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### **Environmental Noise Assessment**

Proposed Child Care Centre 11 Lewis Street, Balgowlah Heights, NSW

> REPORT NUMBER 7102-1.1R Rev C

> > DATE ISSUED 17 August 2021

Prepared For: Oxford Number 1 C/- Mr George Antoniou 42F/100 Bourke Street Alexandria NSW 2015

Attention: Mr George Antoniou



	Rev	/isior	History
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Status	Date	Prepared	Checked	Comment
Draft	17/12/2020	Adam Shearer	Stephen Gauld	By email, for client review
Final	21/12/2020	Adam Shearer	Stephen Gauld	
Rev A	28/06/2021	Adam Shearer	William Wang	Revised layout
Rev B	30/06/2021	Adam Shearer	William Wang	Client details
Rev C	17/08/2021	Adam Shearer		Revised layout

Document 7102-1.1R Rev C, 46 pages plus attachments

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#### **1.0 CONSULTING BRIEF**

Day Design Pty Ltd was engaged by Mr George Antoniou on behalf of Oxford Number 1 to carry out an acoustic assessment of a proposed Child Care Centre at 11 Lewis Street, Balgowlah Heights, NSW.

This commission involves the following:

#### Scope of Work:

- Inspect the site and environs
- Measure the background noise levels at critical locations and times
- Establish acceptable noise level criteria
- Quantify noise emissions from the proposed Child Care Centre
- Calculate the level of noise emission, taking into account building envelope transmission loss, screen walls and distance attenuation
- Prepare a site plan identifying the development and nearby noise sensitive locations
- Provide recommendations for acoustical treatment (if necessary)
- Prepare an Environmental Noise Assessment Report.

Day Design understand that subsequent to the submission and deemed refusal of Development Application DA2020/1758, Mr George Antoniou has entered into Class 1 proceedings in the Land and Environment Court of NSW, Case number 2021/00052122.

This revision of the Environmental Noise Assessment Report consists of an assessment of the noise emissions from the amended building design to the neighbouring receiver locations.



#### 2.0 PROJECT DESCRIPTION AND SUMMARY OF FINDINGS

A new Child Care Centre is proposed to be built at 11 Lewis Street, Balgowlah Heights, NSW, for up to 57 children.

The proposed development site is situated on land zoned R2 – *Low Density Residential* under Manly Local Environmental Plan (LEP) 2013. Child Care Centres are permitted to be constructed with consent in a R2 – *Low Density Residential* zone under the State Environmental Planning Policy (SEPP) (Educational Establishments and Child Care Facilities) 2017.

The proposed development site currently contains a two-storey residential building and swimming pool. The site has a gentle declining gradient from west (high side) to east (low side).

The development site is bounded by two-storey residential dwellings to the north and south (similarly zoned R2 – *Low Density Residential*), by Lewis Street to the east and Balgowlah Heights Public School (PS) to the south. Single and two-storey residential dwellings also exist on the opposite side of Lewis Street, as shown on Figure 1.

The nearest noise sensitive receptors to the property, in various directions, are shown on Figure 1 and in Table 1.

Receptor, Type & Location	Address	Direction from site
R1 – Residence - 1.5 m above ground level in backyard - RL86.97, 1 m from boundary		
R1A – Residence - Outside south western first floor window - RL89.72, 4.5 m from boundary		
R1B – Residence - 1.5 m above (lower) ground level in front yard - RL83.81, 1 m from boundary	13 Lewis Street <sup>1</sup> (two storey)	North
R1C – Residence - 1.5 m above the ground level front balcony - RL86.57, 2.5 m from boundary		
R1D – Residence - Outside south eastern first floor window RL89.72, 2.7 m from boundary		

#### Table 1Noise Sensitive Receptors



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<sup>&</sup>lt;sup>1</sup> Note, there are no southern facing first floor windows at R1 – 13 Lewis Street. The first floor windows face either east or west.

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#### Table 1Noise Sensitive Receptors (continued)

Receptor, Type & Location	Address	Direction from site
R2 – Residence - 1.5 m above ground level in front yard - RL82.48, 1 m from boundary	26 Lewis Street (one & two storey)	East
R3 – Educational - 1.5 m above ground level, outside northern ground floor classroom window – RL86.75, 6.5 m from boundary		
R3A – Educational - 1.5 m above ground level of outdoor play area - RL86.75, 25 m from boundary	9B Lewis Street	South
R3B – Educational - 1.5 m above ground level, outside northern ground floor classroom window – RL88.29 <sup>2</sup> , 9 m from boundary		
R4 – Residence - 1.5 m above ground level in backyard – RL89.50³, 15 m from boundary	<b>F</b> 4 Destring Street	
R4A – Residence - 4.5 m above ground level outside eastern first floor window – RL92.96, 21 m from boundary	(two storey)	West

Each noise source on the site is at varying distances from the receptors, therefore specific distances from each area where the noise source may be located are used in all calculations.

The proposed Child Care Centre will include the demolition of the existing residential dwelling and swimming pool and the construction of a new building to incorporate three indoor play areas, cot room, amenities, office/staff areas, kitchen, three outdoor play areas, and a basement level car park for 16 vehicles (staff and/or visitors).

Entry and exit to the basement car park will be located on Lewis Street on the eastern side of the site.

The proposed layout of the Child Care Centre can be seen in the Nordon Jago Architects drawings for Job Number BVR00120, dated 10 August 2021, attached as Appendix C.





<sup>&</sup>lt;sup>2</sup> Assumed height, we have been advised that the windows were inaccessible during the site survey.

<sup>&</sup>lt;sup>3</sup> Assumed height, based on ground floor HD heights provided in survey plan.

The operating hours for the proposed Child Care Centre are:

• Monday – Friday: 7.00 am to 7.00 pm.

We have been advised that outdoor play will be restricted to the following hours:

• Monday – Friday: 7.00 am to 6.00 pm.

The Child Care Centre will have a capacity of 57 children as follows:

- 0 2 year old: 12 Children
- 2 3 year old: 15 Children
- 3 5 year old: 30 Children.

Northern Beaches Council requires a revised acoustic assessment of the potential noise levels from the children playing indoors and outdoors, car park and the mechanical plant to ensure the noise impact from the proposed Child Care Centre will not adversely affect the acoustic amenity of nearby noise sensitive receptors.

Northern Beaches Council will also likely require a revised acoustic assessment of the potential intrusive noise the proposal may be exposed to, such as from road traffic on Lewis Street.

Calculations and measurements show that, provided the recommendations in Section 6.0 are implemented, the level of noise emission from the Child Care Centre and also the level of intrusive noise at the Child Care Centre will meet the requirements of the State Environmental Planning Policy (SEPP) (Educational Establishments and Child Care Facilities) 2017, the NSW Department of Planning and Environment's *Child Care Planning Guideline,* the Association of Australasian Acoustical Consultant's *Guideline for Child Care Centre Acoustic Assessment* and the NSW Environment Protection Authority's *Road Noise Policy*.



Environmental Noise Assessment



Figure 1. Site Plan – 11 Lewis Street, Balgowlah Heights, NSW



#### 3.0 MEASURED NOISE LEVELS

#### 3.1 Measured Ambient Noise Levels

In order to assess the severity of a possible environmental noise problem in a residential area it is necessary to measure the ambient background noise level at the times and locations of worst possible annoyance. The lower the background noise level, the more perceptible the intrusive noise becomes and the more potentially annoying.

The ambient  $L_{90}$  background noise level is a statistical measure of the sound pressure level that is exceeded for 90% of the measuring period (typically 15 minutes).

The Rating Background Level (RBL) is defined by the Environment Protection Authority (NSW) as the median value of the (lower) tenth percentile of L<sub>90</sub> ambient background noise levels for day, evening or night periods, measured over a number of days during the proposed days and times of operation.

The places of worst possible annoyance are the residential premises located to the north, east and west of the proposed site, shown at receptors locations 'R1' to 'R2' and 'R4' and 'R4A', in Figure 1. The times of worst possible annoyance will be during the day when the children are playing outside in the outdoor playing areas.

As specified in Section 3.1 "Background Noise Monitoring" of the Association of Australasian Acoustical Consultants Guideline for Child Care Centre Acoustic Assessment, where a consultant is unable to measure the background noise level at the most affected residential receiver location, the consultant 'shall select another suitable and equivalent location'.

