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Ausco Investment Group Pty Ltd

199 Canterbury Road, Blackburn

Acoustic Report

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REVISION HISTORY		
Revision No.	Date Issued	Reason/Comments
0	20 Oct 2016	Initial Issue
1	31 Oct 2016	Updated site layout
2	18 Nov 2016	Updated barrier details
3	23 Nov 2016	Inclusion of waste collection

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1 INTRODUCTION

ViPAC has been engaged by Ausco Investment Group Pty Ltd to prepare an acoustic report for a new childcare centre development at 199 Canterbury Road, Blackburn. The development will consist of a single storey building with eight classrooms, associated facilities, outdoor play areas, and a basement car park providing 30 parking spaces. This report presents the acoustic recommendations for the development according to *Technical guideline – child care centre noise assessment (AAAC).*

2 REFERENCES

- *Technical guideline – child care centre noise assessment*, *Association of Australian Acoustical Consultants (AAAC), ver. 1.4, May 2008*
- *AS/NZS 2107:2000 Recommended design sound levels and reverberation times for building interiors*
- *EPA Noise Control Guidelines – Publication 1254*

Acoustic terminology is given in Appendix A.

3 DRAWINGS

Table 3.1 – Development drawings

Drawing Title	Drawing Number	Date	Revision
Design Response	SA-01	OCT 2016	C
Ground Floor Plan	TP-01	OCT 2016	D
Basement Plan	TP-02	OCT 2016	D
Elevations	TP-03	OCT 2016	B
Sections	TP-04	OCT 2016	B
Boundary Wall	TP-05	OCT 2016	A

4 SITE DESCRIPTION

The proposed development site at 199 Canterbury Road, Blackburn is adjacent to the residential properties 1A, 1, 3 Lagoona Court and 201 Canterbury Road. The residence at 1 Lagoona Court is a two storey house and the other addresses are single storey. The site is bordered by Canterbury Road to the South and a reserve (Masons Road Flood Retarding Basin RB099) to the North. Figure 4.1 shows the site location.

Figure 4.1 – Aerial map of the development site

5 ACOUSTIC CRITERIA

There are no national/state acoustic policies/standards for the development of childcare centres. A guideline *Technical guideline – child care centre noise assessment* prepared by AAAC (Association Australian Acoustical Consultants) is adopted in this report.

Table 5.1 presents the determinations of acoustic criteria provided in the AAAC guideline.

Table 5.1 – Determination of noise criteria for childcare centres

Noise sources	Receptors	Noise criteria, dBA	Note
Outdoor play areas	Residential properties	$L_{Aeq,15min}$ < Background noise level + 10 dB	Up to 2 hours outdoor play per day
		$L_{Aeq,15min}$ < Background noise level + 5 dB	More than 2 hours outdoor play per day
Indoor play areas, mechanical plant, pick-up & drop-off traffic	Residential properties	$L_{Aeq,15min}$ < Background noise level + 5 dB	Pick up & drop off is assumed to occur at the facility carpark.

To establish the noise criteria for the nearby residential properties, background noise levels at the proposed site were measured during the afternoon of 13th October 2016. The weather during the measurements was dry with light winds. A calibration check of the sound level meter was performed before and after the measurement set, no significant drift was noted. Measurement instrumentation used is presented in Appendix B. The measured noise levels are presented in Table 5.2 and measurement locations are shown Figure 5.1.

Figure 5.1 – Background noise measurement locations

Table 5.2 – Noise levels measured at site

Location	Time [hh:mm]	Duration [mm:ss]	Measured sound pressure level [dBA]	Notes
M1	14:13pm	15:02	$L_{Aeq,15min}$ = 54 **$L_{AF90,15min}$ = 48**	Direct line of sight to Canterbury Rd, 4m from East boundary. Traffic noise dominant. Audible bird and aircraft noise.
M2	14:29pm	15:01	$L_{Aeq,15min}$ = 63 **$L_{AF90,15min}$ = 54**	Approximately 30m from Canterbury Rd. Traffic noise dominant. Audible bird noise.
M3	14:46pm	15:03	$L_{Aeq,15min}$ = 53 **$L_{AF90,15min}$ = 48**	Obscured line of sight to Canterbury Rd, 10m from West boundary. Traffic noise dominant. Audible bird and foliage noise.
M4	15:04pm	15:04	$L_{Aeq,15min}$ = 53 **$L_{AF90,15min}$ = 48**	Obscured line of sight to Canterbury Rd, 10m from North boundary. Traffic noise dominant. Audible bird and foliage noise from adjacent reserve (Melbourne Water)

The noise levels L_{AF90} presented in Table 5.2 are used for the establishment of noise criteria at the surrounding residential properties.

