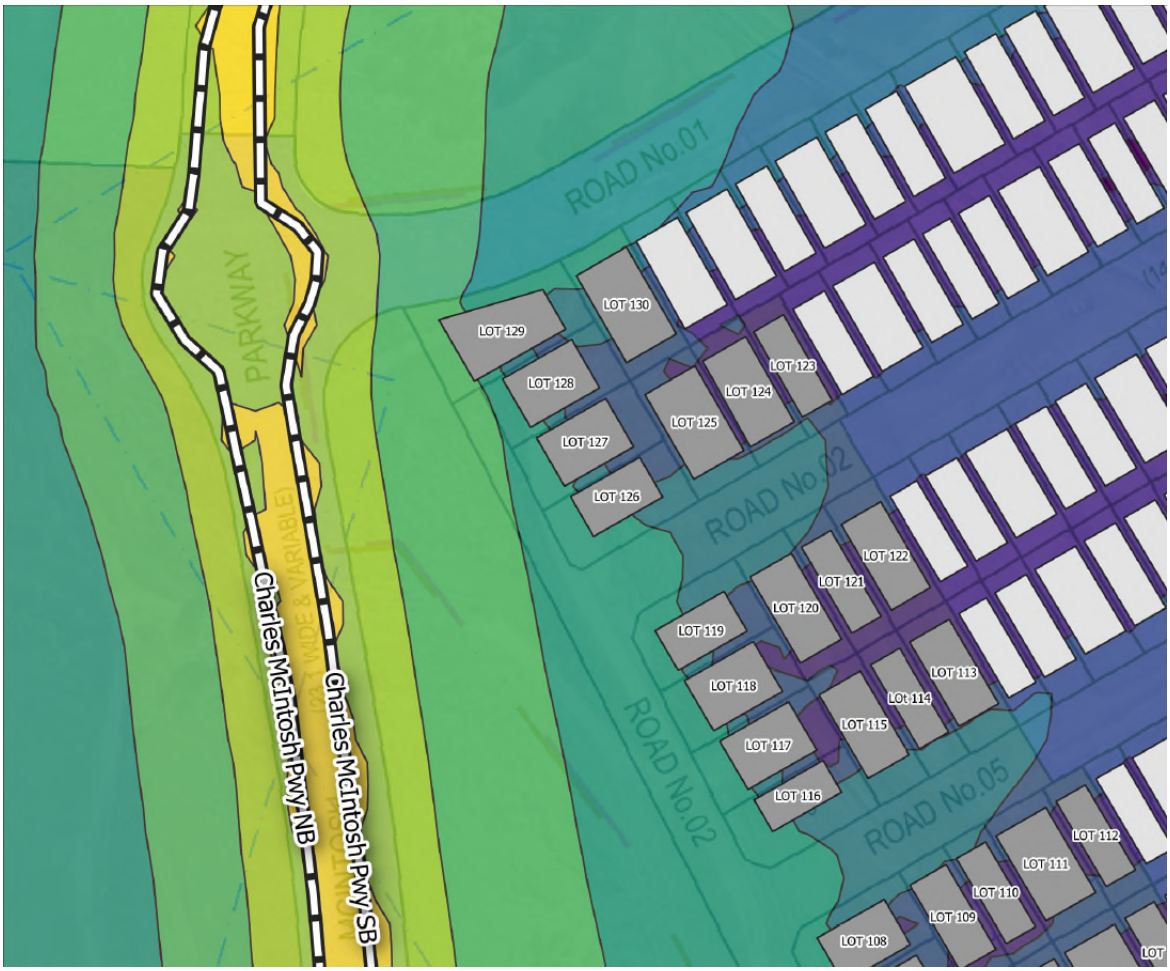
With respect to Lots 207 – 210 (see Figure 2), we assume that the future residential dwellings will be located towards the southern end of the lot to provide a consistent streetscape with Lots 201 – 206 along Future Road No. 02. Therefore, this assessment considers the PPOS areas for Lots 207 – 210 to be located at the northern end of the lot where external noise levels are less than the 57dB(A) noise criterion without any requirement for acoustic fencing along the lot boundaries.