It was not considered feasible for Day Design to gain access and measure the background noise levels at all eight potentially affected residential receiver locations around the site (*access to all three properties to conduct simultaneous measurements would be required*), therefore, equivalent locations on the site were selected. The locations are considered suitable as the background noise level has been measured both in the front and rear (also at first floor height) set back on the site, providing representative background noise levels for all surrounding receptor locations. Day Design notes that the background noise in the area is mainly influenced by local fauna, intermittent road traffic noise on Lewis Street and noise associated with the use of a school (children playing).

Long-term ambient noise levels were measured on site at 11 Lewis Street in the front at ground and first floor level, Locations 'B' and 'B1', and in the rear at ground level, Locations 'A', as shown on Figure 1, from Monday 16 November to Tuesday 24 November 2020. As the Child Care Centre is not proposed to operate on weekends, ambient noise levels measured on Saturday 21 and Sunday 22 November have been excluded from the assessment period.



17-Aug-202<sup>2</sup>

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The early morning, daytime and early evening ambient noise levels are presented in the attached **Appendix B1, B2 and B3**. The calculated Rating Background Levels are shown in Table 2.

Noise Measurement Time Period		L90 Rating Background Level	Existing L <sub>eq</sub> Noise Level
Logation (A)	Early Morning (6.30 am to 7 am)	34 dBA	-
Rear – Ground Floor	Day (7 am to 6 pm)	37 dBA	50 dBA
	Early Evening (6 pm to 7 pm)	37 dBA	-
Location (D)	Early Morning (6.30 am to 7 am)	40 dBA	-
Front – Ground Floor	Day (7 am to 6 pm)	42 dBA	55 dBA
	Early Evening (6 pm to 7 pm)	41 dBA	-
Leasting (D1)	Early Morning (6.30 am to 7 am)	41 dBA	-
LOCALION BI -	Day (7 am to 6 pm)	43 dBA	55 dBA
F10111 – F11St F100F	Early Evening (6 pm to 7 pm)	42 dBA	-

Table 2 Mindlene Noise Bevels 11 Bewis Street, Daigowian Heights, NS	Table 2	Ambient Noise Levels -	11 Lewis Street	, Balgowlah Heights, N	SW
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Meteorological conditions typically consisted of clear skies during the assessment period with temperatures ranging from 17 to 26°C. Some periods of rainfall were recorded during the measurement survey period, however, where required, this data has been removed from the RBL noise calculations. Ambient noise measurements were therefore considered reliable and typical for the receptor areas.

In addition to the above, short term attended noise level measurements were performed on Tuesday 24 November between 11.05 am and 11.36 am at (lower) ground level in the center of the front yard of 11 Lewis Street, and between 11.46 am and 12.17 pm at the rear of 11 Lewis Street, adjacent to Location 'A', at first floor level, to establish the noise level difference, if any, at varying heights at the front and rear of the development site. These locations are to be referred to as Locations 'A1' and 'B2' throughout the remainder of this report.

The measured L<sub>90, 15 minute</sub> existing ambient noise levels were as follows:

		Location 'A'	Location 'A1'	Difference
•	11.46 am	42 dBA	46 dBA	+ 4 dB;
•	12.02 am	41 dBA	46 dBA	+ 5 dB;
		Location 'B'	Location 'B2'	Difference
•	11.05 am	51 dBA	48 dBA	- 3 dB; and
•	11.21 am	44 dBA	40 dBA	- 4 dB.

Oxford Number 1 Environmental Noise Assessment

Considering the above, the first floor receiver location on the western façade of 13 Lewis Street, 'R1A' and eastern façade of 54 Beatrice Street, 'R4A', will be assessed against the long term measured ambient noise levels shown in Table 2 at Location 'A' plus 4 dB and the (lower) ground floor receiver locations on the eastern side of 13 Lewis Street, 'R1B' and 26 Lewis Street, 'R2', will be assessed against the long term measured ambient noise levels shown in Table 2 at Location 'B' minus 4 dB.

#### 3.2 Measured Road Traffic Noise Levels

The proposed development is directly affected by road traffic noise from Lewis Street, which carries moderately low traffic volumes.

The measured weekday  $L_{Aeq, 1 hour}$  traffic noise levels measured in Location 'B' are shown below in Table 3.

		L	LAeq, 1 hour Road Traffic Noise (dBA)					
Time	Mon 16/11	Tues 17/11	Wed 18/11	Thurs 19/11	Fri 20/11	Mon 21/11	Tues 22/11	
Location 'B'	– Front, 11	Lewis Stre	eet, Balgow	lah Height	s – Ground	Floor		
7 – 8 am	-	54	55	55	56	56	56	
8 – 9 am	-	55	56	56	57	55	57	
9 – 10 am	-	53	52	59	54	52	55	
10 – 11 am	-	52	53	55	57	52	53	
11 – 12 pm	-	56	54	58	56	53	54	
12 – 1 pm	-	57	53	65	54	54	-	
1 – 2 pm	-	57	55	56	57	55	-	
2 – 3 pm	51	53	54	56	57	54	-	
3 – 4 pm	57	55	56	59	57	54	-	
4 – 5 pm	56	55	55	57	56	56	-	
5 – 6 pm	54	54	55	58	54	52	-	

#### Table 3Measured LAeq, 1 hour Road Traffic Sound Pressure Levels - Location 'B'

Short-term attended  $L_{Aeq}$  noise level measurements were carried out at Location 'B2', between 11.05 am and 11.36 am, on Tuesday 24 November 2020, to establish the octave band centre frequencies. Traffic flow and traffic noise levels along Lewis Street were moderately low and intermittent during the measurement period.



Based on the long term measurements from Location 'B', short term measurements from Location 'B2', and the calculation method shown in Appendix B, Section B3 of the NSW Road Noise Policy for the 'overall  $L_{Aeq, (1 \text{ hour})}$ ', the calculated day time traffic noise levels used in the calculations in Section 8.0 of this report are shown in Table 4.

Description			Meas at Octa	ured So ave Bai	ound Pr nd Cent	essure re Frec	e Levels Juencie	s (dB) es (Hz)	
	dBA	63	125	250	500	1k	2k	4k	8k
Location 'B' –		60		- 4	-	-0	10	40	
Daytime L <sub>Aeq, 1-hour</sub> (7 am – 6 pm)	56	60	56	51	50	52	49	43	38

#### Table 4Calculated LAeq, 1 hour Road Traffic Sound Pressure Levels

We are of the opinion that the noise levels above in Table 4 are typical for this area, and have adopted these values in the design of noise insulation for the proposed development.

Meteorological conditions during the testing consisted of clear skies with temperatures of approximately 22°C. Atmospheric conditions were ideal for noise monitoring. Noise measurements were therefore considered reliable and typical for the receptor area.



#### 4.0 ACOUSTIC CRITERIA

This Section presents the noise guidelines applicable to this proposal and establishes the project specific noise criteria.

#### 4.1 Northern Beaches Council MDCP (2013)

Northern Beaches Council's in its Manly Development Control Plan (MDCP) 2013 – as amended 1 December 2019, Section 4.4.6 'Child Care Centres' outlines the following requirements in relation to acoustics:

#### '4.4.6 Child Care Centres

See also relevant licensing requirements, operational procedures and Building Code of Australia standards.

Relevant DCP objectives in this plan in relation to these paragraphs include:

Objective 1) To ensure that the child care centres are a high quality and compatible with neighbouring land uses and that the site is generally suitable for child care centres in terms of its topography, adjacent land uses and pedestrian safety of the area and will not adversely affect the amenity of the existing neighbourhood by way of noise, loss of privacy and traffic.

**Note**: Other buildings or places used for home based childcare (see LEP Dictionary) are permitted without consent in the LEP. However if these developments are in areas identified as Bush Fire Prone the Rural Fire Service consider them to be Special Fire Protection Purpose development and may require a Bush Fire Safety Authority.

