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277-279 SCENIC ROAD, HIGHTON CHILDCARE CENTRE

Acoustic Report

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Executive summary

Renzo Tonin & Associates undertook an acoustic assessment of the proposed childcare centre development, to be located at 277-279 Scenic Road, Highton, as part of the development planning application, with the following outcomes:

- Noise from children occupying the outdoor play areas is expected to conform with the nominated childcare centre outdoor play criteria at the nearest residential receivers, with implementation of the acoustic fencing outlined in Section 7.
- Criteria for mechanical services were set out, for application in the detailed design phase of the development. The Subject Childcare Centre is considered low risk with respect to EPA Pub. 1826.
- Car park activity is expected to conform with applicable amenity criteria.
- Waste collection and delivery times were proposed with accordance with EPA Publication 1254.

With implementation of the advice set out in this acoustic report it is expected that the Subject Childcare Centre can conform with relevant criteria, and on that basis, not unreasonably affect residential amenity in the area.

Contents

Executive summary	iii
1 Introduction	1
2 Site overview	2
3 Childcare centre overview	3
4 Existing noise environment	3
5 Criteria	4
5.1 Noise emissions from outdoor play area - AAAC Guideline	4
5.2 Car park noise – sleep disturbance	5
5.2.1 Representative car park noise levels	5
5.3 Noise from mechanical services – EPA Publication 1826	6
5.4 Deliveries to and waste collection from commercial tenancies	7
5.4.1 Deliveries	7
5.4.2 Waste collection	7
6 Noise impact assessment and recommendations	8
6.1 Noise emissions from outdoor play areas	8
6.2 Noise emission from mechanical services	9
6.3 Noise emissions from car park	9
6.4 Deliveries to and waste collection from commercial tenancies	10
7 Acoustic specification	11
8 Conclusion	12
APPENDIX A Glossary of terminology	13

List of tables

Table 4-1: Noise measurement locations	3
Table 5-1: AAAC Guideline – outdoor play area noise criteria	4
Table 5-2: AAAC sound power levels for groups of 10 children playing	4
Table 5-3: Sleep disturbance criteria	5
Table 5-4: Measured noise level peaks from car park activity	5
Table 5-5: Maximum test car noise level spectrum	6
Table 5-6: EPA Pub. 1826-P1 noise limits for mechanical services	6
Table 6-1: Outdoor play noise level analysis	8
Table 6-2: Car park noise analysis with proposed fence	10

List of figures

Figure 1: Site overview	2
Figure 2: Acoustic specification	11

1 Introduction

Renzo Tonin & Associates has undertaken an acoustic assessment of a double storey childcare centre development, to be located at 277-279 Scenic Road, Highton (the Subject Site / Proposed Childcare Centre). Renzo Tonin & Associates has based its assessment of the Subject Childcare Centre on the following drawings:

- Town Planning Drawing Set, entitled '*PROPOSED CHILDCARE DEVELOPMENT 277-279 SCENIC ROAD, HIGHTON, VIC 3216*' dated May 2026, by The ELLIS Group Architects

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

Site overview

Figure 1: Site overview



3 Childcare centre overview

The proposed operational limits for the Subject Childcare Centre are understood to be:

- Childcare centre attendance: 90
- Hours of operation: 6:30am – 6:30pm Monday to Friday

The Subject Childcare Centre is understood to comprise:

- A double storey childcare centre building
 - 22 placements for 3-to-6-year-olds
 - 48 placements for 2-to-3-year-olds
 - 20 placements for 3 months-to-2-year-olds
- An external play area on north, south and west site aspects
- A car park located at ground level on the east site aspect, accessed from east boundary (Scenic Road)

The Subject Childcare Centre has proposed the acoustic fencing outlined in Section 7.

4 Existing noise environment

To quantify the existing noise levels at the Subject Site, attended noise measurements were conducted on Wednesday, 9 April 2025.

The measurement locations are shown on Figure 1 and described in Table 4-1 below.