Figure 2: Extract of ground level noise contours (Lots 207-210)



With respect to Lot 129 (see Figure 3), it is assumed that the future residential dwelling will be located towards the western end of the lot due to the potential for an attached garage/carport which is accessed via Future Road No. 02 (at the south-western corner of the lot). Therefore, this assessment considers the PPOS area for Lot 129 to be located at the eastern end of the lot where external noise levels are less than 50dB(A) without any requirement for acoustic fencing along the lot boundaries.

Figure 3: Extract of ground level noise contours (Lot 129)



5 Conclusion

Renzo Tonin & Associates has completed an assessment of potential noise impacts to the proposed Tranche 3 DA03 West residential subdivision at Cobbitty. Road traffic noise from Cobbitty Road and the future extension of Charles McIntosh Parkway has been considered. The report has been prepared in accordance with the requirements of Camden Council and the NSW Transport and Infrastructure SEPP.

The results of the noise modelling identify that:

- Exceedances of the external Transport and Infrastructure SEPP criteria are predicted at some facades of residential dwellings exposed and/or in close proximity to Cobbitty Road and Charles McIntosh Parkway.
- For facades that are subject to traffic noise levels above the external Transport and Infrastructure SEPP criteria, indicative acoustic facade treatments have been recommended to meet the internal noise level criteria. The affected facades and indicative facade treatment recommendations are provided in APPENDIX C.
- Residential dwelling requiring mechanical ventilation to satisfy the Interim Guideline requirements have been identified in Section 4.6. For these dwellings, it is important to ensure that:
    - The cumulative noise level of mechanical ventilation and traffic noise inside the dwelling complies with the Oran Park Precinct Development Control Plan (discussed in Section 3.1) of this report).
    - The mechanical ventilation does not create a new noise leakage path for the external traffic noise to enter the dwelling.
    - The noise emission of mechanical ventilation does not create a noise nuisance to neighbouring residential premises.

APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (particularly wind and temperature inversions) occurring at a site for a significant period of time. In the NSW INP this occurs when wind occurs for more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of nights in winter.		
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.		
Assessment period	The time period in which an assessment is made. e.g. Day 7am-10pm & Night 10pm-7am.		
Assessment Point	A location at which a noise or vibration measurement is taken or estimated.		
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the LA90 noise level if measured as an overall level or an L90 noise level when measured in octave or third-octave bands.		
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of common sounds in our environment:		
	threshold of hearing	0 dB	The faintest sound we can hear, defined as 20 micro Pascal
		10 dB	Human breathing
	almost silent	20 dB	
		30 dB	Quiet bedroom or in a quiet national park location
	generally quiet	40 dB	Library
		50 dB	Typical office space or ambience in the city at night
	moderately loud	60 dB	CBD mall at lunch time
		70 dB	The sound of a car passing on the street
	loud	80 dB	Loud music played at home
		90 dB	The sound of a truck passing on the street
	very loud	100 dB	Indoor rock band concert
		110 dB	Operating a chainsaw or jackhammer
	extremely loud	120 dB	Jet plane take-off at 100m away
	threshold of pain	130 dB	
		140 dB	Military jet take-off at 25m away
dB(A)	A-weighted decibel. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter is denoted as dB(A). Practically all noise is measured using the A filter.		

dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies. The dB(C) level is not widely used but has some applications.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L10	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L90	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
LAeq or Leq	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time, which would produce the same energy as a fluctuating sound level. When A-weighted, this is written as the LAeq.
Lmax	The maximum sound pressure level measured over a given period. When A-weighted, this is usually written as the LAmax.
Lmin	The minimum sound pressure level measured over a given period. When A-weighted, this is usually written as the LAmin.
Reflection	Sound wave reflected from a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy by conversion to thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 pico watt.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone referenced to 20 mico Pascal.
Tonal Noise	Sound containing a prominent frequency and characterised by a definite pitch.

