DA ACOUSTIC REPORT - SUBDIVISION

Lot 6, DP229296, Garfield Road East Subdivision

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1.0 INTRODUCTION

PKA has been commissioned to provide an acoustic report as part of the DA documentation to be submitted to the Blacktown City Council.

The purpose of this report is to estimate the potential noise impacts from road traffic from the future predicted activity on Garfield Road East provide acoustic recommendations for future residential development of the subdivision.

2.0 SUMMARY

An acoustic assessment has been conducted in accordance with the acoustic requirements of Blacktown City DCP acoustic requirements and the Department of Planning's "*Developments Near Rail Corridors and Busy Roads-Interim Guidelines*" to assess the traffic noise intrusion.

Based on the noise study and predictions detailed in acoustic report prepared by Renzo Tonin & Associates titled *"NSW Department of Planning and Infrastructure, TG584-01F02 (R6) Riverstone East – Noise and Odour"* dated 24th March 2015 and considering the required internal noise levels the outer envelope of the building has been checked and a glazing schedule has been determined.

Providing our recommendations detailed in Section 5.2 are implemented, the proposed subdivision development will comply with the acoustic requirements of Blacktown City Council.

3.0 SITE DESCRIPTION

The proposed residential subdivision is at Lot 6 (DP229296), Garfield Road East, Riverstone. The site is bound by Clarke Street to the west and Garfield Road East to the north. The site is potentially affected by traffic on the road to the north based on future predicted traffic volumes.

The site location is shown in Figure 3-1.

Figure 3-1 Site Location

4.0 NOISE CRITERIA

4.1 Blacktown City Council DCP

It appears that the Blacktown City Council DCP *(Table4-7)* requires an assessment to meet the noise criteria for residential premises impacted by traffic noise.

Table 4-7: Noise criteria for residential premises impacted by traffic noise

	Sleeping areas	Living areas
Naturally ventilated/ windows open to 5% of the floor area (Mechanical ventilation or air conditioning systems not operating)	LAeq 15 hours (day): 40dBA LAeq 9 hour (night): 35dBA	LAeq 15 hours (day): 45dBA LAeq 9 hour (night): 40dBA
Doors and windows shut (Mechanical ventilation or air conditioning systems are operating)	LAeq 15 hours (day): 43dBA LAeq 9 hour (night): 38dBA	LAeq 15 hours (day): 46dBA LAeq 9 hour (night): 43dBA

This is similar to the NSW *"State Environmental Planning Policy (Infrastructure) 2007"* which sets guidelines for internal noise levels in residential developments.

4.2 State Environmental Planning Policy (Infrastructure) 2007

The developments located next to major roads or train lines are generally assessed against the acoustic requirements of Department of Planning document "*Developments near rail corridors and busy roads- Interim Guidelines".* The acoustic requirements support specific rail and road provisions of the State Environmental Planning Policy (Infrastructure SEPP) 2007 which considers residential sites adjacent to roads with AADTs more than 40,000 and may also be applied for best practice for sites with AADTs exceeding 20,000.

The DoP Interim Guidelines provide noise criteria for the buildings near the major roads and rail corridors as presented in Table 4-1.

Table 4-1 Internal noise goals from DoP guidelines / SEPP Clause 102

Internal Space	Time Period	Internal Noise Level – Windows Closed	Measurement Descriptor
Sleeping areas (bedroom)	Night (10pm to 7am)	35 dB(A)	$L_{eq(9hr)}$ Night
Other habitable rooms (excl. garages, kitchens, bathrooms & hallways)	Day or Night	40 dB(A)	$L_{eq(15hr)}$ Day or $L_{eq(9hr)}$ Night

Section 3.6.1 of the DoP guidelines sets internal noise criteria for residences with windows closed. It also states that:

> *"if internal noise levels with windows or doors open exceed the criteria by more than 10 dB(A), the design of the 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".*

5.0 ASSESSMENT

5.1 Estimated Noise Levels and Assumptions

Noise study and predictions detailed in acoustic report prepared by Renzo Tonin & Associates titled *"NSW Department of Planning and Infrastructure, TG584-01F02 (R6) Riverstone East – Noise and Odour"* dated 24th March 2015 were used in the preparation of this report. To predict the 2027 (10 years hence) traffic volumes, a 2% annual growth rate was applied.

