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86 THE AVENUE, BANKSTOWN

PROPOSED CHILDCARE CENTRE - DA ACOUSTIC ASSESSMENT

11 July 2024

ENVISION GROUP Pty Ltd

TN562-01F01 86 The Avenue, Bankstown - Proposed Childcare Centre DA Acoustic Assessment (r3)

40 YEARS 1982-2022 ACOUSTIC ENGINEERING EXCELLENCE

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Document details

Detail	Reference
Doc reference:	TN562-01F01 86 The Avenue, Bankstown - Proposed Childcare Centre DA Acoustic Assessment (r3)
Prepared for:	ENVISION GROUP Pty Ltd
Address:	
Attention:	Nicole Kingham

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
30.05.2024	DA Issue		1	S. Khan		Y. Kalkunte
7.06.2024	Minor updates		2	S. Khan		Y. Kalkunte
11.07.2024	Update of architectural drawings		3	S. Khan		Y. Kalkunte

File Path: R:\AssocSydProjects\TN551-TN600\TN562 yk 86 The Avenue, Banklstown\1 Docs\01 Report\TN562-01F01 86 The Avenue, Bankstown - Proposed Childcare Centre DA Acoustic Assessment (r3).docx

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1 Introduction

Renzo Tonin & Associates (RT&A) has been engaged to undertake an assessment of potential noise impacts associated with the proposed childcare centre development at 86 The Avenue, Bankstown (the project). This report forms part of the support documentation being prepared for a new Development Application (DA).

This assessment addresses:

- External noise impacts (surrounding road traffic noise) on the proposed occupied areas of the project and details minimum acoustic recommendations to the building envelope to ensure a suitable level of internal acoustic amenity is provided for future occupants.
- Operational noise emissions associated with the project and the potential impacts on surrounding noise sensitive receivers. Noise emissions will be evaluated against the provisions of Canterbury-Bankstown Council and the NSW Environment Protection Authority (EPA). Where necessary, building and/or noise management recommendations will be detailed to demonstrate compliance with the relevant noise emission objectives.

The work documented in this report was carried out in accordance with RTA's Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. A glossary of acoustic terms used in this report is detailed in APPENDIX A.

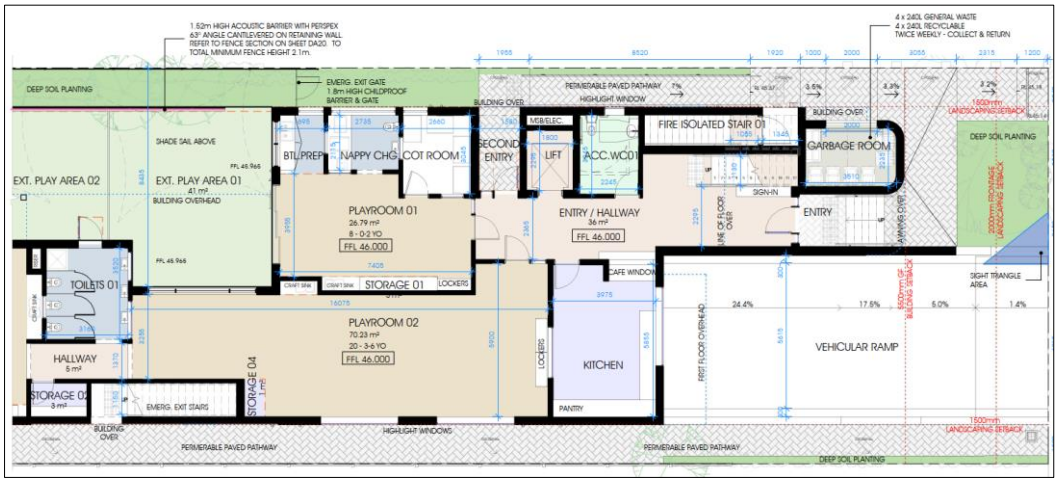
2 Project Overview and Site Description

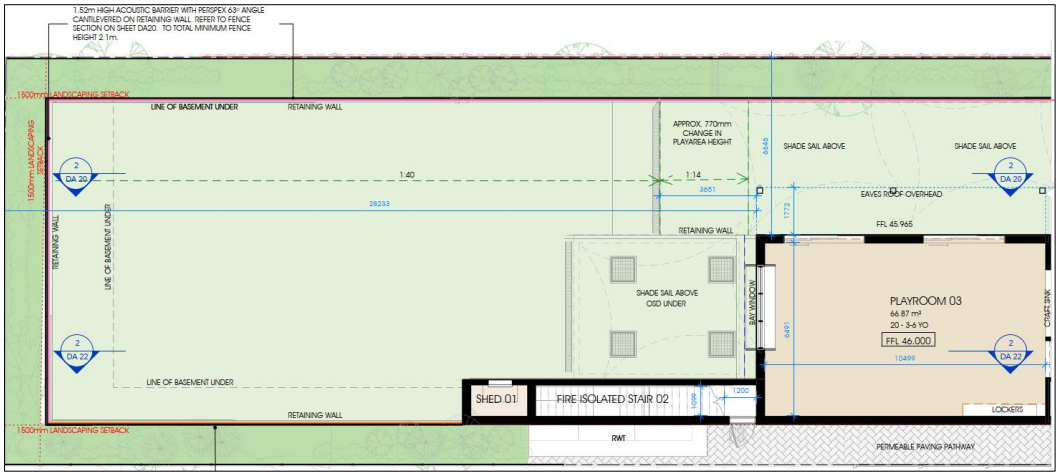
The project site is located at 86 The Avenue, Bankstown (Lot 47, Sec. A, DP110163), within the Canterbury-Bankstown Council local government area (LGA). It is bounded by the Avenue to the east and residential properties to the north, south and east. The site is currently subdivided (see Figure 2-2), with only the eastern half of the site developed with a residential property. The western half of the site is currently vacant/undeveloped. The Avenue is a four-lane local road (two predominant parking lanes) with low volumes of traffic.