APPENDIX B Noise modelling results

Plot Date: 14/02/24 - 16:13 Layout: Gen Appendix Template - Day ground noise contour

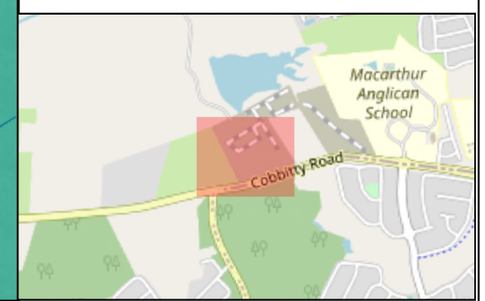
GIS File: R:\AssocSydProjects\TM501-TM550\TM504 ds 531 Cobbitty Rd. Cobbitty\Task 5 - T3 DA03\5 Calcs\01 GIS\TM504-05 Presentation (r1).qgz

LEGEND

Noise contours - dB(A)

- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- > 70

- Tranche 3 DA03 West buildings
- Other buildings in subdivision development
- Existing buildings
- Roads



REV	BY	DATE	DESCRIPTION	APPROVER
r0	CC	14/02/24	Prepare figures	..

A3 Original

Co-ordinate System: GDA94 / MGA zone 56

0 19 38 57 76 95 114 m

At A3 1:1,500

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

mirvac

ACOUSTIC CONSULTANT

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Tranche 3 DA03 West, Cobbitty residential subdivision

LAeq(15 hour) daytime traffic noise contours - 1.5m above ground level

Plot Date: 14/02/24 - 16:17 Layout: Gen Appendix Template - Day Level 1 noise contour

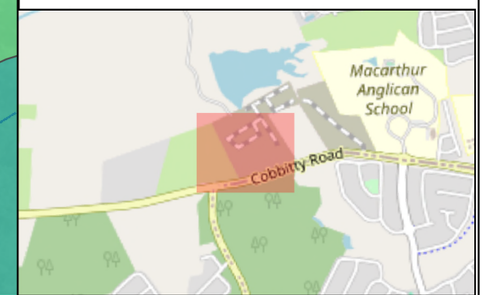
GIS File: R:\AssocSydProjects\TM501-TM550\TM504 ds 531 Cobbitty Rd, Cobbitty\Task 5 - T3 DA03\5 Calcs\01 GIS\TM504-05 Presentation (r1).qgz

LEGEND

Noise contours - dB(A)

- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- > 70

- Trance 3 DA03 West buildings
- Other buildings in subdivision development
- Existing buildings
- Roads



REV	BY	DATE	DESCRIPTION	APPROVER
r0	CC	14/02/24	Prepare figures	..