The lower background noise level is used for setting the noise criteria to ensure that the amenity of neighbouring residences is preserved.

Table 5.3 presents the noise criteria for the current project based on the measurements in Table 5.2.

Table 5.3 – Noise criteria for proposed childcare centre in this report

Noise sources	Receptors	Noise criteria, $L_{Aeq,15min}$ [dBA]	Note
Outdoor play areas	Residential properties	53	More than 2 hours outdoor play per day
Indoor play areas, mechanical plant, pick up & drop off	Residential properties	53	Children playing indoors

The noise criterion for the residential properties for children playing outside was calculated by adding a value of 5 dB to the background noise levels L_{AF90} at locations M1, M3 & M4. This noise criterion is for the case that outside play time will exceed 2 hours per day.

6 ASSESSMENT & RECOMMENDATIONS

6.1 CHILDREN NOISE ON RESIDENTS

The outdoor noise of children playing (children yelling) at the residential properties has been assessed based on the plan drawing *Ground Floor Plan (TP-01, Rev D) Oct 2016*. The outdoor play areas are highlighted in Figure 6.1. Each outdoor play area provides space for the following number of children:

- Area 1 = 24 Children
- Area 2 = 46 Children
- Area 3 = 44 Children
- Area 4 = 24 Children

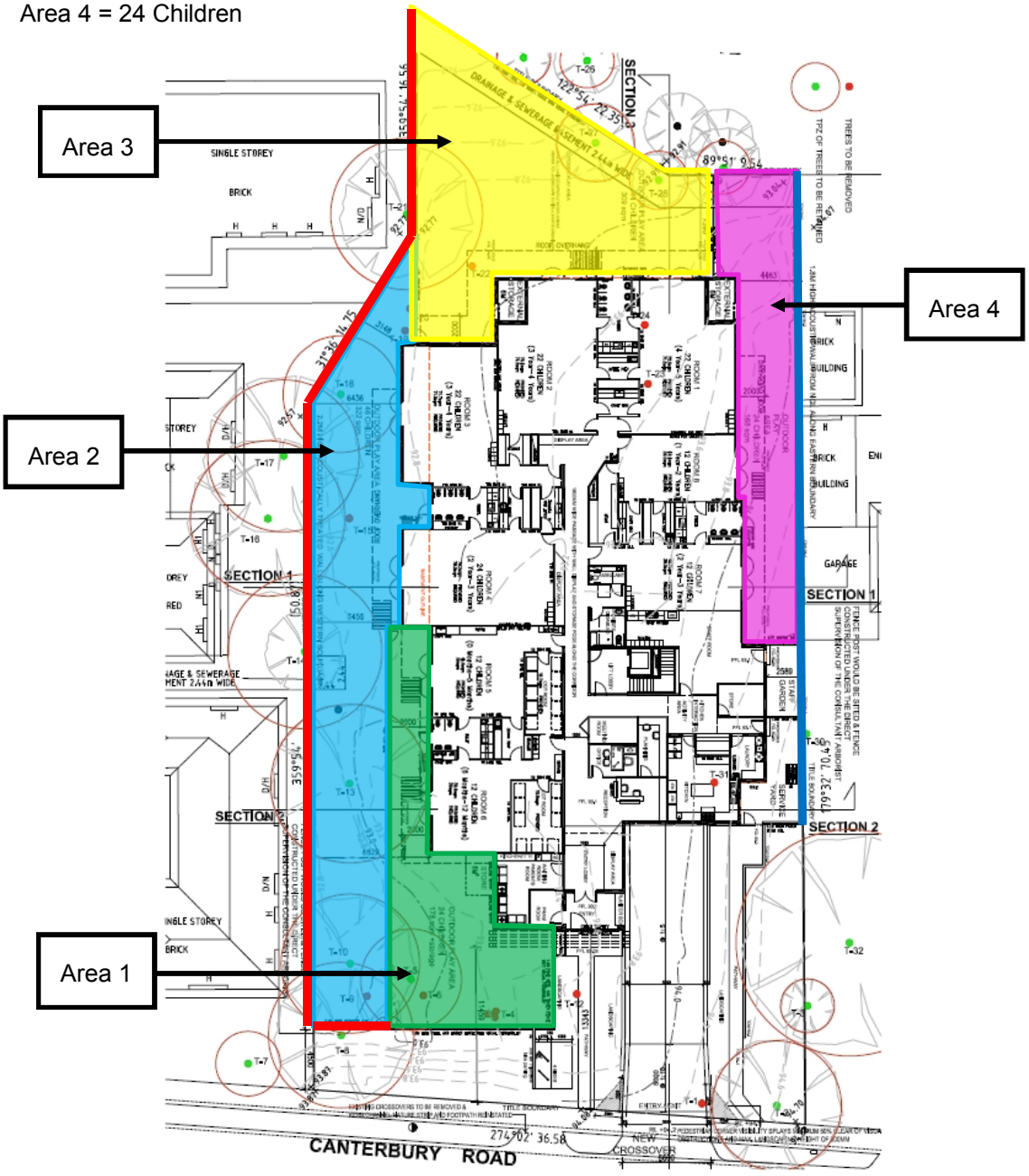

Figure 6.1 – Outdoor play area locations

In general, the noise level from children playing is highly dependent on the age of children and the number of children in a group. This report adopts the sound power levels for the different age groups of children given in the AAAC technical guideline. The number of children in each age group at the facility is specified in *Ground Floor Plan (TP-01, Rev D) Oct 2016* for each classroom:

Room 1 (4yrs-5yrs) = 22 Children	Room 5 (0mths-6mths) = 12 Children
Room 2 (3yrs-4yrs) = 22 Children	Room6 (6mths-12mths) = 12 Children
Room 3 (3yrs-4yrs) = 22 Children	Room 7 (2yrs-3yrs) = 12 Children
Room 4 (2yrs-3yrs) = 24 Children	Room 8 (1yrs-2yrs) = 12 Children

The assessments of adjacent residential properties for children playing outside are conducted based on the following assumptions:

- Children are generally playing in groups of 10 near the boundary fence or in the front area of classrooms.
- The age groups of children playing outside are determined by the classrooms adjacent to each area:
  - Area 1: Room 5 & 6 (0mths – 12mths)
  - Area 2: Room 3 & 4 (2yrs – 4yrs)
  - Area 3: Room 1 & 2 (3yrs – 5yrs)
  - Area 4: Room 7 & 8 (1yrs – 3yrs)
- Residences affected by children playing outside are 1, 1A and 3 Lagoona Court, and 201 Canterbury Road
  - The residents on Lagoona Court are affected by children playing to the West and North of the building.