It is proposed to demolish the existing residential property on site, to provide a new two-storey childcare centre offering, with basement car parking. The main external play area is proposed to the rear of the new building on ground level, adjacent to the western boundary. In total three (3) indoor playrooms and two (2) external play areas are proposed on ground level with a further playroom and external play area proposed on level 1, as illustrated in. The childcare centre will accommodate up to 68 children and 12 staff, with the age breakdown of children envisages as follows:

- Ages 0-2 years – 8 children
- Ages 2-3 years – 20 children
- Ages 3-6 years – 40 children

GROUND FLOOR PLAN





FIRST FLOOR PLAN

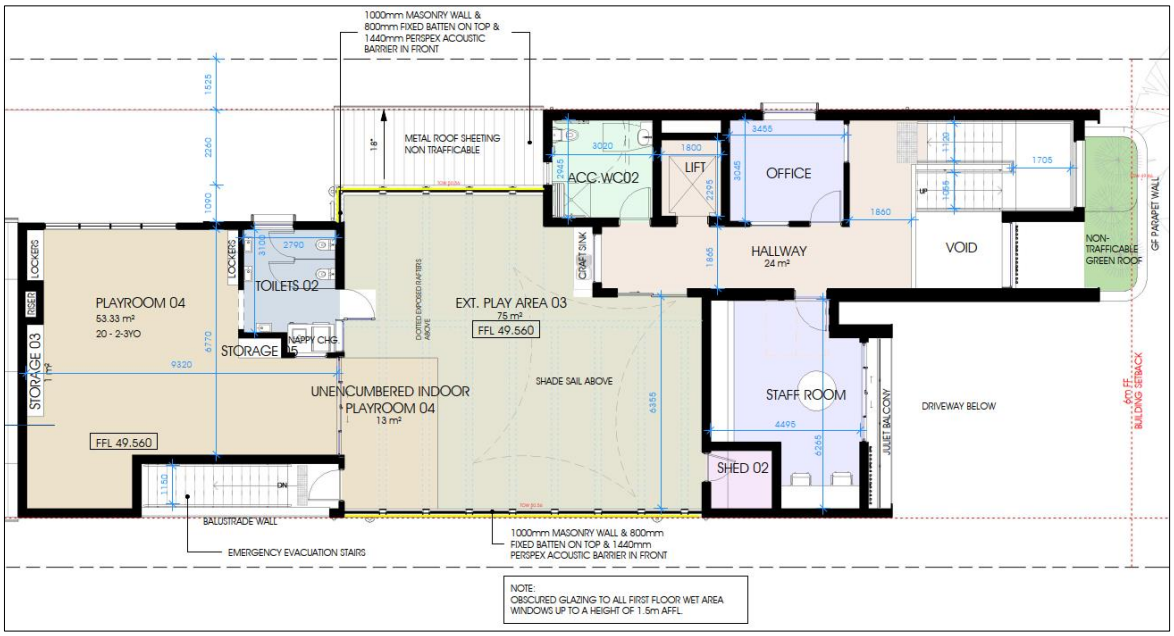


Figure 2-1: Proposed floor plans [6]

A total of 17 parking spaces is proposed in the basement level, with a service bay and turning circle also provisioned for waste collection. Access to the basement carpark is proposed via a new 5.6m wide combine ingress/egress driveway on the south-eastern side of the site's frontage along the Avenue.

The proposed operating hours are 7am-6pm.

2.1 Surrounding Sensitive Receivers and Assessment Locations

All properties in the immediate vicinity of the subject site comprise of residential dwellings. The potentially nearest affected residences are as follows:

- North
  - R1 – Double storey residential dwelling at 82A The Avenue, Bankstown
  - R2 – Double storey residential dwelling at 84 The Avenue, Bankstown
- South
  - R3 – Two (2) single storey dwellings on the same lot at 88 The Avenue, Bankstown. Both dwellings occupy the western half of the lot.
- West
  - R4 – single storey dwelling at 81 Cantrell Street, Yagoona
  - R5 – double-storey residential dwelling at 79-79A Cantrell St, Yagoona
- East
  - R6 – Mix of single and double storey residential properties at 79-83 The Avenue, Bankstown.

Figure 2-2 presents the subject site aerial and assessment locations.

The summary of assessment locations for the operational noise predictions in Section are presented in Table 2-1, and also illustrated in Figure 2-2. These locations have been selected to represent worst-case positions at the receivers.

Table 2-1: Assessment locations

ID	Receiver address	Assessment location	Receiver type
R1	82A The Avenue, Bankstown	First floor window overlooking the subject proposal and ground level external play areas	Residential
R2-A	84 The Avenue, Bankstown	First floor window overlooking the subject proposal and ground level external play areas	Residential
R2-B		Backyard	Residential
R2-C		Level 1 balcony wrapping around corner of east and southern frontage	Residential
R3-A	88 The Avenue, Bankstown	Ground floor window along the northern frontage	Residential
R3-B	88A The Avenue, Bankstown	Ground floor window along the northern frontage	Residential
R4	81 Cantrell St, Yagoona	Backyard	Residential
R5-A	79-79A Cantrell St, Yagoona	First floor window overlooking the subject proposal and ground level external play areas	Residential
R5-B		Backyard	Residential
R6	79-83 The Avenue, Bankstown	At the boundary of residential properties	Residential

Figure 2-2: Site description and assessment locations (source: Nearmap Limited)

3 Existing noise environment

A survey of the existing noise environment at the project site was conducted using both long term unattended noise monitoring and attended short term measurements. Noise measurements are ideally carried out at the nearest or most potentially affected locations surrounding the subject proposal. An alternative, representative location should be established in the case of access restrictions, or a safe and secure location cannot be identified. Furthermore, representative locations may be established in the case of multiple receivers as it is usually impractical to carry out measurements at all locations surrounding a site.

Noise survey location considerations included site topography, contributions from environmental noise sources (road traffic, building services plant and equipment etc.) and representative secure locations for the identified surrounding sensitive receivers (see Section 2.1).

All instruments have current calibration from a NATA accredited laboratory and complies with Australian Standard AS 1259.2-1990 *'Acoustics - Sound Level Meters; Part 2: Integrating – averaging'*.

3.1 Methodology

The noise environment of an area varies over time.

- Relevant time periods for the assessment of road traffic noise impacts are provided in NSW Department of Planning, Housing and Infrastructure (DPHI) publications '*State Environmental Planning Policy (Transport and Infrastructure) 2021'* (Transport and Infrastructure SEPP) [4] and the '*Development Near Rail Corridors and Busy Roads – Interim Guideline*' (DPHI Guideline[1]) [3] and are as follows:
  - Day: 7:00 – 22:00 (15-hour period)
  - Night: 22:00 – 7:00 (9-hour period)
- The NSW Environmental Protection Authority's (EPA) '*Noise Policy for Industry*' (NPfI) [7], outlines standard time periods over which the background noise levels are to be determined, which is as follows:
  - Day: 07:00 – 18:00 Monday to Saturday and 08:00 – 18:00 Sundays & Public Holidays
  - Evening: 18:00 – 22:00 Monday to Sunday & Public Holidays
  - Night: 22:00 – 07:00 Monday to Saturday and 22:00 – 08:00 Sundays & Public Holidays

[1] The Guideline is intended to assist in the planning, design and assessment of development in, or adjacent to, rail corridors and busy roads. It supports specific rail and road provisions of the *State Environmental Planning Policy (Infrastructure) 2007* (abbreviated as Infrastructure SEPP) which was superseded by the Transport and Infrastructure SEPP in April 2022.