#### 4.4.6.1 General Location Considerations

- a) Sites located within busier non-residential area require additional considerations of the safety and amenity of the children.
- b) Preference will be given to sites which form part of or adjacent to established churches, primary schools or community facilities, provided that it can satisfy the traffic and parking requirements.
- c) Sites adjoining fewer residential properties will reduce the negative amenity impact on the neighbourhood in terms of noise and loss of privacy. Semi-detached dwellings are generally not preferred. Units within residential flat buildings are not suitable for child care centres.
- d) Site should be located close to public transport services due to the potential for lowering the demand onsite parking and reducing traffic congestion.
- e) Sites should be flat or gently sloping from the road.
- f) Where possible, the child care centre should have a north to northeast aspect to allow maximum solar access.
- g) Sites on arterial roads or at busy intersections should be avoided.



#### 4.4.6.3 Built Form and Building Appearance

*Relevant DCP objectives in this plan in relation to these paragraphs include:* 

- *Objective 1)* To ensure child care centre is compatible with the scale of existing building in the vicinity.
- *Objective 2)* To ensure that the appearance of the development is of high visual quality, enhances and complements the streetscape of the area.
- a) Child care centres must comply with the same standards for built form controls as other development permissible in the LEP zone.
- b) The design and layout of the child care centres must respond to the character of the existing neighbourhood and streetscape. Existing residential character of the locality must be maintained through the use of appropriate finishes material, landscaping, fencing and plantings.
- c) Fences of child care centres should be designed to minimise noise transmission and loss of privacy for adjoining area, and complement the predominated streetscape.

#### 4.4.6.4 Indoor and Outdoor Play areas

Relevant DCP objectives in this plan in relation to these paragraphs include:

- *Objective 1)* To ensure that the design and layout of the play areas provide a safe and pleasant environment for children.
- *Objective 2)* To ensure that play areas allow visual and acoustic privacy for children of the centre and the neighbouring residents.

#### Indoor Spaces

- a) Appropriate indoor space area should be provided within the child care centre.
- b) Layout of the building, especially the playroom areas, should be designed to allow easy supervision of children.
- c) Building layout should be designed to minimise the need to access function areas via children's play rooms as this reduces the overall size, safety and functionality of the play space.
- d) The layout must be appropriately designed to minimise the noise impact to adjoining properties. Noise generating areas such as playgrounds or playrooms should be oriented away from neighbouring bedrooms.
- e) Double glazing and/or appropriate location of windows should be used where necessary to reduce noise impact from the centre.
- *f)* Direct overlooking of adjoining internal living areas, bedrooms and private open spaces should be minimised through appropriate building layout and suitably located pathways, windows and doors.



#### Outdoor Spaces

- g) Appropriate outdoor play area should be provided within the child care centre.
- *h)* Outdoor play areas should have a north or north east orientation to allow maximum solar access.
- *i)* Outdoor play area should not be occupied by any motor vehicles or used for any other purposes during operating hours.
- *j)* The layout of the outdoor play area should be designed to allow constant supervision and access to children.
- *k)* Outdoor play areas should be located away from neighbouring properties to minimise noise impact to adjoining properties.
- *l)* Appropriate hedging should be planted along the fence lines to create a playground buffer between adjoining properties.
- *m)* Appropriate fencing should be provided to segregate outdoor play area and other activities of the child care centre.



#### 4.2 NSW Department of Planning & Environment

#### 4.2.1 SEPP (Educational Establishments and Child Care Facilities) 2017

The NSW Department of Planning and Environment (DoPE) published the State Environmental Planning Policy (SEPP) (Educational Establishments and Child Care Facilities) 2017 on 1 September 2017. The relevant parts of the SEPP to this proposal have been extracted and are revised below:

Part 3 - Early education and care facilities - specific development controls, Clause 26 states -

#### '26 Centre-based child care facility—development control plans

- (1) A provision of a development control plan that specifies a requirement, standard or control in relation to any of the following matters (including by reference to ages, age ratios, groupings, numbers or the like, of children) does not apply to development for the purpose of a centre-based child care facility:
  - (a) operational or management plans or arrangements (including hours of operation),
  - (b) demonstrated need or demand for child care services,
  - (c) proximity of facility to other early childhood education and care facilities,
  - (d) any matter relating to development for the purpose of a centre-based child care facility contained in:
    - *(i) the design principles set out in Part 2 of the Child Care Planning Guideline, or*
    - (ii) the matters for consideration set out in Part 3 or the regulatory requirements set out in Part 4 of that Guideline (other than those concerning building height, side and rear setbacks or car parking rates).
- (2) This clause applies regardless of when the development control plan was made.'

#### 4.2.2 Child Care Planning Guideline

The NSW Department of Planning and Environment (DoPE) published the Child Care Planning Guideline (CCPG) in August 2017 as a supplement to the State Environmental Planning Policy (SEPP) (Educational Establishments and Child Care Facilities) 2017.

The SEPP states that "a consent authority must take into consideration this Guideline [CCPG] when assessing a development application (DA) for a centre-based child care facility." The SEPP also determines the Guideline "will take precedence over a Development Control Plan (DCP), with some exceptions, where the two overlap in relation to a child care facility."

The Guideline was introduced to 'assist industry to deliver early childhood education facilities that are of the highest standards' and 'to align NSW planning controls with the National Quality



#### Oxford Number 1 Environmental Noise Assessment

Framework for early education and care, creating more certainty for developers and operators seeking service approval'.

Section 3, *Matters for Consideration*, Subsection 3.5 Acoustic Privacy, contains the following considerations:

#### 'Considerations

*Objective: To minimize the impact of child care facilities on the acoustic privacy of neighboring residential developments.* 

С23

A new development, or development that includes alterations to more than 50 percent of the existing floor area, and is adjacent to residential accommodation should:

- Provide an acoustic fence along any boundary where the adjoining property contains a residential use (An acoustic fence is one that is a solid, gap free fence)
- Ensure that mechanical plant or equipment is screened by solid, gap free material and constructed to reduce noise levels eg acoustic fence, building or enclosure

*C24* 

A suitably qualified acoustic professional should prepare an acoustic report which will cover the following matters:

- Identify an appropriate noise level for a child care facility located in residential and other zones
- Determine an appropriate background noise level for outdoor play area during times they are proposed to be in use
- Determine the appropriate height of any acoustic fence to enable the noise criteria to be met'

Subsection 3.6 Noise and air Pollution, contains the following consideration:

#### 'Considerations

С26

An acoustic report should identify appropriate noise levels for sleeping areas and other non play areas and examine impacts and noise attenuation measures where a child care facility is proposed in any of the following locations:

- On industrial zoned land
- Where the ANEF contour is between 20 and 25, consistent with AS2021:2000
- Along a railway or mass transit corridor, as defined by State Environmental Planning Policy (infrastructure) 2007
- On a major or busy road
- Other land that is impacted by a substantial external noise.'



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#### 4.3 AAAC – Guideline for Child Care Centres Acoustic Assessment

The AAAC published a guideline relating to the assessment of noise from Child Care Centres called "Guideline for Child Care Centre Acoustic Assessment", first in May 2008, again in October 2013 and most recently updated in September 2020.

Section 3 of the AAAC Guideline states the following in relation to noise attenuation and generation for Child Care Centres:

#### 3.2 Criteria - Residential Receptors

#### 3.2.1 Outdoor Play Area

The noise impact from children at play in a child care centre differs from the domestic situation in that it is a business carried out for commercial gain, the number of children can be far greater than in a domestic situation and the age range of the children at the centre does not significantly vary over time as it would in a domestic situation. However, the noise from children is vastly different, in both character and duration, from industrial, commercial or even domestic machine noise. The sound from children at play, in some circumstances, can be pleasant, with noise emission generally only audible during the times the children play outside. Night time, weekend or public holiday activity is not typical and child care centres have considerable social and community benefit.

**Base Criteria** – With the development of child care centres in residential areas, the background noise level within these areas can at certain times, be low. Thus, a base criterion of a contributed  $L_{eq,15min}$  45 dB(A) for the assessment of outdoor play is recommended in locations where the background noise level is less than 40 dB(A).

**Background Greater Than 40 dB(A)** – The contributed  $L_{eq,15min}$  noise level emitted from an outdoor play and internal activity areas shall not exceed the background noise level by more than 5 or 10 dB at the assessment location, depending on the usage of the outdoor play area. AAAC members regard that a total time limit of approximately 2 hours outdoor play per morning and afternoon period should allow an emergence above the background of 10 dB (ie background +10 dB if outdoor play is limited to 2 hours in the morning and 2 hours in the afternoon).