Table 4-1: Noise measurement locations

ID	Location	Details
M1	175 Scenic Road (across Willowfield Court, on natural strip – to south of Subject Site)	Measurement duration: 10:08am-10:18am, Wednesday, 9 April 2025. • Measured L₉₀: 39 dB(A) at 1.5 metres above ground level The microphone was set in free field conditions and away from reflective surfaces. The noise environment comprised of local traffic noise and natural environment noise.
M2	281 Scenic Road (adjacent property, on natural strip – to east of Subject Site)	Measurement duration: 10:21am-10:31am, Wednesday, 9 April 2025. • Measured L₉₀: 41 dB(A) at 1.5 metres above ground level The microphone was set in free field conditions and away from reflective surfaces. The noise environment comprised of local traffic noise and natural environment noise.

An NTi XL2 sound level analyser was used for the measurement campaign. The XL2 is a Class 1 instrument having accuracy suitable for field and laboratory use. The calibration of the device was checked in the field immediately before and after the measurement using a Brüel & Kjær Type 4231 calibrator; no drift in calibration was observed. The noise monitors conform with IEC 61672-1:2013 and IEC 61260-1:2014; the sound calibrator conforms with IEC 60942:2017, and; all carry manufacturers certification or NATA certification detailing Standard conformance testing within the last two years and one year respectively.

5 Criteria

5.1 Noise emissions from outdoor play area - AAAC Guideline

The *Association of Australian Acoustical Consultants – Guideline for Childcare Acoustic Assessment v3.0, September 2020* (the AAAC Guideline) sets out a recommended assessment methodology for noise impact assessments to accompany a development application for childcare centres and provides typical recommendations for the control of noise from such centres.

The AAAC guideline sets out 'background +10 dB(A)' and 'background + 5 dB(A)' criteria for various scenarios for outdoor play in the context of the NSW planning environment. As applied in numerous Victorian Civil and Administrative Tribunal (VCAT) hearings, the opinion of the Victorian acoustic consulting industry is generally that the 'background +10 dB(A)' criterion is appropriate in a Victorian context; and 'background + 5dB(A)' is excessively stringent for protection of residential amenity during the day period for noise from outdoor play. By way of comparison, it is common practice for members of the Victorian acoustic consulting industry to set criteria for licenced venue patron noise as 'background +10 dB(A)' during the day and evening.

On this basis, Table 5-1 presents the noise criteria for outdoor play for the Subject Childcare Centre.

Table 5-1: AAAC Guideline – outdoor play area noise criteria

Background measurement location	Background noise level L_{90} , dB(A)	AAAC guideline noise limit at residential receivers L_{eq} , dB(A)
M1 at 1.5 metres above ground level	39	$L_{90} + 10 = 49$
M2 at 1.5 metres above ground level	41	$L_{90} + 10 = 51$

Note: The minimum measured background noise level per Table 4-1.

The AAAC Guideline sets out representative sound power levels for children playing and these are shown in Table 5-2.

Table 5-2: AAAC sound power levels for groups of 10 children playing

Age group	Sound power level $L_{w,eq}$ [dB ref 10^{-12} watt] at frequency (Hz)							dB(A)
	63	125	250	500	1k	2k	4k	
0 to 2 years	54	60	66	72	74	71	67	78
2 to 3 years	61	67	73	79	81	78	74	85
3 to 6 years	64	70	75	81	83	80	76	87

Note: Per AAAC Guideline, "If applicable, an adjustment to the above sound power levels of -6 dB could be applied in each age group for children involved in passive play."

5.2 Car park noise – sleep disturbance

There are currently no legislated policies or guidelines in Victoria for the control or assessment of noise induced sleep disturbance or its associated health impacts. With respect to sleep disturbance, Section 5.4 of the New South Wales Office of Environment and Heritage (formally the Department of Climate Change and Water) Road Noise Policy, March 2011, and NSW EPA document Environmental Criteria for Road Traffic Noise, 1999 (ECRTN) conclude that:

- *From the research on sleep disturbance to date it can be concluded that:*
 - *Maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep*
 - *One or two noise events per night, with maximum internal noise levels of 65-70 dB(A), are not likely to affect health and wellbeing significantly.*

When a window to a room is open (such as might be required for natural ventilation during the night), it is commonly accepted that the noise level inside the room due to external sources would be 10-to-15 dB(A) lower than the noise level outside the room. These criteria are generally accepted in Victoria where amenity may be affected due to sleep disturbance and are typically taken to apply between 10pm and 7am the following day. The established sleep disturbance criteria are presented in Table 5-3.

