



29 November 2017

Ref: 171500/7510

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**RE: ACOUSTIC ASSESSMENT 405-415 PACIFIC HIGHWAY, LAKE MUNMORAH**

This letter report presents the results of a noise impact assessment conducted for a multiple lot housing subdivision at 404-415 Pacific Highway, Lake Munmorah. The assessment has been conducted to accompany a gateway approval to Central Coast Council.

The NSW Department of Planning and Environment granted Gateway Approval on 19 February 2015 for the amendment of the (then) Wyong Local Environment Plan (2013) to rezone the subject land for low density residential and environmental protection purposes. This report has been prepared to satisfy a requirement under point 2 of the Determination that a noise impact assessment must be included with any planning proposal pertaining to the subject land.

**AMBIENT NOISE LOGGING**

Ambient noise levels were monitored by Spectrum Acoustics at two locations on the site from 16-20 October 2017. Data was recorded at 15 minute statistical intervals using a Rion NL-42 environmental noise logger. The measurements were conducted in accordance with relevant EPA guidelines and AS 1055-1997 "Acoustics – Description and Measurement of Environmental Noise". The noise logger used complies with the requirements of AS 1259.2-1990 "Acoustics – Sound Level Meters", and has current NATA calibration certification.

The logger was programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period. Calibration of the logger was performed during the instrument's initialisation procedures, with calibration results being within the allowable  $\pm 0.5$  dB(A) range.

**Figure 1** shows the project site and the noise logger locations. Logger N1 was placed in close proximity to the Pacific Highway, approximately in line with the nearest potential residential facade to the road. Logger n2 was located at approximately 250m from the highway.



**Figure 1. Project site and logger locations** (Source: Google Earth).

Ambient  $L_{Aeq}$  and background ( $L_{A90}$ ) noise levels obtained from the loggers are summarised below in **Table 1** and shown graphically in **Appendix A**. Table 1 includes the background ( $L_{90}$ ) levels, the  $L_{eq}$  over the full day (11 hour, 7am-6pm), evening (4 hour, 6pm-10pm) and night (9 hour, 10pm-7am) periods.

TABLE 1 MEASURED AMBIENT NOISE LEVELS 16/10/17 to 20/10/17			
Location	Day	Evening	Night
N1	53 dB(A) $L_{90}$	50 dB(A) $L_{90}$	38 dB(A) $L_{90}$
	67 dB(A) $L_{eq}$ (period)	66 dB(A) $L_{eq}$ (period)	63 dB(A) $L_{eq}$ (period)
N2	48 dB(A) $L_{90}$	47 dB(A) $L_{90}$	36 dB(A) $L_{90}$
	58 dB(A) $L_{eq}$ (period)	57 dB(A) $L_{eq}$ (period)	52 dB(A) $L_{eq}$ (period)

## TRAFFIC NOISE ASSESSMENT

The NSW Road Noise Policy (RNP, 2012), as adopted by the Roads and Maritime Services (RMS) of NSW, recommends various criteria for different road developments and uses. For new residential developments near roads carrying more than 20,000 vehicles per day, the RNP advises that land use

developers must meet internal noise goals in the Infrastructure SEPP (Department of Planning NSW, 2007). The SEPP (2007) is supported by the Department of Planning guideline “Development near Rail Corridors and Busy Roads – Interim Guideline” (2008) which gives the following internal noise level criteria in Section 3.5:

In any bedroom in the building: **35 dB(A), $L_{eq}$**  at any time 10pm – 7am, and

Anywhere else in the building (other than a garage, kitchen, bathroom or hallway): **40dB(A), $L_{eq}$**  at any time.

These criteria originated from the Rail Infrastructure Corporation (RIC) publication “Consideration of Rail Noise and Vibration in the Planning Process” (2003) where it is explicit that the criteria apply with windows and doors closed. The criteria correspond to those in AS/NZS 2107, where the noise is considered to be “quasi-continuous” in nature.

Figure 2 is a reproduction of Figure B2 from the Interim Guideline (2008) showing a typical situation of a dwelling adjacent to a busy road and calculated internal noise levels relative to external noise levels using the UK Calculation of Road Traffic Noise (CoRTN) methodology. Figure 2 shows a traffic noise level of 68 dB(A) at windows W1 and W2 directly facing the road. Windows W3 and W4 are on facades perpendicular to the road, thereby being shielded from 50% of the traffic noise by the building structure, and noise levels are 2-3 dB below the traffic noise level at W1 and W2. Window W5 is approximately twice the distance from the road as W4 and experiences an external traffic noise level 4 dB below the level at W4.

Figure 2 also gives the traffic noise loss for three constriction scenarios labelled A, B and C. The following specifications for these construction scenarios are reproduced from the Guideline. The specification for walls includes insulation in the wall cavity, however brick veneer achieves  $R_w > 45$  without insulation, which will not reduce the overall noise insulation of the room as a whole, since windows are the acoustically weakest elements. Any recommendations regarding the following construction specifications assume no insulation in facade walls.