**Up to 4 hours (total) per day** – If outdoor play is limited to no more than 2 hours in the morning and 2 hours in the afternoon, the contributed  $L_{eq,15min}$  noise level emitted from the outdoor play shall not exceed the background noise level by more than 10 dB at the assessment location.

More than 4 hours (total) per day – If outdoor play is not limited to no more than 2 hours in the morning and 2 hours in the afternoon, the contributed  $L_{eq, 15min}$  noise level emitted from the outdoor play area shall not exceed the background noise level by more than 5 dB at the assessment location.



The assessment location is defined as the most affected point on or within any residential receiver property boundary. Examples of this location may be:

- 1.5 m above ground level;
- On a balcony at 1.5 m above floor level;
- Outside a window on the ground or higher floors.

#### 3.2.2 Indoor Play Area, Mechanical Plant, Pick up and Drop off

The cumulative  $L_{eq, 15 \text{ minute}}$  noise emission level resulting from the use and operation of the child care centre, with the exception of noise emission from outdoor play discussed above, shall not exceed the background noise level by more than 5 dB at the assessment location as defined above. This includes the noise emission resulting from:

- Indoor play;
- Mechanical plant;
- Drop off and pick up;
- Other activities/operations (not including outdoor play).

#### 3.2.3 Sleep Disturbance\*

The noise impact of staff arrivals, setup, cleaning or other on-site activities prior to 7 am or during night-time hours should be assessed at nearby residential premises. The  $L_{Amax}$  noise level emitted from vehicles arriving and parking, depending on the requirements of the state or territory where the centre is located shall not exceed the background noise level by more than 15 dB outside the nearest habitable room window.

#### 3.4 Other Sensitive Receivers\*

Where appropriate, assessment should include consideration of noise emission to other sensitive uses including schools, hospitals, places of worship and parks (active and passive). Depending on the requirements of the state or territory where the centre is located, in the absence of applicable noise criteria for such a sensitive use, the cumulative  $L_{eq,15min}$  noise level emitted from the use and operation of the child care centre shall not exceed 65 dB(A), from all activities (including outdoor play), when assessed at the most affected point on or within the sensitive property boundary, and shall not exceed 45 dB(A) internally, with windows or doors of the sensitive receiver open.

\***Note:** The Sections above (3.2.3 and 3.4) replace references to the NSW Environment Protection Authority's *NSW Noise Policy for Industry* which is a policy specifically aimed at assessing noise emissions from industrial noise sources listed in Schedule 1 of the Protection of the Environment Operations Act 1997 (POEO, 1997), and does not include specific noise criteria for assessing noise emissions from Child Care Centres. Due to an oversight of the AAAC's Guideline, Day Design's *DA Environmental Noise Assessment Report* did not include these provisions/Sections of the Guideline. Day Design is of the opinion these criteria are the relevant



criteria for assessing noise emissions from Child Care Centres and have therefore adopted them in this revised assessment.

Section 5 of the AAAC Guideline states the following in relation to external noise impact on children within Child Care Centres.

#### 5.1 Road, Rail Traffic and Industry

The  $L_{Aeq,1hr}$  noise level from road traffic, rail or industry at any location within the outdoor play or activity area during the hours when the Centre is operating should not exceed 55 dB(A).

The  $L_{Aeq,1hr}$  noise level from road traffic, rail or industry at any location within the indoor activity or sleeping areas of the Centre during the hours when the centre is operating shall be capable (ie with doors and/or windows closed) of achieving 40 dB(A) within indoor activity areas and 35 dB(A) in sleeping areas.

#### 4.4 NSW Environment Protection Authority – NSW Road Noise Policy

#### 4.4.1 Road Traffic Noise Assessment Criterion - Residential

The NSW Road Noise Policy (RNP), in Section 2.3.1, sets out road traffic noise assessment criteria for residential land uses in Table 3. The information in that table is extracted below in Table 5.

Road Category	Type of project/land use	Assessment Criteria – dB(A) Day (7 am – 10 pm)
Local roads	<ol> <li>Existing residences affected by additional traffic on existing local roads generated by land use developments</li> </ol>	LAeq, (1 hour) 55 (external)

#### Table 5 Road Traffic Noise Assessment Criterion - Residential

#### 4.4.2 Road Traffic Noise Assessment Criterion – Non - Residential

Section 2.3.2 of the Policy, sets out the road traffic noise assessment criteria for non-residential land uses in Table 4. The information in that table is extracted below in Table 6.

#### Table 6 Road Traffic Noise Assessment Criteria – Non - Residential

	Assessment Criteria – dB(A)
Existing sensitive land use	Day (7 am - 10 pm)
School classrooms	LAeq, (1 hour) 40 (internal) when in use
Open space (passive use)	LAeq, (15 hour) 55 (external) when in use

#### 4.5 Project Specific Noise Criteria

Noise emissions from the outdoor play areas and cumulative noise impacts of the Child Care Centre and potential sleep disturbance impacts that may arise from staff arriving in the mornings are assessed against the *AAAC's Guideline*, as follows in Section 4.5.1.1 to 4.5.1.3. On - road traffic has been assessed against the EPA's *RNP*, as follows in Section 4.5.1.4.

Noise intrusion from local sources (road traffic) are assessed against the *AAAC's Guideline,* as follows in Section 4.5.2.

#### 4.5.1 Noise Emission Criteria

When all the above factors are considered, we find that the most stringent noise criteria are:

#### 4.5.1.1 Residential Receivers

The following criteria will be applied for children playing in the outdoor play areas and the cumulative noise impact from all other noise sources including the indoor play areas, mechanical plant and car park during the day period (7 am to 7 pm).

'R1' and 'R4'- Based on measured noise levels in Location 'A'

- $(40^4 + 5 =)$  **45 dBA** L<sub>Aeq, 15 minute</sub> during the day for outdoor play for more than 4 hours per day; or
- (37 + 10 =) **47 dBA** LAeq, 15 minute during the day for outdoor play up to 4 hours per day; and
- (37 + 5 =) **42 dBA** LAeq, 15 minute during the day and in the evening for all other noise sources.

'R1A' and 'R4A' – Based on calculated noise levels in Location 'A1'

- (41 + 5 =) **46 dBA** LAeq, 15 minute during the day for outdoor play for more than 4 hours per day; or
- (41 + 10 =) **51 dBA** L<sub>Aeq, 15 minute</sub> during the day for outdoor play up to 4 hours per day; and
- (41 + 5 =) **46 dBA** L<sub>Aeq, 15 minute</sub> during the day and in the evening for all other noise sources.

<sup>&</sup>lt;sup>4</sup> See Section 4.3 of this report. Based on the 'Base Criteria' recommended in Section 3.2.1 of the AAAC Guideline.





'R1B' and 'R2'– Based on calculated noise levels in Location 'B2'

- $(40^5 + 5 =)$  **45 dBA** L<sub>Aeq, 15 minute</sub> during the day for outdoor play for more than 4 hours per day; or
- (38 + 10 =) **48 dBA** L<sub>Aeq, 15 minute</sub> during the day for outdoor play up to 4 hours per day; and
- (38 + 5 =) **43 dBA** LAeq, 15 minute during the day for all other noise sources; and
- (37 + 5 =) **42 dBA** LAeq, 15 minute in the evening for all other noise sources.

'R1C' – Based on calculated noise levels in Location 'B'

- (42 + 5 =) **47 dBA** L<sub>Aeq, 15 minute</sub> during the day for outdoor play for more than 4 hours per day; or
- (42 + 10 =) **52 dBA** LAeq, 15 minute during the day for outdoor play up to 4 hours per day; and
- (42 + 5 =) **47 dBA** LAeq, 15 minute during the day for all other noise sources; and
- (41 + 5 =) **46 dBA** LAeq, 15 minute in the evening for all other noise sources.

'R1D' – Based on calculated noise levels in Location 'B1'

- (43 + 5 =) **48 dBA** LAeq, 15 minute during the day for outdoor play for more than 4 hours per day; or
- (43 + 10 =) **53 dBA** L<sub>Aeq, 15 minute</sub> during the day for outdoor play up to 4 hours per day; and
- (43 + 5 =) **48 dBA** LAeq, 15 minute during the day for all other noise sources; and
- (42 + 5 =) **47 dBA** L<sub>Aeq, 15 minute</sub> in the evening for all other noise sources.