Table 5-3: Sleep disturbance criteria

Type	Period	Criterion
Maximum Noise	10pm – 7am	L _{max} 50-55 dB(A) inside bedroom (or L _{max} 65 dB(A) outside an open bedroom window)

5.2.1 Representative car park noise levels

Renzo Tonin & Associates has previously conducted extensive measurements and testing of noise from car parks Table 5-4 shows the range of measured noise levels.

Table 5-4: Measured noise level peaks from car park activity

Noise source	Noise Level L _{max} dB(A)
General car park activity	49 to 63
Test car parking, 12 to 5 metres from microphone	63 to 64
Test car ignition, 5 metres from the microphone	61
Test car boot slam, 10 to 5 metres from the microphone	61 to 69
Test car door slam, 8 to 6 metres from the microphone	57 to 62

Notes: Measurable noise levels from general car park activity were comprised of door slamming for the most part, at a distance of 10 to 60 metres from the microphone.

As shown in Table 5-4, the controlled measurements using the test car (the test car boot slam) were observed to generate higher noise levels than other car park activity. As such, noise level peaks from the test car were used for analysis detailed in this report. Table 5-5 presents the noise levels from the maximum test car noise event.

Table 5-5: Maximum test car noise level spectrum

Details	Noise level L_{max} at frequency (Hz)							dB(A)
	63	125	250	500	1k	2k	4k	
Car boot slam, 5 metres from measurement microphone, L_{max}	84	72	69	63	64	62	59	69

5.3 Noise from mechanical services – EPA Publication 1826

EPA Publication 1826 'Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues' - Part 1, (EPA Pub. 1826) sets out noise limits for from commerce, industry, and trade premises. EPA 1826 sets the methodology for assessing the effective noise level to determine unreasonable noise under the Environment Protection Regulations 2021, and therefore under the Environment Protection Act 2017.

EPA Pub. 1826 noise limits are calculated from planning overlays and background noise levels measured within an area in absence of intrusive commercial noise sources. The table below presents the applicable noise limits.

Noise criteria for mechanical services were calculated as presented in Table 5-6.

Table 5-6: EPA Pub. 1826-P1 noise limits for mechanical services

Period	Location	Zoning level L_{eq} , dB(A)	Background L_{90} , dB(A)	Classification	Applicable limit L_{eq} , dB(A)
Day	Nearest residential receivers	53	41	Neutral	53
Evening		46	-	Neutral	46
Night		41	-	Neutral	41

Notes: The evening and night noise limit has been determined using neutral background noise methodology.

EPA 1826 /	Day:	Monday-to-Saturday 7am-to-6pm;	Sundays NA
EP Reg 2021	Evening:	Monday-to-Saturday 6pm-to-10pm;	Sundays and public holidays 7am-to-10pm
period definitions:	Night:	All days 10pm-to-7am	

5.4 Deliveries to and waste collection from commercial tenancies

EPA Victoria Publication 1254 'Noise Control Guidelines' provides the following guidelines to mitigate the impact of deliveries and waste collection on residential amenity.