3.2 Survey Locations and Instrumentation

3.2.1 Long term noise survey

A Type 2 RTA Technology environmental noise logger was installed along the western boundary of the existing dwelling on site, as illustrated in Figure 2-2. This location was selected to be representative of the existing background noise levels at the surrounding residences potentially overlooking the external play areas and was not impacted by noise from surrounding building services plant/equipment. The survey was conducted from the 3rd to 12th April 2024, with the logger calibrated before and after the survey using a Bruel & Kjaer Type 4231 calibrator. No significant deviation in calibration was noted.

Concurrent weather data during the monitoring period was sourced from the Bureau of Meteorology's Bankstown Airport AWS (-33.92 °S 150.98 °E). This data was analysed, and periods of inclement weather have been highlighted in APPENDIX C (in accordance with guidance provided in the NPfI).

3.2.2 Attended noise measurements

Attended noise measurements were also conducted along the eastern site boundary, to gauge the typical peak period road traffic noise levels. This location is illustrated in Figure 2-2.

Measurements were conducted on two separate occasions – 12th April 2024 (between 5:00pm and 6:00pm) and 15th April 2024 (between 7:30am and 8:30am). A NTI Audio Type XL2 audio and acoustic analyser was used for the measurements, programmed to record using an 'A' frequency weighting, 'F' time weighting, and fitted with an approved windshield. The analyser was calibrated at the start and end of the measurement period, with no significant calibration drift noted.

3.3 Noise Survey Results

Existing road traffic noise levels impacting the project are detailed in Table 3-1. Period representative rating background noise levels (RBLs; L_{A90}) are detailed in Table 3-2, determined in accordance with the procedures of the NPfI.

Table 3-1: Existing road traffic noise levels

Location	Date and Time	Measured Traffic Noise Levels, dB(A)$L_{eq(1hr)}$
The Avenue, approx. 5m from nearside of curb	12th April 2024 (5pm to 6pm)	56
	15th April 2024 (7:30am to 8:30am)	60

Table 3-2: Measured background noise levels

Monitoring location	Rating Background Noise Levels (RBLs), dB(A)$L_{90(period)}$		
	Day (7am-6pm)	Evening (6pm-10pm)	Night (10pm-7am)
Western boundary of existing dwelling on site (see Figure 2-2)	42	42	37

4 Legislative Context

4.1 Canterbury-Bankstown Council

Chapter 10.1 of Council's '*Canterbury-Bankstown Development Control Plan 2023*' (Council DCP) [2] applies to childcare centre type developments. Section 5 of this chapter of the DCP outlines the following relevant development controls related to acoustic privacy:

Acoustic privacy

5.1 Air conditioning, mechanical ventilation or any other continuous noise source must not exceed the ambient level at any specified boundary by more than 5dB(A).

5.2 The location and design of child care facilities must consider the projection of noise from various activities to avoid any adverse impacts on the residential amenity of adjoining land. For the purpose of this clause, Council requires development applications to submit an Acoustic Report prepared by a suitably qualified acoustic consultant to determine:

(a) existing noise levels at the identified sensitive receiver locations;

(b) likely noise levels to emanate from the child care facility at the identified sensitive receiver locations;

(c) whether the development must apply measures to ensure the noise of children playing in outdoor areas does not exceed 10dB(A) above the background noise level;

(d) whether the location and setbacks of the development are sufficient to protect the acoustic privacy of adjacent dwellings;

(e) whether the location of outdoor areas should avoid living areas and bedrooms of adjacent dwellings; and

(f) whether the development must install certain noise attenuation measures to protect the acoustic privacy of adjacent dwellings.

The Acoustic Report must measure the noise readings over a 15 minute period and must provide details of all modelling assumptions including source noise data, noise monitoring positions, receiver heights and locations, prevailing meteorological conditions during the monitoring, confirmation of the methodology adopted along with a copy of the model input and output data.

5.3 The maximum height for noise attenuation walls and fences along the boundary of the site is 2m.

4.2 NSW Government

Chapter 3 of the DPHI Transport and Infrastructure SEPP addresses educational establishments and childcare facilities and was provided to facilitate the effective delivery of educational establishments and early education and care facilities across the State.

Clause 23 of this chapter outlines the following matters for consideration by consent authorities:

Before determining a development application for development for the purpose of a centre-based child care facility, the consent authority must take into consideration any applicable provisions of the Child Care Planning Guideline, in relation to the proposed development.

Therefore, the consent authority must take into consideration the relevant acoustic provisions contained in the DPHI '*Childcare Planning Guideline*' (Childcare Guideline) [4], which are detailed in Section 4.2.1 below.

4.2.1 DPHI Childcare Planning Guideline

The Childcare Guideline provides a consistent state-wide planning and design framework for preparing and considering DAs for centre-based childcare facilities.

Part 3 of this guideline specifies that matters be taken into consideration while designing childcare facilities in NSW, with relevant acoustic items presented below:

- High solid acoustic fencing to shield facility from road traffic noise (C10)
- Orienting the building to ensure visual privacy and minimise potential noise and overlooking on neighbours (C11)
- Screening of mechanical plant and equipment using solid, gap free material, to reduce noise impacts to surrounding residences (C22)
- Provide an acoustic report which contains noise criteria, background noise levels and height of acoustic fences to achieve compliance (C23)
- Provide design solutions to minimise external noise impacts (road, rail, aircraft and industrial sources) on both internal and external areas of the facility (C24)
- Acoustic report identifying appropriate noise levels for sleeping areas and other non-play areas and examine impacts and noise attenuation measures for sites near industry, busy roads, railway or mass transit corridors, and near airports (C25)

Hence relevant criteria for the evaluation of both external noise impacts on and operational noise emissions from the project will be provided in this assessment, in line with the provisions of the Childcare Guideline above. These are discussed in Section 5.1 and 6.1 below.

5 External Noise Impact Assessment (On Children)

5.1 Assessment Criteria

5.1.1 Canterbury-Bankstown Council

Section 5 in Chapter 10.1 of the Council DCP does not provide any guidance on acceptable noise levels for external noise impacts on occupied areas, internal or external.