A3 Original

Co-ordinate System: GDA94 / MGA zone 56

0 19 38 57 76 95 114 m

At A3 1:1,500

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

mirvac

ACOUSTIC CONSULTANT

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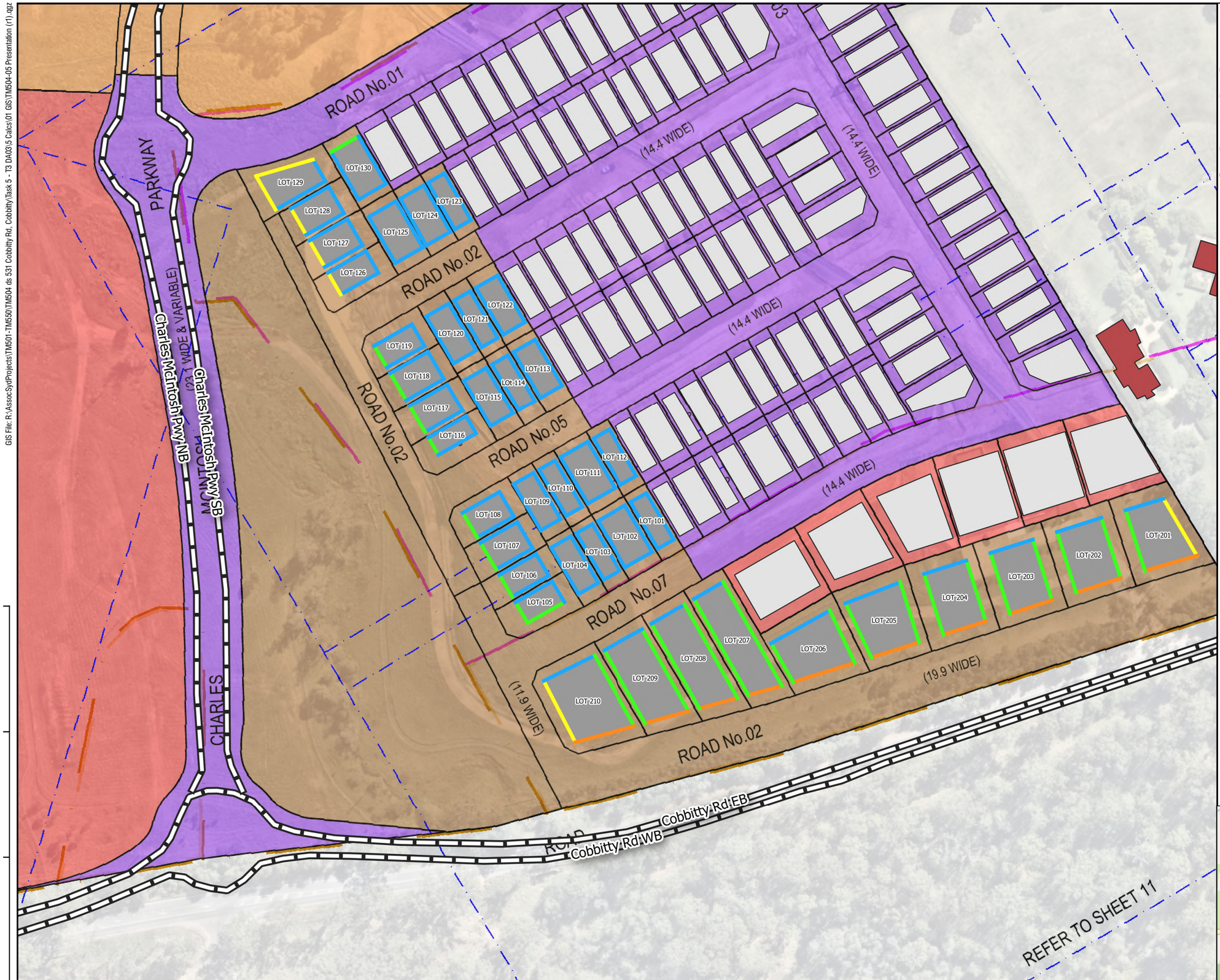
Tranche 3 DA03 West, Cobbitty residential subdivision

LAeq(15 hour) daytime traffic noise contours - 4.5m above ground level

APPENDIX C Building treatment recommendations

Plot Date: 14/02/24 - 16:24 Layout: Gen Appendix Template - Ground categories

GIS File: R:\AssocSydProjects\TM501-TM550\TM504 ds 531 Cobbitty Rd, Cobbitty\Task 5 - T3 DA03\5 Calcs\01 GIS\TM504-05 Presentation (r1).qgz

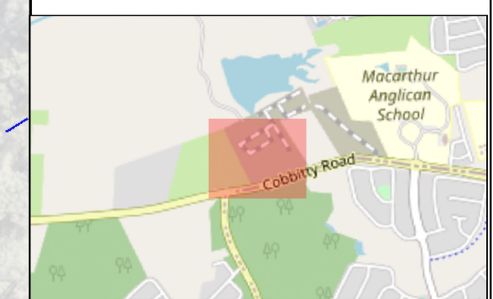


LEGEND

Facade treatment categories

- N/A
- Cat. 1
- Cat. 2
- Cat. 3
- Cat. 4

- Tranche 3 DA03 West buildings
- Other buildings in subdivision development
- Existing buildings
- Roads



REV	BY	DATE	DESCRIPTION	APPROVER
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r0	CC	14/02/24	Prepare figures	..