5.4.1 Deliveries

EPA Victoria Publication 1254 'Noise Control Guidelines' provides the following guidelines for deliveries:

- *Schedule: Deliveries to shops, supermarkets & service stations*
 - *7 am - 10 pm Monday to Saturday*
 - *9 am - 10 pm Sundays and public holidays*
- (Outside these hours) ... deliveries should be inaudible in a habitable room of any residential premises ... regardless of whether any door or window ... is open*

5.4.2 Waste collection

EPA Victoria Publication 1254 'Noise Control Guidelines' provides the following guidelines for waste collection:

- *Refuse bins should be located at sites that provide minimal annoyance to residential premises.*
- *Compaction should be carried out while the vehicle is moving.*
- *Noisy verbal communication between operators should be avoided where possible.*

The following times are recommended for waste collection:

- *One collection per week*
 - *6:30 am - 8 pm Monday to Saturday*
 - *9 am - 8 pm Sunday and public holidays*
- *Two or more collections per week*
 - *7 am - 8 pm Monday to Saturday*
 - *9 am - 8 pm Sunday and public holidays*

6 Noise impact assessment and recommendations

A CadnaA three-dimensional noise model, implementing ISO 9613 noise propagation algorithms was built, to calculate noise propagation from the Subject Childcare Centre to surrounding residential premises.

The built form of the Subject Childcare Centre and surrounding dwellings were integrated into the model. The following propagation effects were included in the predictive model:

- Mitigation of noise with distance, including geometrical spreading and air absorption
- Reflections from buildings and environment
- Barrier effects due to obstructions between noise sources and residential receivers
- Ground absorption effects
- Local topographical changes

6.1 Noise emissions from outdoor play areas

For the analysis, it was assumed that:

- For the 90 permitted at the Subject Childcare Centre:
 - Child distribution as per the supplied architectural plans.
 - All children are playing outside at any given time.
 - As typical, half the children are involved in active play, and half are involved in passive play.
- Noise sensitive receivers were located within residential lot boundaries surrounding the Subject Childcare Centre; within grounds at a height of 1.5 metres.

Table 6-1 presents predicted noise levels from outdoor play at surrounding residential receivers with the acoustic fencing proposed in Section 7.

Table 6-1: Outdoor play noise level analysis

Assessment location	Predicted noise L _{eq} dB(A)	AAAC guideline noise limit at residential receivers L _{eq} dB(A)	Conformance with criteria
Ground Floor façade of dwelling			
281 Scenic Road – to north	38	51	✓
280 Scenic Road – to north east	45	49	✓
2A Maidie Street – to north east	43	49	✓
278 Scenic Road – to east	49	51	✓
274 Scenic Road – to south east	45	51	✓
275 Scenic Road – to south	47	51	✓
273 Scenic Road – to south	44	51	✓
14 Willowfield Court – to west	40	49	✓
15B Buckley Falls Road – to north west	34	49	✓

Assessment location	Predicted noise L _{eq} dB(A)	AAAC guideline noise limit at residential receivers L _{eq} dB(A)	Conformance with criteria
13A Buckley Falls Road – to north west	34	49	✓
First Floor façade of dwelling			
2A Maidie Street – to north east	44	49	✓
275 Scenic Road – to south	47	51	✓
15B Buckley Falls Road – to north west	34	49	✓
13A Buckley Falls Road – to north west	34	49	✓

As presented, the proposed acoustic fence is expected to provide sufficient sound reduction for noise levels from outdoor play to materially conform with the nominated criteria. Accordingly, the Architect shall ensure that requirements set out in acoustic specification in Section 7 are satisfied.

6.2 Noise emission from mechanical services

Section 5.1 sets out noise limits for mechanical services. Whilst details of mechanical plant selection and location are not typically available during the concept design / town planning phase, Renzo Tonin & Associates is able to provide commentary on the likely compliance of the Subject Childcare Centre's proposed plant with noise criteria, drawing on experience from similar projects:

- It is expected that small scale air conditioner condensers and exhaust fans will be used.
 - Generally, they are located on balconies, on the rooftop or on Ground Level services area. Such units do not generally generate significant noise and are generally have a sound power level of 65 to 70 dB(A).
- The Subject Childcare Centre is proposed to be double storey and have fences as described in Section 7.
- As such, the built form of development is likely to provide acoustic shielding and distance shall provide noise emission reduction.
- Air conditioners and exhaust fans are expected to operate during the day period only.