Heavy vehicle flow has been assumed as 5% for Garfield Road East.

The following table presents the future road traffic volumes presented in the report.

Table 5-1 Predicted Future Traffic Volumes on Garfield Road

Road Name	15 Hour Daytime	9 Hour Night Time	AM Peak Hour	PM Peak Hour	Estimated AADT 24-Hour
Garfield Road East	7,488	832	865	870	8,320

The report notes a worst-case traffic flow (pm peak) of 870 vph. Our calculation was performed using the standard Calculation of Road Traffic Noise (CORTN) method using the following parameters for the future Garfield Road East activity:

Peak flow per hour	870 vph
Speed	80 km/hr
% Heavy Vehicles	5%
Gradient	0
Distance from middle of road to lot boundary	20 m
Height of receptor	1.5 m (first Storey window)
Allowance L_{10} to Leq	-2.5 dB(A)

Predicted L_{AEQ} (1-hour peak) at lot boundary: 68 dB(A).

PKA have conducted extensive noise surveys of similar busy roads in the past and based on that, L_{eq15hr} and L_{eq9hr} values were derived while maintaining a conservative approach. In PKA's experience, for busy roads, there is a typical difference of 3dB between the worst L_{eq1hr} and the L_{eq15hr} daytime values. Furthermore, for busy roads, there is typically an additional 3dB difference in the L_{eq9hr} night-time values.

Based on this, PKA is predicting an **$L_{Aeq\text{-}15hr}$ of 65 dB(A)** and an **$L_{Aeq\text{-}9hr}$ of 62 dB(A)** at the ground floor of the residential setback of Stage 2 (without the effect an any additional boundary fences).

This predication is in line with the noise monitoring results presented in report prepared by Renzo Tonin & Associates titled *"NSW Department of Planning and Infrastructure, TG584-01F02 (R6) Riverstone East – Noise and Odour"* dated 24th March 2015.

5.2 Architectural Treatment

The following typical dwelling construction is assumed:

- External walls - double brick or brick veneer
- Roofs - either steel with Anticon or Tiled with sarking
- Ceiling insulation – R3.0 batts
- Ceiling – Plasterboard

Calculation of internal noise levels are based on the following room properties:

Table 5-2 Assumed Room Dimensions

Room Type	Floor Area (m^2)	Ceiling Height (m)	Reverb time (s)	Glazing Area (m^2)
Bedroom	16	2.7	0.6	4
Living	30	2.7	1.0	9

It is recommended and assumed that **boundary fences of a minimum height of 1.8m** will be installed to meet the requirements for outdoor courtyard areas. Side fences generally run along the side boundary from near the front façade of the house to the back boundary fence.

Receiver heights are based on 1.5m for the ground floor and 4.5m for first floor above terrain level.