The assessment location is defined as the most affected point on or within any residential receiver property boundary. Examples of this location may be:

- 1.5 m above ground level;
- On a balcony at 1.5 m above floor level;
- Outside a window on the ground or higher floors.



<sup>&</sup>lt;sup>5</sup> See Section 4.3 of this report. Based on the 'Base Criteria' recommended in Section 3.2.1 of the AAAC Guideline.

#### 4.5.1.2 Educational Receivers

**Environmental Noise Assessment** 

School Classrooms – 'R3' and 'R3B'

• **55 dBA** (external) (45 dBA internal) Leq, 15 minute when in use (day) for all noise sources.

This criterion applies outside the most-affected classroom window of Balgowlah Heights PS.

Active Recreation Receiver – 'R3A'

• **65 dBA** L<sub>eq, 15 minute</sub> when in use (day) for all noise sources.

This criterion applies at the most-affected point within the area that is reasonably expected to be used by people, when in use.

#### 4.5.1.3 Sleep Disturbance

Sleep disturbance will be assessed at 1 metre from the most affected façade of the potentially most affected residential receivers 'R1C', 'R1D' and 'R2', for sleep disturbance. Compliance at the potentially most affected residential receiver locations will ensure compliance with the noise criteria at all other residential receiver locations.

The following criterion will be applied at 1 metre from the most affected façade of the residential receivers, for sleep disturbance:

'R1C' – Based on measured noise levels in Location 'B'

• (40 + 15 =) **55 dBA** L<sub>AFmax</sub> between 6.30 am and 7 am (staff arriving);

'R1D' – Based on measured noise levels in Location 'B1'

• (41 + 15 =) **55 dBA** L<sub>AFmax</sub> between 6.30 am and 7 am (staff arriving);

'R2' – Based on calculated noise levels in Location 'B2'

• (36 + 15 =) **51 dBA** L<sub>AFmax</sub> between 6.30 am and 7 am (staff arriving).

#### 4.5.1.4 On – Road Traffic Noise Criteria

#### Residential Receivers - 'R1C', 'R1D', and 'R2'

The following criterion will be applied at 1 metre from the most affected façade of the potentially most affected residential receiver locations 'R1C', 'R1D', and 'R2':

• **55 dBA** (external) L<sub>eq, 1 hour</sub> between 7 am and 6 pm.

#### Educational Receivers - 'R3' and 'R3A'

The following criterion will be applied at the reasonably most affected point within 'R3A', for on – road traffic noise:

• **55 dBA** (external) L<sub>eq, 15 hour</sub> when in use.

The following criterion will be applied at 1 metre from the most affected façade of 'R3', for on – road traffic noise:

• **50 dBA** (external) (40 internal) L<sub>eq, 1 hour</sub> when in use.



#### 4.5.2 Noise Intrusion Criteria

Road Traffic Intrusion - in accordance with the AAAC's Guideline:

- Internal traffic noise levels within the sleeping areas of the Child Care Centre should not exceed  $L_{eq, 1 hour}$  **35 dBA** during operating hours.
- Internal traffic noise levels within the indoor play areas of the Child Care Centre should not exceed Leq, 1 hour **40 dBA** during operating hours.
- External traffic noise levels in any outdoor play or activity area of the Child Care Centre should not exceed Leq, 1 hour **55 dBA** during operating hours.



#### 5.0 CHILD CARE CENTRE NOISE EMISSION

The main sources of noise from the proposed Child Care Centre will be as follows:

- Children playing both outside and inside;
- Mechanical plant; and
- Cars entering and exiting the car parks.

The noise assessment was based on the Nordon Jago Architects' drawings for Job Number BVR00120, dated 10 August 2021, attached as Appendix C.

#### 5.1 Indoor and Outdoor Play Areas

The Association of Australasian Acoustic Consultants has presented a range of A-weighted sound power levels per child in Table 1 of its *'Guideline for Child Care Centre Acoustic Assessment'*. The sound power levels for each group are presented in Table 8 and used in this assessment.

The sound power levels for each group are presented in Table 7 and used in this assessment.

Number and Age of	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
Ciniuren	dBA	63	125	250	500	1k	2k	4k	8k
10 children, 0 to 2 years	78	54	60	66	72	74	71	67	64
10 children, 2 to 3 years	85	61	67	73	79	81	78	74	70
10 children, 3 to 5 years	87	64	70	75	81	83	80	76	72

#### Table 7Leq, 15 minute Sound Power Levels - Groups of 10 Children at Play

In the notes to Table 1 of the *AAAC's Guideline*, where passive/quiet activities are engaged in by children, the noise generated by children is generally 6 dB lower than active play.



#### 5.2 Car Park Noise Emission

Based on the RTA's 'Guide to Traffic Generating Developments' prediction of 0.8 peak (morning 7 am-9 am) vehicle trips per child for Child Care Centres (Long-day care), we have assumed, as a worst case scenario, a flow of cars equivalent to 46 cars in 1 hour arriving or leaving the Child Care Centre in the morning peak. This is equivalent to 12 vehicle trips in a 15-minute period.

For the assessment of sleep disturbance we have assumed staff members will arrive at the Child Care Centre prior to 7 am and park in the basement car park.

For the assessment of on road traffic noise, based on the RTA's 'Guide to Traffic Generating Developments' prediction of 0.8 morning peak (7 am-9 am), 0.3 early afternoon peak (2.30 - 4 pm) and 0.7 afternoon peak (4 pm - 6 pm) vehicle trips per child for Child Care Centres (Long-day care), we have assumed, as a worst case scenario, a flow of cars equivalent to 46 cars in 1 hour and 103 cars in 15 hours arriving or leaving the Child Care Centre during any given day.

The Sound Exposure Level<sup>6</sup> (SEL) and L<sub>AF, max</sub> sound power level and spectra of vehicle noise is shown below in Table 8 and is based on previous measurements by Day Design.

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
SEL level of car drive by at approximately 10 km/h up an incline	82	90	87	80	78	77	72	70	64
SEL level of car drive by at approximately 20 km/h	84	93	85	82	80	81	75	70	65
L <sub>AFmax</sub> of car entering car park	92	98	92	90	88	88	83	80	76

#### Table 8SEL & LAF, max Sound Power Levels - Car Park

<sup>&</sup>lt;sup>6</sup> SEL is the total sound energy of a single noise event condensed into a one second duration.





#### 5.3 Mechanical Plant

The mechanical plant, including air conditioning condensers, kitchen exhaust fan and lift motor, have not been selected at this stage. Therefore, a preliminary noise assessment will be based on typical units for the size of the development.

We have assumed that five air conditioning condenser units will be located in the *'Mechanical Plant Zone'* located on the southern side of the roof (see drawing DA.190 B), a lift motor will be located in the basement within the lift shaft and the kitchen exhaust fan will be located above the kitchen, and exhaust at roof level, as shown in the attached Appendix D.

A schedule of the sound power levels for the typical mechanical plant is shown below in Table 9.

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
•	dBA	63	125	250	500	1k	2k	4k	8k
Typical Outdoor Condenser Unit <sup>7</sup>	75	80	78	78	74	68	62	54	48
Hydraulic Lift Motor <sup>8</sup>	63	59	61	55	59	58	56	52	48
Kitchen Exhaust Fan <sup>9</sup>	60	66	60	59	57	54	52	49	46

#### Table 9 Leq, 15 minute Sound Power Levels - Mechanical Plant

We recommend a detailed analysis be carried out once the mechanical plant is selected and locations are finalised, prior to the issue of a Construction Certificate.



<sup>&</sup>lt;sup>7</sup> Spectral sound power level based on Daiken VRV IV S – RXYMQ8AY1, outdoor condenser unit.

<sup>&</sup>lt;sup>8</sup> Spectral sound power level based on a residential lift system previously measured by Day Design.

<sup>&</sup>lt;sup>9</sup> Spectral sound power level based on a domestic kitchen exhaust fan previously assessed by Day Design.

#### 5.4 Predicted Noise Levels

Knowing the sound power level of a noise source (see Tables 7 to 9) the sound pressure level (as measured with a sound level meter) can be calculated at a remote location using suitable formulae to account for distance losses, sound barriers, etc.