5.1.2 NSW Government

Condition 2.119 of the DPHI Transport and Infrastructure SEPP outlines the following for impact of road noise on non-road development:

2.119 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 childcare 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 Secretary for the purposes of this section 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 7 am,

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

The DPHI Guideline provides direction for developments that may be impacted by busy roads and the consideration of this guideline is a requirement for development specified under the Transport and Infrastructure SEPP.

However, as map 11D of the *Traffic volume maps for Transport and Infrastructure SEP* [2] does not classify The Avenue as a carriageway carrying more than 20,000 Annual Average Daily Traffic (AADT), hence it is not mandatory or recommended to undertake a noise intrusion assessment for the project.

5.1.3 Association of Australasian Acoustical Consultants

The Association of Australasian Acoustical Consultants (AAAC) guideline '*AAAC Guideline for Child Care Centre Acoustic Assessment*' (AAAC Guideline) [1], is generally referenced by Acoustic Consultants for the evaluation of noise impacts associated with childcare centre proposals.

Section 5 of this guideline addresses external noise impacts to children, with $L_{Aeq,1hr}$ noise level from road traffic at any location within the external play area recommended to not exceed 55 dB(A). For internal areas, noise targets of 35 dB(A) $L_{eq(1hr)}$ and 40 dB(A) $L_{eq(1hr)}$ are recommend for sleeping areas and play/activity rooms respectively, with all façade windows and doors closed.

5.1.4 Recommended road traffic noise design targets

The Avenue is not classified as an arterial road or a carriageway carrying heavy volumes of traffic (i.e. > 20,000 AADT), hence the provisions of DPHI are not mandatory. The Council DCP does not stipulate any acoustic provisions for external noise impact on children.

However, to ensure an acceptable level of acoustic amenity is being achieved for staff and children in the project, the guidance of the AAAC Guideline is recommended. The recommendations of Australian/New Zealand Standard 2107:2016 *'Acoustics - Recommended design sound levels and reverberation times for building interiors'* (AS/NZS 2107:2016) [9] are adopted for administrative areas of the project.

Table 5-1 details the recommended road traffic noise targets for the development.

Table 5-1: Recommended project external noise impact targets (road traffic)

Space	Recommended Noise Target, dB(A)$L_{eq(1hr)}$
Indoor playroom	40
External play area	55
Sleeping areas	35
Private office	40
Staff room	45
Entry/hallway	45

[2] https://roads-waterways.transport.nsw.gov.au/about/environment/reducing-noise/traffic-volume-maps-for-infrastructure-sepp.html

5.2 Recommended Acoustic Treatments (Road Traffic Noise Impacts)

Internal noise levels were calculated based on the road traffic noise level incident on the building façades, spectral characteristics of the external noise, building fabric design (area of building element exposed to noise) and internal area (room) sound absorption characteristics.

The following acoustic treatments are required to achieve compliance with the internal noise goals identified in Table 5-1.

5.2.1 Glazed windows and doors

The minimum glazing specification for the proposed development is detailed in Table 5-2. The installation of façade elements in building openings and the design of window mullions, door frames and perimeter seals, shall not reduce the sound insulation of the overall glazing assembly (i.e. glass, frame and seals) below the nominated R_W values. Key items to note to prevent this include:

- Acoustic seals nominated for all external windows and doors, are required to be fitted with Q-lon type acoustic seals or equivalent rubber bulb acoustic seals. **Mohair of fin type seals are not acceptable for the windows and doors requiring acoustic seals**.
- Perimeter of opening around façade element is acoustically sealed i.e., space between frame (before architraves are installed for windows) and wall structure is sealed with silicone or polyurethane acoustic sealant and foam backing rod.

The glazing specification is indicative only and other constructions that provide the same or better sound insulation performance for the glazing assembly, are also acceptable. The window/door supplier/manufacturer shall provide evidence that the glazing system proposed has been tested in a registered laboratory, with results showing compliance with the minimum listed R_W requirements.

Table 5-2: Recommended minimum façade glazing specification

Level	Space	Minimum Sound Insulation Rating of Glazing Assembly	Indicative Glazing Configuration	Acoustic Seals
Ground	Cot Room	R_w 32	6.38mm laminate	Yes
	Playroom 01, 02 & 03	R_w 30 OR R_w 32 if also used as a sleeping space	6mm (float or toughened) OR 6.38mm laminate	Yes
	All other occupied areas	R_w 30	6mm (float or toughened)	
First	Staff room	R_w 30	6mm (float or toughened)	Yes
	Office	R_w 30	6mm (float or toughened)	Yes
	Playroom 04	R_w 30 OR R_w 32 if also used as a sleeping space	6mm (float or toughened) OR 6.38mm laminate	Yes

Notes:

1. The minimum acoustic performance corresponds to the cumulative performance of the glazing assembly i.e. glass, frame and seals.
2. The minimum glazing specification below is provided for consent/approvals process and shall not be used for construction unless otherwise approved in writing by the acoustic consultant.
3. The glazing specification is preliminary, and a comprehensive assessment shall be conducted prior to Construction Certification.
4. Before committing to any form of construction or committing to any builder, advice should be sought from an acoustic consultant to ensure that adequate provisions are made for any variations which may occur as a result of changes to the form of construction where only an "estimate" is available for the sound insulation properties of recommended materials.
5. The glazing supplier shall ensure that installation techniques will not diminish the R_w performance of the glazing when installed on site.
6. The nominated glazing thicknesses should be considered the minimum thicknesses to achieve acoustical ratings. Greater glazing thicknesses may be required for structural loading, wind loading etc.

5.2.2 External walls

Masonry systems (in-situ concrete, concrete blockwork or similar) will provide adequate sound insulation (in principle, external wall constructions with a sound isolation rating 15dB higher than the recommended glazing specifications, are sufficient to maintain the acoustic performance of the overall facade system) against site road traffic noise and no further upgrade is required for acoustic purposes.

Metal wall cladding is illustrated in the architectural elevations [6]. If the cladding forms part of a light-weight external wall system (i.e. metal cladding fixed to frame with stud wall internal lining), the system shall achieve a minimum acoustic performance of R_w 45. The precise minimum construction of light-weight external wall systems will need to be confirmed by an Acoustic Consultant during subsequent stages of design, as the framing size, insulation and internal lining specification are dependent on proposed cladding material. Typically this will include metal cladding + 150mm frame with 90mm thick 14kg/m^3 density acoustic insulation + 1 x 13mm fire-rated plasterboard internal lining.