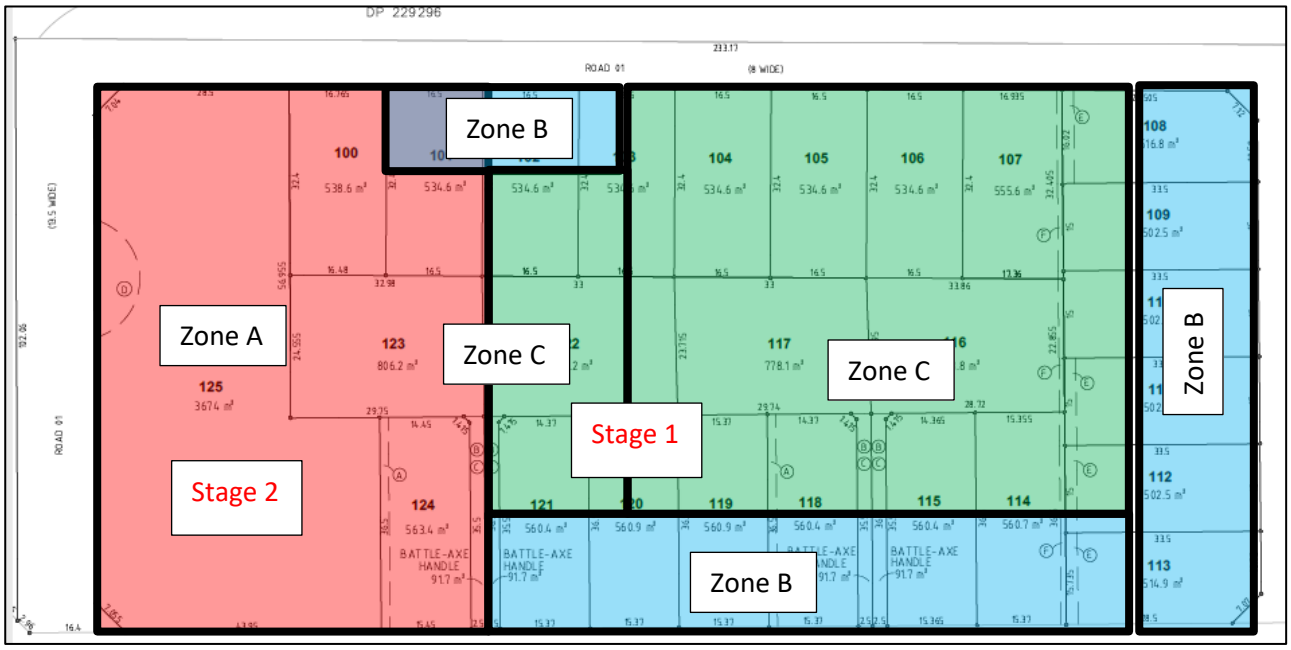
The following figures show the treatment zones. It is PKA's understanding that the development will be split into two stages as shown in the below figure.

Figure 5-1 Development Stages

As Stage 2 is proposed to be developed at a later stage depending on other factors, in the interim, some of the residential areas of Stage 1 will be exposed to the traffic noise resulting in the requirement for acoustic upgrades. However, following the construction of Stage 2, there will be significant shielding in Stage 1 from the updated development in Stage 2.

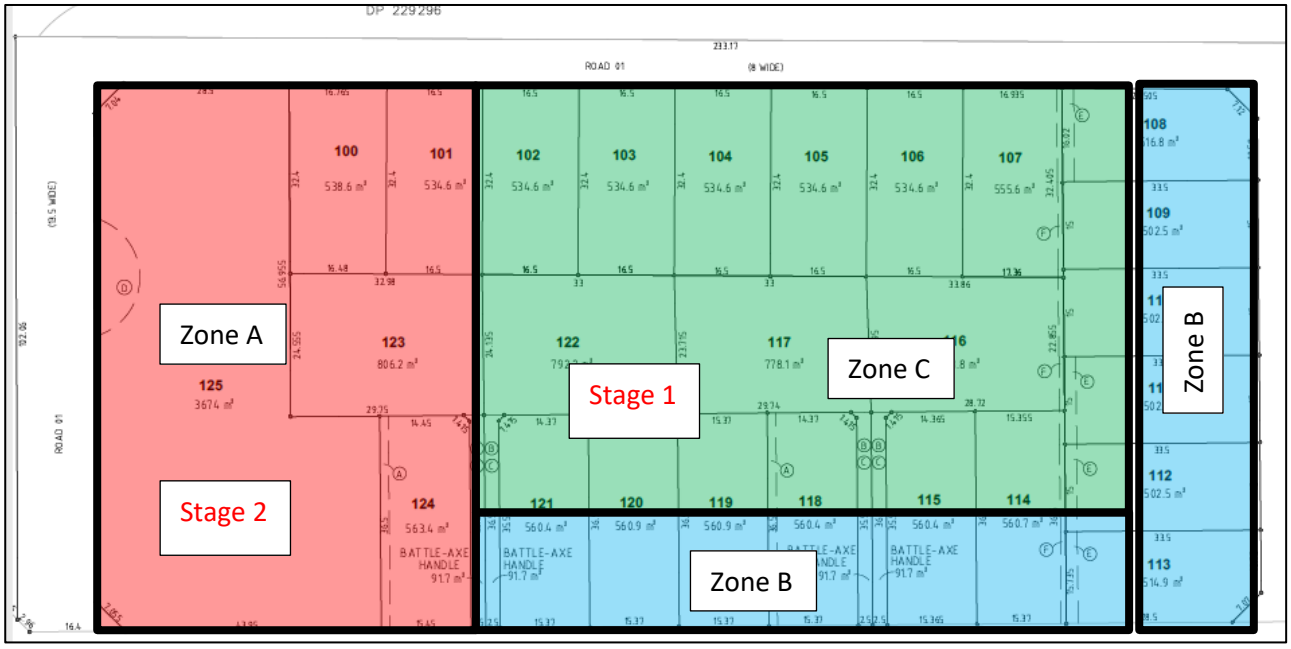
Due to the uncertainty of the timeline, the following two treatment zone options have been presented. Option 1 is considering that both Stage 1 and Stage 2 will be developed simultaneously or closely and considering the effect of shielding from Stage 2.