On the above basis, it is expected that mechanical services noise from the Subject Childcare Centre will present a low risk with respect to EPA Pub. 1826. As an additional recommendation to guide the development:

- It is good practice to, as practical, locate mechanical services away from surrounding dwellings; and locate services on roof/building sides furthest away from dwellings. In this case, locate equipment away from the north, east and south aspects.
This is to maximise noise reduction provided by distance and acoustic shielding from the building.

6.3 Noise emissions from car park

As it is proposed that the Subject Childcare Centre operate during the morning on weekdays, it is possible that early morning car movements may occur during the night-time period. As such, sleep disturbance criteria may be applied for car park noise, as defined in Section 5.2.

Table 6-2 presents predicted noise levels from car park noise.

Table 6-2: Car park noise analysis with proposed fence

Dwelling location	Predicted maximum noise level outside window, L_{max} dB(A)	Does predicted noise level comply with sleep disturbance criterion? (L_{max} 65 dB(A) outside an openable bedroom window)
281 Scenic Road – to north	58	✓
280 Scenic Road – to north east	55	✓
278 Scenic Road – to east	56	✓
274 Scenic Road – to south east	53	✓
275 Scenic Road – to south	59	✓
1 Willowfield Court – to west	51	✓
15B Buckley Falls Road – to north west	30	✓

Note: Noise levels calculated from worst case activities documented in Table 5-5.

Noise levels at other dwellings are lower than the noise levels presented above, as a result of greater distance from the car park

As presented in Table 6-2, car park activity is not expected to exceed the sleep disturbance criterion of 65 dB(A) outside adjacent dwelling windows.

6.4 Deliveries to and waste collection from commercial tenancies

Delivery and waste collection should be conducted in accordance with EPA Publication 1254, as set out in Section 5.4.

7 Acoustic specification

Figure 2: Acoustic specification



Acoustic fence

1. (blue) The proposed acoustic fence shall be built to a minimum of 2 metres total height, relative to the higher ground level between the outdoor play area and the adjacent residential property.
2. Acoustic fences and parapets may be constructed using any of treated timber, glass, precast concrete panels, lightweight aerated concrete, transparent acrylic panels, profiled metal sheet cladding, and/or fibre cement sheeting as long the selected material (or combined skins) has a mass of at least 8kg/m².
For example, a fence of 12mm thick timber palings, 50mm overlap between palings is often acceptable; and at least 6.38mm thick laminated glass balcony glazing is also acceptable.
3. Where the above condition is not demonstrated, the overall sound transmission loss through the material of which the fence is to be constructed shall not be less than R_w 20, to be approved by a suitably qualified acoustic consultant. For example, 0.42mm BMT steel fencing is the minimum thickness that performs this criterion.
4. Acoustic fences and parapets shall have no gaps or holes, and shall be designed so that there is no likelihood of them occurring through natural causes or deformations which would allow noise to pass through.
5. The fence must be designed and built in an acceptable manner so that noise will not pass underneath it.

8 Conclusion

Renzo Tonin & Associates undertook an acoustic assessment of the proposed childcare centre development, to be located at 277-279 Scenic Road, Highton, as part of the development planning application, with the following outcomes:

- Noise from children occupying the outdoor play areas is expected to conform with the nominated childcare centre outdoor play criteria at the nearest residential receivers, with implementation of the acoustic fencing outlined in Section 7.
- Criteria for mechanical services were set out, for application in the detailed design phase of the development. The Subject Childcare Centre is considered low risk with respect to EPA Pub. 1826.
- Car park activity is expected to conform with applicable amenity criteria.
- Waste collection and delivery times were proposed with accordance with EPA Publication 1254.

With implementation of the advice set out in this acoustic report it is expected that the Subject Childcare Centre can conform with relevant criteria, and on that basis, not unreasonably affect residential amenity in the area.

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.

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 L ₉₀ 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	
	130 dB		
threshold of pain	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 _{Max}	The maximum sound pressure level measured over a given period.		
L ₉₀	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L ₉₀ noise level expressed in units of dB(A).		
L _{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.		
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.		
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 through its conversion into thermal energy.		
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.		
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.		