There should not be vents on the internal skin of external walls. All penetrations in the internal skin of external walls should be acoustically sealed (i.e. airtight).

5.2.3 Roof and ceiling

The proposed metal deck roof shall achieve a minimum acoustic performance of R_w 43 for playroom 4 and R_w 40 for all other areas. The precise minimum construction of light-weight roof systems will need to be confirmed by an Acoustic Consultant during subsequent stages of design, as the framing/fixing type and spatial constraints will determine if additional treatment is required to the external skin, insulation specification to cavity and internal lining specification. Indicatively for a system comprising of Colorbond roof sheeting, this will include 1 x 13mm fire-rated plasterboard ceiling suspended at least 150mm below the roof sheeting, with cavity packed with 75mm thick 14kg/m^3 density acoustic insulation, to achieve R_w 43 and 1 x 13mm standard plasterboard ceiling to achieve R_w 40.

Ceiling penetrations in all occupied spaces (such as for light fittings etc.) shall be acoustically treated and sealed gap free with a flexible acoustic sealant.

6 Operational Noise Emission Assessment

6.1 Assessment Criteria

6.1.1 Canterbury-Bankstown Council

As discussed in Section 4.1 above, section 5 in Chapter 10.1 of the Council DCP outlines the following relevant development controls related to operational noise emissions:

- Noise from air conditioning, mechanical ventilation or any other continuous sources, must not exceed the ambient level at any specified boundary by more than 5dB(A).
- Noise of children playing in outdoor play areas must not exceed 10dB(A) above the background noise level.

The Council DCP does not detail any provisions for other operational noise sources typically associated with childcare centre facilities, i.e. indoor playrooms and drop off and pick up. The AAAC Guideline is referenced again for guidance.

6.1.2 Association of Australasian Acoustical Consultants

Section 3.2.2 of the AAAC Guideline nominates a cumulative assessment for operational noise impacts associated childcare centre facilities for all noise sources with the exception of activity noise from external play areas. Cumulative noise emissions ($L_{eq,15minutes}$) are recommended to not exceed the background noise level by more than 5 dB at the most affected point on or within any residential property boundary. Noise sources include:

- Activity noise from indoor playrooms
- Mechanical plant and equipment
- Drop off and pick up

6.1.3 EPA Road Noise Policy

For land use developments with the potential to create additional traffic on surrounding road network, noise impacts associated with the additional traffic is assessed with reference to the EPA publication '*Road Noise Policy*' (RNP) [7]. Section 2.3.1 of this policy sets out road traffic noise assessment criteria for affected residential land uses.

As discussed in Section 2, the Avenue will fall under the classification of a local road, with the resulting criteria as follows:

Table 6-1: RNP noise goals for additional traffic generated by the site

Road Category	Type of Project/Land Use	Assessment Criteria, dB(A)	
		Day (7am to 10pm)	Night (10pm to 7am)
Local roads	6. Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq,(1\ hour)}$ 55 (external)	$L_{Aeq,(1\ hour)}$ 50 (external)

6.1.4 Project operational noise emission goals

Table 6-2 outlines the noise goal for surrounding residences for operation noise impacts from use of the external play areas. These noise goals are based on the provisions of Council DCP, i.e. "background+10dB(A)" (see Section 6.1.1).

Table 6-3 outlines noise goals for all other operational noise impacts associated with the project, including additional traffic generation. These noise goals are based on the provisions of AAAC Guideline (see Section 6.1.2; compliance with this provision will also result in compliance with the Council DCP provision for mechanical plant/equipment) and the RNP (see Section 6.1.3).

Table 6-2: Project noise goal for external play areas operations

Receiver	Calculated RBL, dB(A)L_{90}	Noise Goal, dB(A)L_{eq}
Any surrounding residences	42 (7am to 6pm)	52

Table 6-3: Project noise goals for all other operational sources

Receivers	Calculated RBL, dB(A)L_{90}	Noise Goal
Cumulative Impacts from Indoor Playrooms, Mechanical Plant/Equipment & Pick up-Drop off		
Any surrounding residences	42 (7am to 6pm)	47 dB(A)$L_{eq(15min)}$
Additional Traffic Generation		
Any surrounding residences[1]	-	55 dB(A)$L_{eq(15min)}$

Notes:

1. Assessed at 1m from the façade and at a height of 1.5m above ground.

6.2 Operational Noise Emission Predictions

6.2.1 Noise from external play areas

Noise levels from children playing vary widely depending on several factors such as:

- Number of children vocal at any one time and type of voice (normal, raised or shouting)
- Directionality of voice
- Activity that the children are engaged in
- Age of the children
- Distance between the children and the receiver point
- Height of the child (i.e. whether standing or seated)

Section 4.1 of the AAAC Guideline recommends sound power levels (SWLs) for lots of 10 children in an external play setting, based on different age groupings, and are reproduced in Table 6-4.

Table 6-4: AAAC recommended effective SWLs for groups of 10 children playing in an outdoor play area

Number and Age of Children	SWLs, $L_{eq(15min)}$							
	Overall dB(A)	Octave band centre frequency - Hz dB(Z)						
		63	125	250	500	1k	2k	4k	8k
10 children aged 3 to 5 years	87	64	70	75	81	83	80	76	72
10 children aged 2 to 3 years	85	61	67	73	79	81	78	74	70
10 children aged 0 to 2 years	78	54	60	66	72	74	71	67	64

Table 6-5 presents the predicted noise levels during outdoor play and are based on the following:

- The predicted noise levels consider acoustic reflections and shielding from buildings and fences, and attenuation due to distance.
- Assessment location typically includes the first-floor window of residences, as they will overlook the play areas and represent the most affected point. Where relevant, predictions are provided in the backyard of properties on ground level, which is representative of the most affected point within a residential receiver property for single storey dwellings where façade is located considerable distance from the boundary.
- Worst case assumption of all three (3) external play areas in use at the same time, with all 68 children playing in the play areas. Distribution as follows:
  - 8 x 0-2 YO in external play area 1
  - 20 x 2-3 YO in external play area 3
  - 40 x 3-6 YO in external play area 2
- 1.8m high continuous solid fence along the northern, southern, and western site boundaries, as illustrated in Figure 6-1.
- Singl source height of 1m for all age groups of children (recommendation from Section 4.1 of the AAAC Guideline, based upon review of World Health Organization [WHO]).
- Acoustic treatments and management controls detailed in Section 7 are implemented.