Noise emission calculations for the indoor and outdoor play areas, car parks and mechanical plant include reductions provided by the following fence heights and time period correction, where relevant:

- proposed 1.8 metre high solid boundary fence constructed along the entire northern boundary of the western ground floor outdoor play area; and
- proposed 1.8 metre high solid boundary fence constructed along the entire northern boundary from the western ground floor outdoor play area to the buildings' front set back to Lewis Street; and
- proposed 1.2 metre high solid boundary fence constructed along the shared northern boundary with 13 Lewis Street from the buildings' front set back to Lewis Street to the eastern site boundary; and
- proposed 1.39 metre high solid boundary fence constructed along the entire eastern boundary of the eastern ground floor outdoor play area; and
- proposed 1.39 metre high solid boundary fence constructed along the entire southern boundary of the eastern ground floor outdoor play area; and
- proposed 1.8 metre high solid boundary fence constructed along the entire southern boundary of the western ground floor outdoor play area; and
- proposed 1.2 metre high solid boundary fence constructed along the shared southern boundary with Balgowlah Heights PS from the buildings' front set back to Lewis Street to the eastern site boundary; and
- proposed 1.8 metre high solid boundary fence constructed along the entire western boundary of the western ground floor outdoor play area; and
- proposed 1.8 metre high solid boundary fence constructed along the entire northern boundary of the first floor outdoor play area; and
- proposed 1.39 metre high solid boundary fence constructed along the entire southern and western boundaries of the first floor outdoor play area; and
- proposed aluminium louvre wall on the eastern, southern and western sides of the *'Mechanical Plant Zone'* =-3 dB see drawings DA.300 B and DA.301 B; and
- fixed aluminium framed glazing (minimum 6.38 mm laminated glass per Section 6.4.1 of this report) construction to window in northern façade of the Cot Room; and
- proposed passive play area for 3-5 year olds in the western ground floor outdoor play area; and



- Time period correction of  $(10 \times log [1/900] = ) 29.5 \text{ dB}$  for SEL noise levels associated with the use of car parks in a 15 minute period Leq, 15 minute calculations only; and
- Time period correction of  $(10 \times \log [1/3600] = ) 35.6 \text{ dB}$  for SEL noise levels associated with the use of car parks in a 1 hour period Leq, 1 hour calculations only; and
- Time period correction of  $(10 x \log [1/54000] = ) 47.3 \text{ dB}$  for SEL noise levels associated with on road traffic noise in a 15 hour period L<sub>eq</sub>, 15 hour calculations only.

We have assumed that all fences are free of visible air gaps to provide an impervious sound barrier.

Where applicable, calculations also include reductions for the acoustic screening provided by the Child Care Centre building and neighbouring buildings to the receptor locations.

Based upon a review of World Health Organization (WHO) data for average children heights, the notes to Table 1 of the *AAAC's Guideline* recommends a source height of 1.0 metre above ground level for all children,

Tables 10 to 12 and 14 show the predicted noise levels at the residential receptors from the proposed activities, during the early morning, day or evening periods.

#### 5.4.1 Outdoor Play Area Noise Levels

The following formula, which is well known to acoustic professionals, was used to calculate noise levels at the receptor locations:

 $L_p = L_w + 10 \log(n/10) - 20 \log(d) - 8 - B$ 

Where:

L<sub>p</sub> = Sound Pressure Level at receptor

L<sub>w</sub> = Sound Power Level for group of 10 children

n = number of children

d = distance from children playing to receptor

B = acoustic reduction due to barrier

Based on a maximum of 57 children evenly spaced across their corresponding outdoor play areas at any one time, as detailed below, the predicted worst-case scenario external  $L_{eq, 15 minute}$  predicted noise level is shown in Table 10.

10 x Child Groups comprising:

Western Ground Floor Outdoor Play Area – 12 x 0-2 and 13 x 3-5 year olds -

- 2 groups of 6 children (Groups 1 and 2) consisting of 6 x 0-2 year olds;
- 1 group of 7 children (Group 3) consisting of 7 x 3-5 year olds; and
- 1 group of 6 children (Group 4) consisting of 6 x 3-5 year olds.

Eastern Ground Floor Outdoor Play Area – 17 x 3-5 year olds -

• 1 groups of 5 children (Group 5) consisting of - 5 x 3-5 year olds; and



• 2 groups of 6 children (Groups 6 and 7) consisting of - 6 x 3-5 year olds.

First Floor Outdoor Play Area - 15 x 2-3 year olds -

• 3 groups of 5 children (Groups 8, 9 and 10) consisting of - 5 x 2-3 year olds.

Note: Groups 3 and 4 are located within the passive play area (see drawing DA.101 D, in the attached Appendix D) on the western side of the outdoor play area.

The approximate locations of the noise sources (children) used for the assessment of each of the outdoor play areas above are shown in the attached Appendix D. All noise sources in each outdoor play area shown in Appendix D are assessed as being outside at the same time to achieve the overall worst case predicted noise levels at each of the receptor locations.

The intrusive external  $L_{eq, 15minute}$  noise levels at all receptor locations are calculated to be as shown in Table 10.

Receptor Location – First Floor (FF), Ground Floor (GF) & Lower Ground Floor (LGF)	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 13 Lewis Street (GF)	44	45	Yes
R1A – 13 Lewis Street (FF)	42	46	Yes
R1B – 13 Lewis Street (LGF)	42	45	Yes
R1C – 13 Lewis Street (GF)	40	47	Yes
R1D – 13 Lewis Street (FF)	46	48	Yes
R2 – 26 Lewis Street (GF)	40	45	Yes
R3 – Balgowlah Heights PS (GF)	54	55	Yes
R3A – Balgowlah Heights PS (GF)	48	65	Yes
R3B – Balgowlah Heights PS (GF)	52	55	Yes
R4 – 54 Beatrice Street (GF)	46	45	No (+ 1 dB)
R4A – 54 Beatrice Street (FF)	43	46	Yes

#### Table 10Predicted Leq, 15 minute Noise Levels - Outdoor Play

The predicted cumulative  $L_{eq}$  levels of noise from children playing outdoors are summarised in Table 10 at the receptors. The predicted levels of noise at receptor locations 'R1B' to 'R3B' and 'R4A', complies with the criteria in Section 4.5.1 of this report, and is therefore acceptable. However, the predicted levels of noise at receptor locations 'R4' exceeds the noise criteria in Section 4.5.1 of this report, and will require noise controls as recommended in Section 6.



Environmental Noise Assessment

#### 5.4.2 Cumulative Noise Level - Indoor Play Area, Mechanical Plant and Car Park

The most stringent noise criteria (evening) has been used to assess each individual noise source as outlined below. Compliance with the most stringent noise criteria will ensure compliance during all other time periods (day).

The predicted worst case cumulative  $L_{eq, 15minute}$  noise levels at all receptor locations are calculated to be as shown in Table 11. Windows and doors to the indoor play areas are modelled as being partially open (75% of the window/door area to account for fixed panels).

I failt & Cal T al K			
Receptor Location – First Floor (FF), Ground Floor (GF) & Lower Ground Floor (LGF)	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 13 Lewis Street (GF)			
- Indoor play area	37		
- Car park	<10		
- Mechanical plant	32		
Cumulative Noise Level	39	42	Yes
R1A – 13 Lewis Street (FF)	-	-	
- Indoor play area	26		
- Car park	<10		
- Mechanical plant	41		
Cumulative Noise Level	41	46	Yes
R1B – 13 Lewis Street (LGF)			
- Indoor play area	27		
- Car park	32		
- Mechanical plant	34		
Cumulative Noise Level	36	42	Yes
R1C – 13 Lewis Street (GF)			
- Indoor play area	30		
- Car park	19		
- Mechanical plant	36		
Cumulative Noise Level	37	46	Yes
R1D – 13 Lewis Street (FF)	-		
- Indoor play area	38		
- Car park	19		
- Mechanical plant	41		
Cumulative Noise Level	43	47	Yes

### Table 11Predicted Cumulative Leq, 15 minute Noise Levels - Indoor Play, Mechanical<br/>Plant & Car Park

Ref: 7102-1.1R REV C

Environmental Noise Assessment

Table 11	Predicted Cumulative Leq, 15 minute Noise Levels – Indoor Play, Mechanical
	Plant & Car Park - Continued