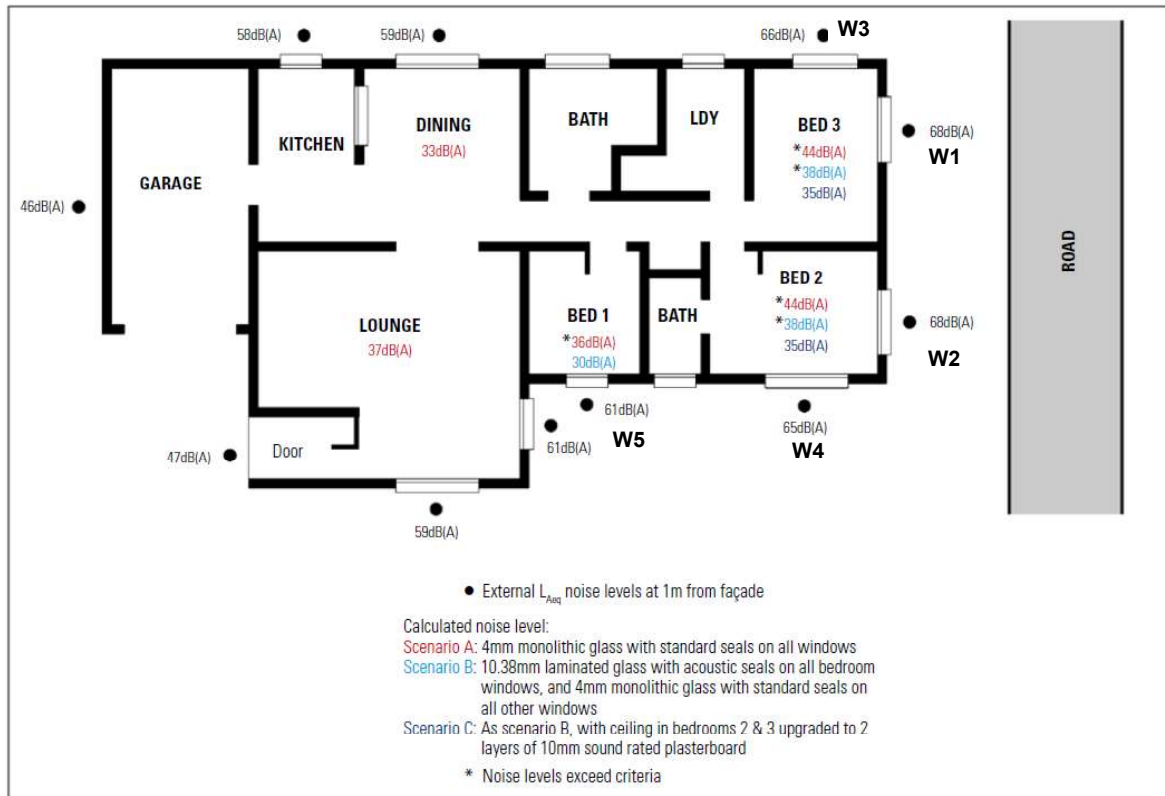


Figure 2. Traffic noise reduction for various construction types.

### Specification A

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

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

### Specification B

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

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

### Specification C

Windows	10.38mm laminated glass with acoustic seals on all bedroom windows, standard 4mm monolithic glass with standard seals on all other windows	(Rw 35)
Doors	30mm solid core timber – lounge room aluminium framed glass sliding door – lounge and dining rooms	(Rw 24)
Walls	brick-veneer and standard plasterboard on timber studs with insulation in cavity	(Rw 52)
Roof	as per Specification B, except the single layer of standard plasterboard ceiling is replaced with a double-layer of 10mm sound-rated plasterboard ceiling	(Rw 52)
Floor	concrete slab	

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

Table 2 summarises the traffic noise reduction provided by each construction scenario for the cases in Figure 2 where a room contains either one or two windows.

TABLE 2 Traffic noise reduction in dB (from Figure B2 of the Interim Guideline (2008))		
Construction scenario	Noise reduction (2 windows)	Noise reduction (1 window)
Scenario A	23	25
Scenario B	29	31
Scenario C	32	34 (estimated)

Between the minimum 23dB reduction for Scenario A and minimum 29dB reduction for Scenario B lies what will be called Scenario A/B in which 23-28 dB traffic noise reduction is required<sup>1</sup>. This will be achieved with the same construction as scenario B except using 6.5mm Vlam Hush (or equivalent) in lieu of the 10.38mm glazing (8.5mm Vlam Hush provides the same acoustic rating as 10.38mm). This conservative measure is based on adopting the 23dB noise reduction for 4mm glass, whether there are one or two windows in the room. **Figure 3** shows a section of the proposed frontage of the subdivision to the Pacific Highway.



**Figure 3. Proposed Lot layout and external (Day / Night) traffic noise levels.**

In the absence of acoustic barriers along proposed southern and western residential boundaries, the limiting external traffic noise levels for Category A (standard) construction according to Table 2 are 63 dB(A) (Day) and 58 dB(A) (Night). These levels occur at Proposed Lot 1, suggesting that no acoustic fencing or upgraded window glazing will be required for this Lot and all Lots at greater distance from the Pacific Highway. This includes Lots 124 – 133 (and all others similarly situated one row back from the Highway) due to the noise shielding effect of dwellings fronting the Highway.

<sup>1</sup> The value of 23dB has been included in the Scenario A/B category as a measure of conservatism.

Dwellings on Lots facing the Pacific Highway (eg, Lots 136 – 148 in Figure 3) will require noise reduction of 27 dB(A) (Day) and 28 dB(A) (Night) in order to achieve the internal noise criteria. The two options for achieving this noise reduction are:

- 6.5mm Vlam Hush (or equivalent) glazing to windows of bedrooms and living rooms of dwellings on Lots nominated as 136 – 155 and 440 – 455. Window suppliers must guarantee an acoustic rating of Rw 32.
- Construct minimum 1.8m acoustic barrier along Pacific Highway frontage of Lots nominated as 136 – 155 and 440 – 455.

Adoption of one of the above recommendations will result in compliance with the internal design noise levels and we advise that the proposal could achieve reasonable acoustic criteria as may be imposed by Council in a development consent.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 49542276.

#### **SPECTRUM ACOUSTICS PTY LIMITED**



**Neil Pennington, MAAS**  
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Principal/Director

# **APPENDIX A**

## **NOISE LOGGER DATA CHARTS**