0 19 38 57 76 95 114 m

At A3 1:1,500

N

FULL SIZE A3

A3 Original

Co-ordinate System: GDA94 / MGA zone 56

NOTE: Do not scale from this drawing.

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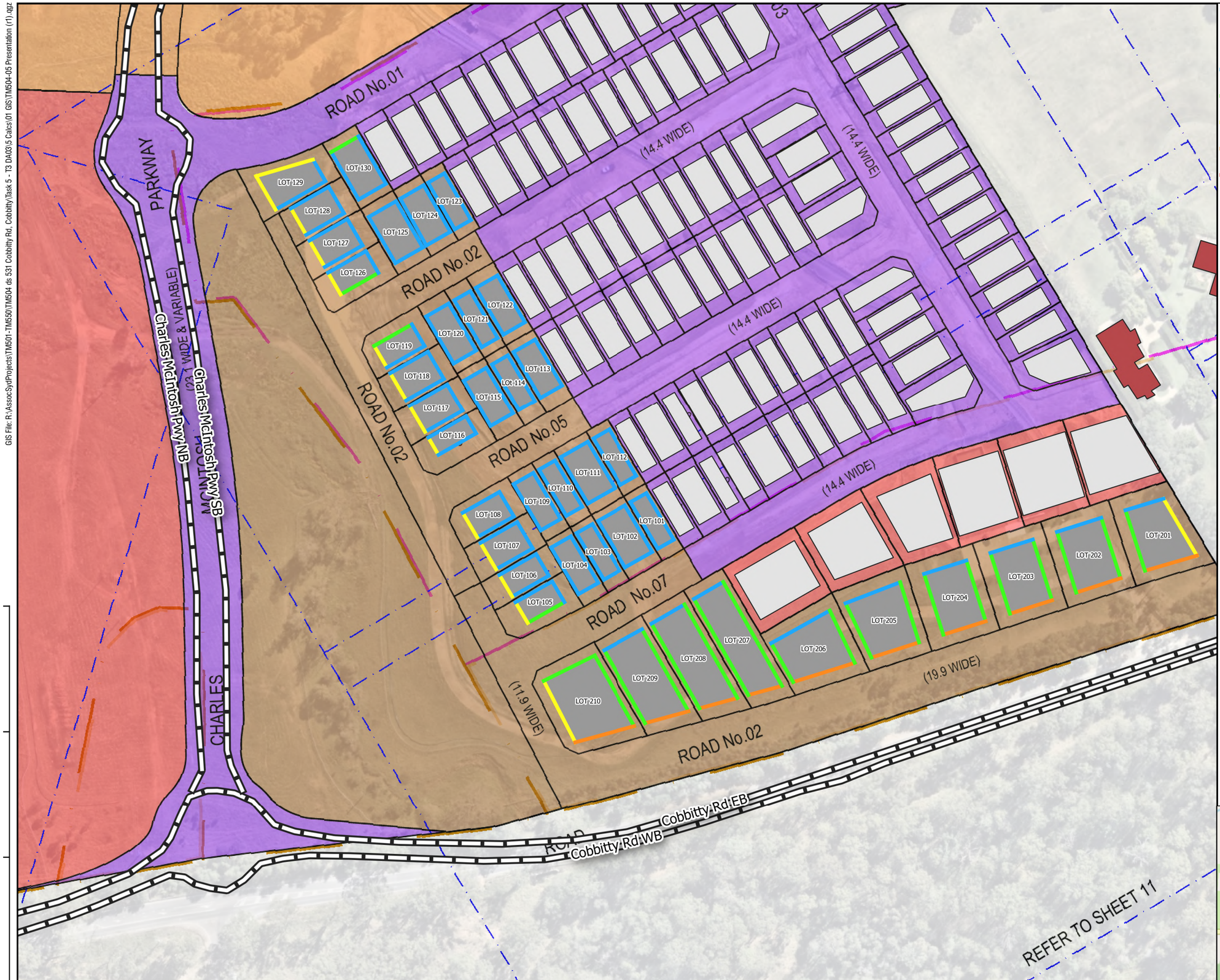
Tranche 3 DA03 West, Cobbitty residential subdivision