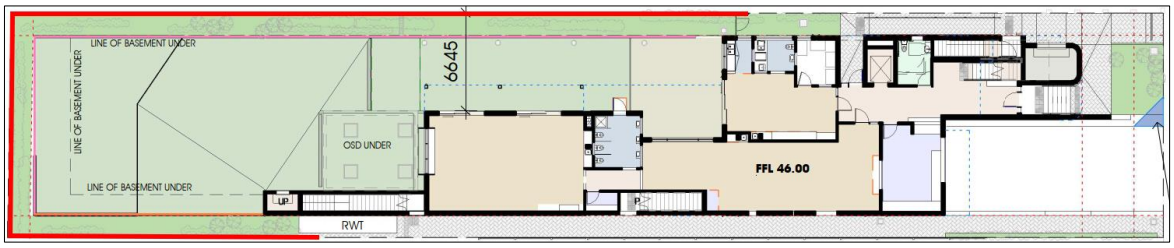


Figure 6-1: Proposed 1.8m lapped and capped timber boundary fence

Table 6-5: Predicted noise levels from outdoor play areas

Receiver	Assessment location	Predicted Noise Level, dB(A)$L_{eq(15min)}$	Noise Goal, dB(A)$L_{eq(15min)}$
82A The Avenue, Bankstown	R1 – First floor window overlooking the subject proposal	up to 50	52
84 The Avenue, Bankstown	R2-A – First floor window overlooking the subject proposal	up to 49	52
	R2-B – Backyard	up to 50	52
88 The Avenue, Bankstown	R3-A – Ground floor window along the northern frontage	up to 46	52
	R3-B – Ground floor window along the northern frontage	up to 51	52
81 Cantrell St, Yagoona	R4 – Backyard	up to 52	52
79-79A Cantrell St, Yagoona	R5-A – First floor window overlooking the subject proposal	up to 52	52
	R5-B – Backyard	up to 51	52

6.2.2 Noise from indoor playrooms, basement carparking (drop off and pick up) and mechanical plant (cumulative)

Table 6-6 presents the predicted cumulative noise levels from all other operational sources associated with the project, based on the following:

- Indoor playrooms
  - Indoor playrooms may operate with windows and doors open or closed. Hence, noise emissions from indoor play and activities are predicted with all proposed sliding doors open, which represents a worst-case scenario.
  - All fixed façade glazing is assumed with at least R_w 30 glazing assemblies, as detailed in Section 5.2.1.
  - Worst case assumption of all 68 children playing in the internal playrooms at the same time, with each playroom attributed a sound pressure level (SPL) of 80dB(A), which is a conservatively high assumed internal SPL in a room with absorptive surface treatments, soft furnishings and toys.
  - during the assessment period. Distribution as follows:
    - 8 x 0-2 YO in playroom 1
    - 20 x 3-6 YO in external playroom 2
    - 20 x 3-6 YO in external playroom 3
    - 20 x 2-3 YO in external playroom 4
- Drop off and pick up
  - All drop off and pick up operations are proposed to occur in the enclose basement carpark.
  - Nosie sources associated with drop off and pick up operations includes engine noise from vehicles arriving/departing (via ramp and driveway), vehicles idling and doors closing. Typical SWLs associated with these sources are assumed as:
    - 76dB(A)L_{eq} for car movements (arriving/departing and manoeuvring)

- 72dB(A)L_{eq} for vehicle idling
- 84dB(A)$L_{eq(1s)}$ for a door slam

– Section 5.1 of the traffic report prepared for the project by Transport Strategies "*86 The Avenue, Bankstown Proposed Child Care Centre Transport and Parking Impact Assessment*" [10], outlines that the centre would generate a maximum of 44 vehicle trips per hour (vtph).

- Conservatively all these trips have been assumed as parents drop off (as this is predicted during the AM peak hour period), with not vehicle trips attributed to staff or deliveries.
- This equates to approx. 11 vehicle trips in a 15-minute period.

- Mechanical plant and equipment
  – Mechanical services design, including details of the proposed equipment selections and specifications are not available at DA stage.
  – A review of operational noise emissions from building services plant is generally conducted during Detailed Design or Construction Certificate stages, to identify contributions to the cumulative operational noise goals.
  – Noise budget for this operational source is detailed in Table 6-7, based on the predicted cumulative noise levels from the indoor playrooms and drop off and pick up operations.

Table 6-6: Predicted cumulative noise levels from indoor playrooms and drop off and pick up operations

Receiver	Assessment location	Predicted Noise Level, dB(A)$L_{eq(15min)}$	Noise Goal, dB(A)$L_{eq(15min)}$
82A The Avenue, Bankstown	R1 – First floor window overlooking the subject proposal and ground level external play areas	45	47
84 The Avenue, Bankstown	R2-A – First floor window overlooking the subject proposal and ground level external play areas	45	47
	R2-B – Backyard	46	47
	R2-C – Level 1 balcony wrapping around corner of east and southern frontage	34	47
88 The Avenue, Bankstown	R3-A – Ground floor window along the northern frontage	<30	47
	R3-B – Ground floor window along the northern frontage	37	47
81 Cantrell St, Yagoona	R4 – Backyard	38	47
79-79A Cantrell St, Yagoona	R5-A – First floor window overlooking the subject proposal and ground level external play areas	43	47
	R5-B – Backyard	38	47
79-83 The Avenue, Bankstown	R6 - At the boundary of residential properties	40	47

Table 6-7: Noise budget for operational noise from mechanical plant

Receiver	Time Period	Mechanical Plant Noise Budget for Cumulative Compliance, dB(A)$L_{eq(15min)}$
82A The Avenue, Bankstown	Proposed centre hours of operation. Day (7am to 6pm)	43
84 The Avenue, Bankstown`		42
88 & 88A The Avenue, Bankstown		47
81 Cantrell St, Yagoona		46
79-79A Cantrell St, Yagoona		44
79-83 The Avenue, Bankstown		46
Any other residence		47

6.2.3 Additional traffic generation

Section 3.4 of the RNP notes that in assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

For traffic noise to increase by more than the permissible 2dB, additional road traffic on the street associated with the project would need to increase by more than 60 percent. The forecasted maximum of 44vtph during the AM peak period (Section 5.1 of the traffic report) is considerably lower than the required 60 percent increase (based on existing traffic conditions in Section 2.4 of the traffic report) and therefore not expected to increase the existing traffic noise levels, with no adverse impacts predicted.