Receptor Location – First Floor (FF) & Ground Floor (GF)	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R2 – 26 Lewis Street (GF)			
- Indoor play area	28		
- Car park	26		
- Mechanical plant	38		
Cumulative Noise Level	39	42	Yes
R3 – Balgowlah Heights PS (GF)	-		
- Indoor play area	45		
- Car park	11		
- Mechanical plant	49		
Cumulative Noise Level	50	55	Yes
R3A – Balgowlah Heights PS (GF)	-		
- Indoor play area	40		
- Car park	23		
- Mechanical plant	43		
Cumulative Noise Level	45	65	Yes
R3B – Balgowlah Heights PS (GF)			
- Indoor play area	40		
- Car park	<10		
- Mechanical plant	44		
Cumulative Noise Level	45	55	Yes
R4 – 54 Beatrice Street (GF)			
- Indoor play area	42		
- Car park	<10		
- Mechanical plant	33		
Cumulative Noise Level	42	42	Yes
R4A – 54 Beatrice Street (FF)		-	
- Indoor play area	38		
- Car park	<10		
- Mechanical plant	33		
Cumulative Noise Level	39	46	Yes

The predicted cumulative  $L_{eq}$  levels of noise from the Child Care Centre are summarised in Table 11 at the receptors. The predicted levels of noise at receptor locations 'R1' to 'R4A', complies with the criteria in Section 4.5.1 of this report, and is therefore acceptable.

Ref: 7102-1.1R REV C

#### 5.4.3 Sleep Disturbance

The external L<sub>AF, max</sub> noise levels at all residential receptor locations, from the noise associated with staff arriving at the Child Care Centre in their vehicle and driving down the access ramp to the basement level car park between 6.30 am and 7 am are calculated to be as shown below in Table 12.

Receptor Location – First Floor (FF) & Ground Floor (GF)	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1C – 13 Lewis Street (GF)	47	55	Yes
R1D – 13 Lewis Street (FF)	48	55	Yes
R2 – 26 Lewis Street (GF)	55	51	No (+ 4 dB)

#### Table 12Predicted LAF, max Noise Levels - Sleep Disturbance

The predicted external levels of noise from staff arriving at the Child Care Centre in their vehicle and driving down the access ramp to the basement level car park between 6.30 am and 7 am are within the noise criteria in Section 4.5.1 at 'R1C' and 'R1D', and are therefore acceptable. However, the predicted external levels of noise from staff arriving at the Child Care Centre in their vehicle and driving down the access ramp to the basement level car park between 6.30 am and 7 am exceeds the noise criteria in Section 4.5.1 at 'R2', and will require a maximum noise level event assessment, as follows.

There is potential for the sleep disturbance criteria to be exceeded at 'R2' from the use of the basement car park driveway by staff arriving prior to 7.00 am.

Day Design has conducted a detailed maximum noise level event assessment of the existing ambient noise levels – particularly the  $L_{max}$  events - at Location 'B2' to determine the likelihood of noise associated with the use of the car park drive way causing sleep disturbance at the most affected nearby residential receiver 'R2' (see Table 12). Compliance at the most affected nearby residential receiver at all other receiver locations.

Table 13 shows the total  $L_{max}$  events greater than or equal to the predicted  $L_{max}$  noise level at 'R2' of 55 dBA between 6.30 am and 7 am over the assessment period.



Environmental Noise Assessment

	e	
Receptor Location	Measured L <sub>max</sub> Noise Level Events ≥ 55 dBA	Measured L <sub>max</sub> Noise Level (dBA) Range ≥ 55 dBA
Early Morning – 6.30 am to 7 am (2 x 15 minut	e periods each early	morning)
Morning 1 - 17/11/2020	2	71 - 71
Morning 2 - 18/11/2020	2	68 - 71
Morning 3 - 19/11/2020	2	71 - 77
Morning 4 - 20/11/2020	2	69 - 71
Morning 5 - 21/11/2020	2	70 - 71
Morning 6 - 22/11/2020	2	64 - 78
Morning 7 - 23/11/2020	2	64 - 67
Morning 8 - 24/11/2020	2	71 - 72
Average per morning	2	72
Total	16	-

#### Table 13Total Lmax Events at Location 'B2' During Assessment Period

Table 13 above shows that  $L_{max}$  noise events greater than or equal to 55 dBA are common at Location 'B2' during the early morning periods. A total of 16 sample 15 – minute periods (early morning) were analysed, with 16, or 100%, featuring an  $L_{max}$  noise event greater than or equal to 55 dBA.

An average of 16  $L_{max}$  noise events (out of 16) greater than or equal to 55 dBA were measured over the assessment period for each early morning period, with an average  $L_{max}$  noise level of 72 dBA. As shown in Table 12, the predicted  $L_{max}$  noise level from noise associated with staff using the basement car park driveway at 'R2' is 55 dBA – 17 dB lower than the average.

Day Design is of the opinion that due to the existing number and level of the  $L_{max}$  noise events greater than or equal to 55 dBA at Location 'B2', the  $L_{max}$  noise events associated with two staff cars arriving at the development site are not likely to cause sleep disturbance at 'R2', and will therefore be acceptable at all residential receiver locations.

#### 5.4.4 On – Road Traffic

Based on Section 4.2 'Traffic Assignment', Figure 5 'Expected Traffic Distribution (Both AM and PM Periods)' of the McLaren Traffic Engineering & Road Safety Consultants 'Traffic and Parking Impact Assessment of Proposed Child Care Centre at 11 Lewis Street, Balgowlah', document reference 200851.01FA, dated 17 December 2020, the distribution of road traffic on the local roads associated with the Child Care Centre is as follows:

- Vehicles exiting/entering to the north 90%; and
- Vehicles exiting/entering to the south 10%.

The external  $L_{eq, 1 hour}$  and  $L_{eq, 15 hour}$  noise levels at the most affected residential receptor locations, 'R1C', 'R1D' and 'R2' and the most affected educational receptors 'R3' and 'R3A', from noise associated with on – road traffic throughout the day are calculated to be as shown below in Table 14.

#### Table 14Predicted Leq, 1 hour & Leq, 15 hour Noise Levels - On - Road Traffic

Receptor Location – First Floor (FF) & Ground Floor (GF)	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1C – 13 Lewis Street (GF)	47	Leq, 1 hour 55	Yes
R1D – 13 Lewis Street (FF)	47	L <sub>eq, 1 hour</sub> 55	Yes
R2 – 26 Lewis Street (GF)	48	L <sub>eq, 1 hour</sub> 55	Yes
R3 – Balgowlah Heights PS (GF)	38	Leq, 1 hour 50	Yes
R3A – Balgowlah Heights PS (GF)	30	Leq, 15 hour 55	Yes

The predicted external levels of noise from on – road traffic are within the noise criteria in Section 4.5.1 and are therefore acceptable.



#### 6.0 RECOMMENDED ACOUSTICAL TREATMENT

#### 6.1 Noise Management Plan

We recommend the Child Care Centre's management implement a Noise Management Plan that should include, but not be limited to the following:

- Ensuring all staff and parents are provided with a copy of the Centre's Noise Management Plan and its implications for them during their time at the Centre.
- The name and contact details of the Centre's Manager should be clearly displayed at the front of the building to ensure neighbours can contact that person at any time the Centre is operating.
- Ensuring a sufficient number of educators are provided to supervise children's outside play to discourage unnecessarily loud activities.
- Facilitating children's small group play when outside, and encouraging educators to engage in children's play and facilitate friendships between children.
- Crying children should be comforted as quickly as possible and moved indoors.
- Activities considered acceptable in the western 'Passive Play Area' include the following:
  - Reading;
  - Drawing;
  - Art and crafts;
  - Puzzles;
  - Block play;
  - Planting;
  - Painting;
  - Gardening.

A short description and management strategies for how the 'Passive Play Area' will be used on a day to day basis should be included in the Child Care Centre's Plan of Management.



#### 6.2 Sound Barrier Walls

The proposed sound barrier wall heights and locations outlined in Section 5.4 and detailed in the attached architectural drawings (Appendix C) are considered acceptable.

The sound barrier walls may be constructed from 3 rail 'solid capped and lapped' timber, 10 mm thick solid polycarbonate (not hollow), 6.38 mm thick laminated glass or masonry. The construction shall be free of visible air gaps to provide an impervious sound barrier.