Ground floor level facade treatment recommendations

Plot Date: 14/02/24 - 16:28 Layout: Gen Appendix Template - Level 1 categories

GIS File: R:\AssocSydProjects\TM501-TM550\TM504 ds 531 Cobbitty Rd, Cobbitty\Task 5 - T3 DA03\5 Calcs\01 GIS\TM504-05 Presentation (r1).qgz

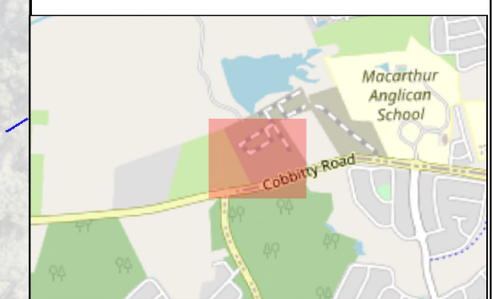


LEGEND

Facade treatment categories

- N/A
- Cat. 1
- Cat. 2
- Cat. 3
- Cat. 4

- Tranche 3 DA03 West buildings
- Other buildings in subdivision development
- Existing buildings
- Roads



REV	BY	DATE	DESCRIPTION	APPROVER
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..	..	..	..	..
r0	CC	14/02/24	Prepare figures	..

A3 Original

Co-ordinate System: GDA94 / MGA zone 56

0 19 38 57 76 95 114 m

At A3 1:1,500

FULL SIZE A3

NOTE: Do not scale from this drawing.

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Tranche 3 DA03 West, Cobbitty residential subdivision

First floor level facade treatment recommendations

Table 5-1: Treatment categories

Category No.	Building Element	Required Acoustic Rating of Building Element, Rw	Construction Recommendation		
1	Windows / Sliding Doors	24+	Openable with minimum 4mm monolithic glass and standard weather seals		
	Facade	38+	Cladding Construction: 9mm fibre cement sheeting or weatherboards or plank cladding externally, 90mm timber stud, R2 insulation batts in wall cavity, 10mm standard plasterboard internally.	Brick Veneer Construction: 110mm brick, 90mm timber stud, minimum 40mm clearance between masonry and stud frame, R2 insulation batts in wall cavity, 10mm standard plasterboard internally.	Cavity Brick Construction: 2 leaves of 110mm brickwork separated by 50mm gap.
	Roof	40+	Pitched concrete or terracotta tile or metal sheet roof, 10mm plasterboard ceiling fixed to ceiling joists, bulk insulation in roof cavity.		
	Door	28+	35mm solid core timber door fitted with full perimeter acoustic seals		
2	Windows / Sliding Doors	27+	Openable with minimum 6mm monolithic glass and full perimeter acoustic seals		
	Facade	45+	Cladding Construction: 9mm fibre cement sheeting or weatherboards or plank cladding externally, 90mm timber stud, R2 insulation batts in wall cavity, 10mm standard plasterboard internally.	Brick Veneer Construction: 110mm brick, 90mm timber stud, minimum 40mm clearance between masonry and stud frame, R2 insulation batts in wall cavity, 10mm standard plasterboard internally.	Cavity Brick Construction: 2 leaves of 110mm brickwork separated by 50mm gap.
	Roof	43+	Pitched concrete or terracotta tile or metal sheet roof, 10mm plasterboard ceiling fixed to ceiling joists, bulk insulation in roof cavity.		
	Door	30+	40mm solid core timber door fitted with full perimeter acoustic seals		
3	Windows / Sliding Doors	32+	Openable with minimum 6.38mm laminated glass and full perimeter acoustic seals		
	Facade	52+	Brick Veneer Construction: 110mm brick, 90mm timber stud, minimum 40mm clearance between masonry and stud frame, R2 insulation batts in wall cavity, 10mm standard plasterboard internally.		Cavity Brick Construction: 2 leaves of 110mm brickwork separated by 50mm gap.
	Roof	48+	Pitched concrete or terracotta tile or sheet metal roof, 1 layer of 13mm sound-rated plasterboard fixed to ceiling joists, bulk insulation in roof cavity.		
	Door	33+	45mm solid core timber door fitted with full perimeter acoustic seals		
4	Windows / Sliding Doors	35+	Openable with minimum 10.38mm laminated glass and full perimeter acoustic seals		