  - The residents on Canterbury Road are affected by children playing in the East and North of the building.

The residence at 1 Lagoona Court represents the greatest risk of increased noise levels due to:

- The layout of the adjacent outdoor play area (Area 2)
- The number and age of children present in the adjacent outdoor play area (Area 2)
- Location of the residence outdoor area adjacent to the boundary fence
- Second storey overlooking the boundary fence

The assessments give the following recommendations for the protection of residents from the noise of children when they are playing outside.

- Construction of 2.2 meter high noise wall along the West boundary from the start of the outdoor play area (Area 2) to the North-west corner of the property. The barrier shall also follow the southern edge of Area 2. The barrier location is highlighted red in Figure 6.1.
- Construction of 2.0 meter high noise wall along the East boundary from the service yard to the North-east corner of the property, highlighted blue in Figure 6.1.
- No special acoustic requirements for the fence along the North boundary

NOTE: The site slopes downward towards the North-west corner of the property. The noise barrier along the Western boundary shall have a minimum height of 2.2 meters as measured from the 93.0m contour within Areas 2 and 3, or the floor level of any outdoor decking in these areas, whichever is more raised. Current plans (*TP-05 Rev A*) indicate the ground level of the Eastern outdoor play area (Area 4) is set down from the neighbouring property ground level. Consequently the minimum Eastern barrier height of 2.0m (measured from the highest ground level within Area 4 and Area 3) may be achieved with a 1.8m high barrier measured from the neighbouring property boundary ground level.

Noise barrier material options are provided in Appendix C.

The Western boundary noise barrier will have a reduced effect for the second storey of 1 Lagoona Court. The noise criteria for rooms within the second storey of this residence facing the development site are adopted from *AS/NZS 2107:2000 Recommended design sound levels and reverberation times for building interiors*. Assuming the noise sensitive rooms are bedrooms, the maximum recommended noise level is L_{Aeq} = 40 dBA (bedrooms near major roads). It should be noted that this is for steady-state or quasi-steady-state noise whereas the highest noise emissions from the childcare centre are likely to be of limited duration.

The noise level within the second storey rooms with windows fully open during outdoor play at the childcare facility is predicted to be marginally higher (2-3 dB) than the recommended criteria. However, if the windows are only partially open, or fully closed, the indoor levels are deemed to be satisfied.