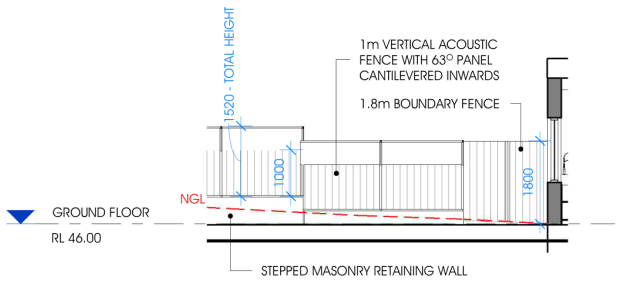
Section 5.3 of the project traffic report [10] also concludes that:

In summary, vehicle movements of this small magnitude (1 vehicle trip every 2 to 3 minutes) will have no perceptible impact on traffic capacity or safety on the road system in the vicinity of the site. This small number would also not present any unsatisfactory traffic-related environmental implications for the local access road system.

Hence, the projected traffic generation associated with the Proposal is expected to be well below the 60 percent increase and therefore not expected to increase the existing traffic noise levels, with no adverse impacts predicted.

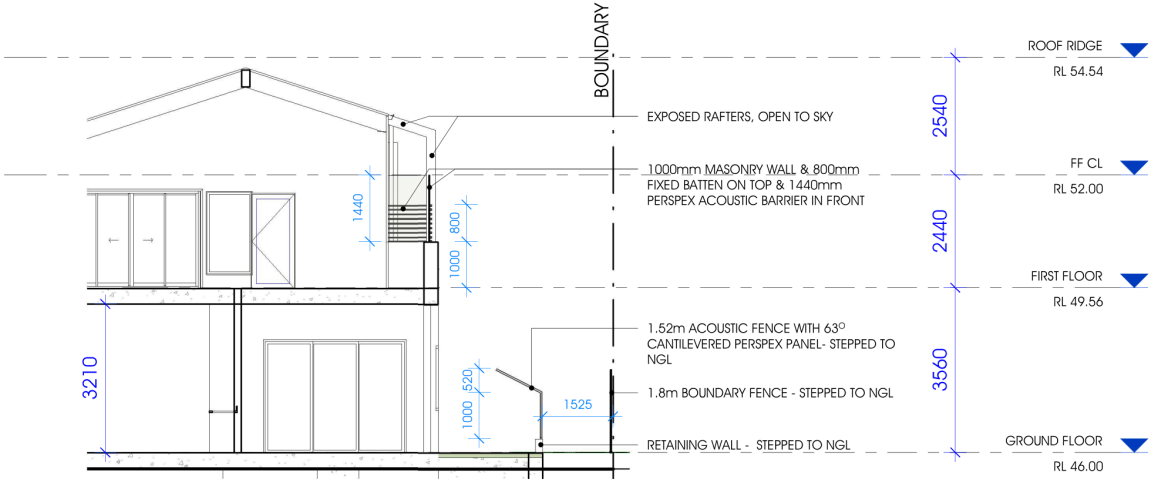
7 Recommendations

- The proposed boundary fence along the northern, southern and western boundaries (as illustrated in Figure 6-1), shall be at least 1.8m above ground level (at any point).
  - The fence shall be constructed from any impervious material such as lapped and capped timber, corrugated sheet steel, a transparent sold material (e.g., glass or 'Perspex'), masonry or a combination of these.
  - They must not contain any acoustically untreated holes or gaps, including beneath the fences at the base.
  - In most cases the minimum surface density of the boundary fence should be 15kg/m^2.
- Additionally acoustic screens are also required around the ground floor external play areas as illustrated in Figure 7-1.
  - The section of screen illustrated in **pink** shall comprise of a 1m high vertical barrier and 1.1m barrier cantilevered inwards towards the play area, at an angle of approx. 63º.
  - The section of screen illustrated in **orange** shall comprise of a 1m high vertical barrier and 1.3m barrier cantilevered inwards towards the play area, at an angle of approx. 51º.
  - The cantilevered screens can be constructed from a transparent sold material (e.g., glass or 'Perspex').
  - They must not contain any acoustically untreated holes or gaps, including beneath the fences at the base and shall have a minimum surface density of at least 15kg/m^2.
- Acoustic screens are also required along the frontages of the first-floor external play area. Perspex screens shall extend at least 1.44m above the masonry wall i.e. to RL 52.00 as illustrated in Figure 7-1 (in **yellow**).
- All façade glazing and light-weight external wall and roof systems shall shall comply with the minimum specifications detailed in 5.2.
  - The proposed sliding doors for the playrooms remain open during indoor play.
  - All doors and windows shall be closed in the event of a music performance.
- A detailed assessment of operational noise emissions from mechanical services plant is to be undertaken by an Acoustic Consultant during subsequent stages of design. Acoustic treatment and management strategies shall be detailed as required, to ensure compliance with the budgets detailed in Table 6-7.
- Signs shall be posted in the basement carpark to turn off engines during idling.



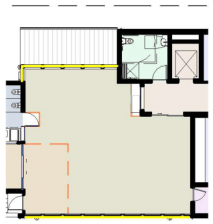
GROUND FLOOR - NORTHERN FENCE DETAIL

SCALE 1 : 100 (A3)



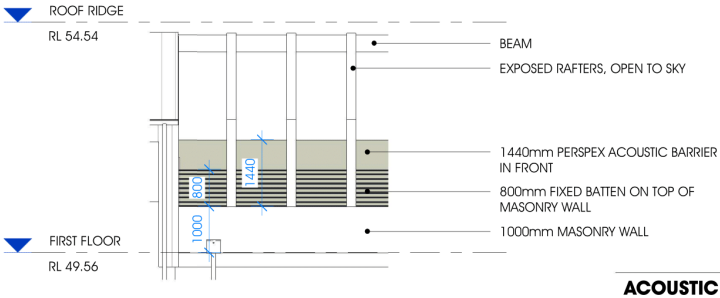
FIRST FLOOR - BARRIER DETAIL & NORTHERN SECTON DETAIL

SCALE 1 : 100 (A3)



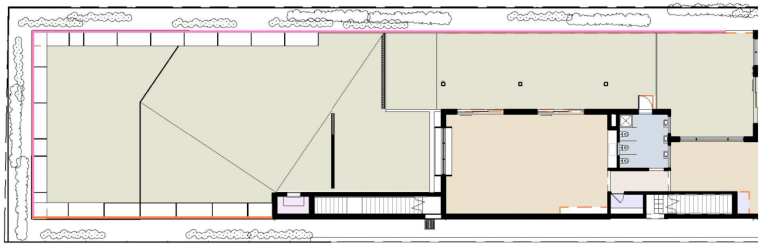
FIRST FLOOR ACOUSTIC FENCE PLAN

SCALE 1 : 300 (A3)