Category No.	Building Element	Required Acoustic Rating of Building Element, Rw	Construction Recommendation	
	Facade	55+	Brick Veneer Construction: 110mm brick, 90mm timber stud, minimum 40mm clearance between masonry and stud frame, R2 insulation batts in wall cavity, 10mm standard plasterboard internally.	Cavity Brick Construction: 2 leaves of 110mm brickwork separated by 50mm gap.
	Roof	52+	Pitched concrete or terracotta tile or sheet metal, 2 layers of 13mm sound-rated plasterboard fixed to ceiling joists, bulk insulation in roof cavity.	
	Door	33+	45mm solid core timber door fitted with full perimeter acoustic seals	

Notes:

- Where a room has different category recommendations on two or more facades, the roof recommendation for the highest category applies.
- Any wall, roof or ceiling penetrations shall be acoustically sealed so as not to reduce the acoustic performance of the element.
- The acoustic performance of glazed doors should be in accordance with the window glazing requirement of the applicable category.
- Development Near Rail Corridors and Busy Roads – Interim Guideline recommends solid core timber doors of 45mm thickness for treatment categories 3 and 4. To align with current industry construction methods, solid core door recommendations have been limited to no more than 40mm thickness.

The required acoustic rating is for the entire system. For example, for windows this includes the glass, frame and seals including the perimeter seal at the wall junction.

By way of explanation, the Sound Insulation Rating Rw is a measure of the noise reduction property of the glazing assembly, a higher rating implying a higher sound reduction performance.

Note that the Rw rating of systems measured as built on site (R'w Field Test) may be up to 5 points lower than the laboratory result.

The client is advised not to commence detailing or otherwise commit to systems which have not been tested in an approved laboratory or for which an opinion only is available. Testing of systems and assemblies is a component of the quality control of the design process and should be viewed as a priority because there is no guarantee the forecast results will be achieved. No responsibility is taken for use of or reliance upon untested systems, estimates or opinions. The advice provided here is in respect of acoustics only.

The advice provided here is in respect of acoustics only. Supplementary professional advice may need to be sought in respect of fire ratings, structural design, buildability, fitness for purpose and the like.

NOTES FOR GLAZING CONSTRUCTIONS:

All openable glass windows and doors shall incorporate full perimeter acoustic seals equivalent to Q-Lon, which enable the Rw rating performance of the glazing to not be reduced.

The above glazing thicknesses should be considered the minimum thicknesses to achieve acoustical ratings. Greater glazing thicknesses may be required for structural loading, wind loading etc.

GENERAL

The sealing of all gaps in acoustic rated glazing assemblies and facades is critical in a sound rated construction. Use only sealer approved by the acoustic consultant.

Check design of all junction details with acoustic consultant prior to construction.

Check the necessity for HOLD POINTS with the acoustic consultant to ensure that all building details have been correctly interpreted and constructed.

The information provided in this table is subject to modification and review without notice.

The advice provided here is in respect of acoustics only. Supplementary professional advice may need to be sought in respect of fire ratings, structural design, buildability, fitness for purpose and the like.