Figure 5-2 Treatment Type Zones (Option 1 – See notes above)



Option 2 is considering that Stage 1 will be developed first and Stage 2 will happen significantly later.

Figure 5-3 Treatment Type Zones (Option 2 – See notes above)



The relevant option is dependent on the council/certifying authority as to what they deem to be "significantly later".

The recommendations below present the architectural upgrades required for the rooms on each façade and floor of the affected lots.

In addition to the recommended 1.8m boundary fence, the lots fronting Garfield Road East (Zone A) will require acoustic treatment to the building façade and the construction will be required to achieve R_w 45. Zones B & C will require R_w 42 which is achievable through most standard construction that satisfy BASIX requirements for external facades.

These can be achieved with standard brick veneer or brick cavity construction. Where light-weight construction is proposed, the appropriate construction must be used to ensure the above ratings are met.

The roof construction of Lots in Zone A above will have to achieve R_w43. Zone B and Zone C will require R_w40 and can be achieved with standard construction. All entry doors must have a minimum R_w30.

The glazing requirements specified apply to windows, glass doors as well as glass infill within timber doors. The construction requirements for each zone are as follows:

Table 5-3 Glazing Acoustic Treatment

Treatment Zone	Glazing System Requirement
Zone A Ground Floor	R_w28, Min. 4mm glazing for Bedrooms R_w24 for other habitable spaces (Assuming 1.8m boundary fence)
Zone B & C Ground Floor	Standard Glazing assuming 1.8m boundary fence
Zone A First Floor	R_w32, Min. 6mm lam glazing for Bedrooms R_w 28, Min. 5mm glazing for other habitable spaces
Zone B First Floor	R_w28, Min. 4mm glazing for Bedrooms R_w24 for other habitable spaces
Zone C First Floor	Standard Glazing

A **more detailed acoustic assessment** is recommended in a case-by-case basis for the residential premises in Zone A when final architectural plans are available to update the requirements for the updated glazing dimensions and orientation. Alternative ventilation requirements must be checked by the relevant authority for acoustically rated windows as they are required to be closed for acoustic complaince to be achieved.

The window systems must be tested in accordance with the following:

- Appendix A Australian Window Association Industry Code of Practice Window and Door – Method of Acoustic Testing.
- Appendix B AS 1191 Acoustics – Method for laboratory measurement of airborne sound insulation of building elements.

All windows and doors with acoustic requirements **must be fitted with proper acoustic seals** such as **Q-LON** (or equivalent) around the top & bottom sliders, and must be air tight. **Avoid brush seals**. Special attention must be given to the sliding doors & windows to have good quality acoustic seals

all around them. Any airgap will drastically reduce the intended acoustic performance of the glazing.

The entire frame to the glazing must be sealed into the structural opening using acoustic mastics and backer rods. Normal weather proofing details do not necessarily provide the full acoustic insulation potential of the window system. The manufacturers' installation instructions for the correct acoustic sealing of the frame must be followed.

APPENDIX A DRAWINGS USED TO PREPARE REPORT

This report was prepared using drawings provided by Orion Consulting for Lot 6, Garfield Road, Riverstone, Project No. 21-0126.

No.	Rev.	Title	Date
Plan 004 Set No.2	01	Proposed Plan of Subdivision Stage 1	26-07-2021
Plan 005 Set No.2	01	Proposed Plan of Subdivision Stage 2	26-07-2021

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