6.2 OTHER CHILDCARE ASSOCIATED NOISE AFFECTING RESIDENTS

6.2.1 PICK-UP AND DROP-OFF NOISE

The carpark in the proposed childcare centre located on the basement level of the building and is accessed directly from Canterbury Road. Residences sensitive to noise from pick up and drop off traffic are 1A Lagoona Court and 201 Canterbury Road. Site observations based on the noise measurements demonstrate that these properties are currently exposed to traffic noise from Canterbury Road and background noise levels in the area are dominated by this road traffic noise. Measurements presented in Table 5.2 show that noise levels (L_{Aeq}) near Canterbury Road are around 63dBA (at location M2). Under the conditions of limited traffic volume (< 2–3 vehicles) entering or leaving the carpark at any one time, it can be concluded that the impact of carpark noise on the residential properties is negligible by comparison to the continuous traffic noise from Canterbury Road. In other words, the pick-up and drop-off traffic noise at the residences is masked by the road traffic noise.

6.2.2 MECHANICAL SERVICE NOISE

Mechanical services shall meet the noise criterial of $L_{Aeq,15min} \leq$ 53 dBA at the nearest noise sensitive residence. Selection and placement of mechanical services for the development should be made to achieve this criterion.

6.2.3 WASTE COLLECTION

In Victoria, EPA Publication 1254 - *Noise control guidelines* provides the noise control guidelines for the collection of commercial waste. Table 6.1 presents the schedule for garbage trucks at commercial premises.

Table 6.1 – Schedule for garbage trucks at commercial premises

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

In addition, the following attention should be paid:

- Refuse bins should be located at sites that provide minimal annoyance to residential premises (the basement level is suitable).
- Compaction on-board waste trucks should be carried out while the vehicle is moving.
- Bottles should not be broken up at the collection site.

- Noisy verbal communication between operators should be avoided where possible.

It is understood that roadside collection of waste is recommended for the site, and use of a mechanical tug to transport bins from the basement level to the collection point may be required. Use of a mechanical tug is suitable provided that it is of electric drive type and use falls within the collection hours specified in Table 6.1. All collection bins shall also be equipped with rubber castors to facilitate quiet rolling.

7 CONCLUSION

This report presents the acoustic assessment for the proposed childcare centre at 199 Canterbury Road, Blackburn. The assessments were conducted in accordance with *Technical guideline – child care centre noise assessment,* AAAC. The following recommendations are concluded according to the assessment results.

- 2.2 meter high noise wall along the West boundary from the start of the outdoor play area to the North-west corner of the property
- 2.0 meter high noise wall along the East boundary from the service yard to the North-east corner of the property
- No special acoustic requirements for the fence along the North boundary

Appendix A GLOSSARY

Term	Definition
dB	Decibel Magnitude of the sound pressure level.
dBA	A-weighted Decibels. The 'A'-weighting adjusts the measured levels to better reflect the sensitivity of the human ear to different frequencies.
R_w	Weighted sound reduction index. A measure of the sound insulation performance of a building element. R_w is measured and calculated using the procedures from AS1276 and AS1191.
$L_{Aeq,T}$	The A-weighted continuous equivalent sound pressure level. It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.
$L_{AF90,T}$	The Fast (time weighting) and A-weighted sound pressure level exceeded for 90% of the measurement period. L_{A90} is used in Victoria as the descriptor for background noise level.
Sound pressure level	The ratio in decibels (dB) of the sound pressure at a given receiver position to a reference pressure of 2.10^5 Pa. The sound pressure level depends, amongst other parameters, on the sound power level of the source and the distance separating the source and the receiver.

Appendix B MEASUREMENT INSTRUMENTATION

Instrument	Model/Type	Serial No.	Next Calibration
Bruel & Kjaer sound level meter (type 1)	2250	2690200	15/12/2017
Bruel & Kjaer calibrator	4230	000019073	12/07/2017

Appendix C NOISE BARRIER MATERIALS

It is understood that a noise barrier of timber construction may be preferred. Timber noise barrier constructions are suitable provided construction quality is high, as timber can distort with age, introducing airgaps in the barrier façade and degrading acoustic performance. Suitable products to meet the necessary acoustic requirements include:

- Boral EzyShield Commercial plywood panels (thickness 24mm, nominal weight of 14 kg/m^2)
- ArmourPly Noise Barrier plywood panels (thickness 27mm)
- Tongue and groove H3 treated timber palings, nominal thickness 50mm.

It is imperative that all panels are tightly joined with no airgaps and the barrier penetrates the ground sufficiently to prevent gaps between the base of the barrier and the ground.

Use of transparent materials (e.g. Acrylic) is suitable in the upper sections of the barrier (above 1.8m) provided any gaps between panels and joins to the lower barrier section are fully sealed.

Use of angled or curved upper sections is permissible provided they are angled toward the development and the barrier height requirements are met.

NOTE: Support posts, rails, transparent material selection/mounting (if applicable), and timber/ply panel stress grades are to be designed by a qualified and suitably experienced structural engineer.