FIRST FLOOR BARRIER DETAIL

SCALE 1 : 100 (A3)



GROUND FLOOR ACOUSTIC FENCE PLAN

SCALE 1 : 300 (A3)

ACOUSTIC RECOMMENDATIONS

- 1.44m HIGH ACOUSTIC BARRIER
- 1.52m HIGH ACOUSTIC BARRIER - 1.0 VERTICAL BARRIER WITH 1.1m CANTILEVERED INWARDS AT 63° ANGLE
- 1.84m HIGH ACOUSTIC BARRIER - 1.0m VERTICAL BARRIER WITH 1.3m CANTILIVERED INWARDS AT 51° ANGLE

PRELIM

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AMENDMENTS: PROJECT NO.: #186

DA 20

ENTITY 8886
PROPOSED CHILDCARE CENTRE
LOT 47, SEC. A, DP110163, 86 THE AVENUE, BANKSTOWN NSW 2200

Figure 7-1: Recommended acoustic screes to external play areas

8 Conclusion

Renzo Tonin & Associates has completed an assessment of noise impacts from the proposed childcare centre development at on 86 The Avenue, Bankstown.

This assessment considered external noise impacts (road traffic noise) to children and staff in the project (external play areas, indoor playrooms, sleeping areas and administration spaces) and operational noise emissions to surrounding residents.

- Reasonable controls can be incorporated into the building envelope design, to ensure a suitable level of internal acoustic amenity is achieved for children and staff. The building, orientation and location of external play areas will also ensure compliance the noise criteria recommended for outdoor play/activity areas. Recommendations are detailed in Section 5.2.
- Operational noise from the project to the potentially most affected residential receiver locations around the site was also assessed and compliance with the noise emission goals can be achieved provided the recommendations in Section 7 are adopted.

As such, the project is suitable from an acoustic viewpoint.

References

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[2] Canterbury-Bankstown Council. (2023). *Canterbury-Bankstown Development Control Plan 2013 – Chapter 10 Other Development; 10.1 Centre-Based Child Care Facilities*. https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-bankstown-development-control-plan-2023.

[3] Department of Planning, Housing and Infrastructure. (2008). *Development Near Rail Corridors and busy Roads – Interim Guideline*. https://www.planning.nsw.gov.au/~/media/Files/DPE/Manuals-and-guides/development-near-rail-corridors-and-busy-roads-interim-guideline-2008.ashx.

[4] Department of Planning, Housing and Infrastructure. (2021a). *Childcare Planning Guideline – Delivering quality child care for NSW (September 2021)*. https://gazette.legislation.nsw.gov.au/so/download.w3p?id=Gazette_2021_2021-501.pdf.

[5] Department of Planning, Housing and Infrastructure. (2021b). *State Environmental Planning Policy (Transport and Infrastructure) 2021*. https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0732.

[6] Envision Group Architects. (2024). *Proposed Childcare Centre – Project Ref No. #186; Entity 8886; Lot 47, Sec. A, DP110163, 86 The Avenue, Bankstown NSW 2200*. Architectural drawings package, revision E, dated 3 July 2024. https://envisiongroup.com.au/.

[7] Environment Protection Authority. (2011). *Road Noise Policy*. https://www.epa.nsw.gov.au/publications/noise/2011236-nsw-road-noise-policy.

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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.

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 period in a day over which assessments are made.
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are 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, when extraneous noise is removed. 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 L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of common sounds in our daytime environment:

threshold of hearing	0 dB	The faintest sound we can hear
	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 decibels. 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 switched on is denoted as dB(A). Practically all noise is measured using the A filter.
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.
L_{90}	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).
L_{Aeq} or L_{eq}	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 L_{Aeq}.

Rw	Weighted Sound Reduction Index A measure of the sound insulation performance of a building element. It is measured in very controlled conditions in a laboratory. The term supersedes the value STC which was used in older versions of the Building Code of Australa. Rw is measured and calculated using the procedure in ISO 717-1. The related field measurement is the DnT,w. The higher the value the better the acoustic performance of the building element.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
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.
Transmission Loss	The sound level difference between one room or area and another, usually of sound transmitted through an intervening partition or wall. Also the vibration level difference between one point and another. For example, if the sound level on one side of a wall is 100dB and 65dB on the other side, it is said that the transmission loss of the wall is 35dB. If the transmission loss is normalised or standardised, it then becomes the Rw or Raw or DnT,w.

APPENDIX B Long-term Noise Monitoring Methodology

B.1 Noise monitoring equipment

A long-term unattended noise monitor consists of a sound level meter housed inside a weather resistant enclosure. Noise levels are monitored continuously with statistical data stored in memory for every 15-minute period.

Long term noise monitoring was conducted using the following instrumentation:

Description	Type	Octave band data	Logger location(s)
RTA06 (NTi Audio XL2)	Type 1	1/1	L1

Note: All meters comply with AS IEC 61672.1 2004 "Electroacoustics - Sound Level Meters" and designated either Type 1 or Type 2 as per table and are suitable for field use.

The equipment was calibrated prior and after the measurement period using a Brüel & Kjær Type 4230 calibrator. No significant drift in calibration was observed.

B.2 Meteorology during monitoring

Measurements affected by extraneous noise, wind (greater than 5m/s) or rain were excluded from the recorded data in accordance with the NSW NPfI. Determination of extraneous meteorological conditions was based on data provided by the Bureau of Meteorology (BOM), for a location considered representative of the noise monitoring location(s). However, the data was adjusted to account for the height difference between the BOM weather station, where wind speed and direction is recorded at a height of 10m above ground level, and the microphone location, which is typically 1.5m above ground level (and less than 3m). The correction factor applied to the data is based on Table C.1 of ISO 4354:2009 '*Wind actions on structures*'.

B.3 Noise vs time graphs

Noise almost always varies with time. Noise environments can be described using various descriptors to show how a noise ranges about a level. In this report, noise values measured or referred to include the L_{10}, L_{90}, and L_{eq} levels. The statistical descriptors L_{10} and L_{90} measure the noise level exceeded for 10% and 90% of the sample measurement time. The L_{eq} level is the equivalent continuous noise level, or the level averaged on an equal energy basis. Measurement sample periods are usually ten to fifteen minutes. The Noise -vs- Time graphs representing measured noise levels, as presented in this report, illustrate these concepts for the broadband dB(A) results.

APPENDIX C Detailed Noise Survey Results