If required, where an existing boundary fence is to be maintained, and to achieve the required vertical heights recommended in the following sections, a new upper portion of fence should be constructed on top of the existing fence. A transparent material such as 10 mm thick UV resistant polycarbonate may be used, cantilevered inwards at 45 degrees, as shown in Appendix E1. The constriction shall be free of visible air gaps to provide an impervious sound barrier.

Alternatively, steel posts may be placed 0.5 to 1 metre stepped in from the existing fences and have 10 mm thick polycarbonate sheeting installed vertically on the outside of the steel posts and then angled inwards to the required vertical height. The vertical section is required to start a minimum of 0.5 or 1 metre (relative to distance from the boundary fence) below the maximum height of the existing fence line, as shown in Appendix E2.

#### 6.3 First Floor Covered Area – Absorptive Treatment

At least 75% of the soffit above the first floor outdoor play area should be acoustically treated to reduce the amount of reflected sound. We recommend that sound absorptive insulation should be fixed directly below the soffit and consist of 100 mm thick polyester insulation (density 32 kg/m<sup>3</sup>) with a ceiling consisting of a perforated metal (mini orb) or perforated fibre cement sheet (minimum open area 20%). An alternative design/material may be installed provided it achieves a minimum of NRC 0.6.

#### 6.4 Building Façade

#### 6.4.1 Glazing Requirements

A typical glazing specification is given in Table 15, however, an alternative glazing specification may be used if the R<sub>w</sub> is achieved or exceeded.

#### Table 15Schedule of Glazing Construction

Glazing Description	Min R <sub>w</sub>	Typical Glazing Specification
Windows – Northern Elevation		
Cot room	30	6.38 mm laminated glass

Glazing not specified above in Table 15 may be of standard thickness with a minimum R<sub>w</sub> 25.



This schedule of construction is typical and for general guidance to the architect in preparing final construction drawings and specifications. Other constructions that provide the same or better Sound Transmission Loss performance may also be acceptable.

Unless otherwise specified, window frames may be either sliding, awning or casement style and be of robust sound-barrier construction having interlocking stiles and Schlegel (or similar) Q-lon seals to minimise sound leakage.

It is most important that any sound leakage paths around the windows be sealed off. We recommend that prior to the fitting of architraves around the windows, the space between the frames and the wall structure be sealed off with polystyrene rod packers and silicone mastic. The window architraves can then be fitted.

#### 6.4.2 Eligible Suppliers of Windows and Glass Doors

The windows and doors are the most critical sound paths in a building. Only those companies who have conducted laboratory testing of their windows should be considered as eligible suppliers. Companies that we are aware of having conducted satisfactory testing include:

•	Architectural Window Systems, Wetherill Park, NSW	Phone: 8783 7611
•	Micos Aluminium Pty Ltd, Hillsdale, NSW	Phone: 9661 5233
•	Christoffel Pty Ltd, Glendenning, NSW	Phone: 9627 4811
•	Aska Windows, Greenacre, NSW	Phone. 9642 8588
•	James Hardie (Trend) Windows, Girraween, NSW	Phone: 9840 2000
•	Boral Window Systems, Smithfield, NSW	Phone: 9757 0555
•	Stegbar (Windows) Pty Ltd, Lansvale, NSW	Phone: 9794 5200

Approval should be sought from Day Design before any other manufacturers' products are considered. R<sub>w</sub> ratings claimed should be supported by acoustical laboratory test reports. We suggest that you obtain confirmation from the glazier that the glazing supplied will meet the required R<sub>w</sub> rating above.

#### 6.5 Construction Certificate - Mechanical Plant

The specifications for the mechanical plant have not yet been selected for this development. For typical mechanical plant and equipment with sound power levels not exceeding those listed in Table 9, it is reasonable and feasible to acoustically treat the associated plant area (absorptive lining, etc) or equipment itself so that noise will not impact the neighbouring properties.

Once mechanical plant has been selected, a detailed acoustic assessment should be made, prior to the issue of a Construction Certificate. We recommend that the mechanical services engineers select mechanical plant equipment with the lowest sound power levels to reduce the amount of acoustic treatment necessary to achieve the noise criteria at nearby residential receivers.



The cumulative noise emissions from the mechanical plant system, and use of the indoor play areas and car park is not to exceed the Project Noise Trigger Levels specified in Section 4.5.

We offer to provide detailed noise controls when specifications of the mechanical plant equipment have been finalised.

Rooms are to be ventilated to the standards set out in clause F4.5 of the Building Code of Australia and Australian Standards AS1668.2:1991.

#### 6.6 Construction Disclaimer

Recommendations made in this report are intended to resolve acoustical problems only. We make no claim of expertise in other areas and draw your attention to the possibility that our recommendations may not meet the structural, fire, thermal or other aspects of building construction.

We encourage clients to check with us before using materials or equipment that are alternative to those specified in our Acoustical Report.

The integrity of acoustic structures is very dependent on installation techniques. Therefore the use of contractors that are experienced in acoustic construction is encouraged. Furthermore, two insulation products may have the same thermal R rating but the sound absorption of one may be entirely deficient, therefore the use of materials and equipment that are supported by acoustic laboratory test data is encouraged.



Environmental Noise Assessment

#### 7.0 PREDICTED NOISE LEVELS - AFTER NOISE CONTROLS

#### 7.1 Outdoor Play Area Noise Levels – After Noise Controls

The intrusive external  $L_{eq, 15minute}$  noise levels at all receptor locations from the outdoor play areas after noise controls have been incorporated into the design, and are calculated to be as shown in Table 16.

Receptor Location – First Floor (FF), Ground Floor (GF) & Lower Ground Floor (LGF)	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 13 Lewis Street (GF)	44	45	Yes
R1A – 13 Lewis Street (FF)	41	46	Yes
R1B – 13 Lewis Street (LGF)	42	45	Yes
R1C – 13 Lewis Street (GF)	39	47	Yes
R1D – 13 Lewis Street (FF)	46	48	Yes
R2 – 26 Lewis Street (GF)	40	45	Yes
R3 – Balgowlah Heights PS (GF)	54	55	Yes
R3A – Balgowlah Heights PS (GF)	48	65	Yes
R3B – Balgowlah Heights PS (GF)	52	55	Yes
R4 – 54 Beatrice Street (GF)	45	45	Yes
R4A – 54 Beatrice Street (FF)	41	46	Yes

 Table 16
 Predicted Leq, 15 minute Noise Levels - Outdoor Play – After Noise Controls

The predicted  $L_{eq}$  levels of noise from the outdoor play areas are summarised in Table 16 at the receptors. Once noise controls are incorporated as recommended in Section 6, the predicted levels of noise at all receptor location comply with the criteria in Section 4.5.1 of this report, and will therefore be acceptable.



Oxford Number 1 Environmental Noise Assessment

### 7.2 Cumulative Noise Level - Indoor Play Area, Mechanical Plant & Car Park – After Noise Controls

Once the noise control recommendations in Section 6 are incorporated into the design, the calculated cumulative sound pressure level at the nearby receptors, from the indoor play areas, car park and mechanical plant will be as shown in Table 17.

Receptor Location –	Predicted Noise	Noise Criterion	Compliance
First Floor (FF), Ground Floor (GF) & Lower Ground Floor (LGF)	Level (dBA)	(dBA)	(Yes/No)
R1 – 13 Lewis Street (GF)			
- Indoor play area	37		
- Car park	<10		
- Mechanical plant	32		
Cumulative Noise Level	38	42	Yes
R1A – 13 Lewis Street (FF)	-	· · ·	
- Indoor play area	26		
- Car park	<10		
- Mechanical plant	41		
Cumulative Noise Level	41	46	Yes
R1B – 13 Lewis Street (LGF)			
- Indoor play area	27		
- Car park	32		
- Mechanical plant	34		
Cumulative Noise Level	36	42	Yes
R1C – 13 Lewis Street (GF)	-		
- Indoor play area	30		
- Car park	19		
- Mechanical plant	36		
Cumulative Noise Level	37	46	Yes
R1D – 13 Lewis Street (FF)	-	· · · ·	
- Indoor play area	38		
- Car park	19		
- Mechanical plant	41		
Cumulative Noise Level	43	47	Yes

### Table 17Predicted Cumulative Leq, 15 minuteNoise Levels - Indoor Play, MechanicalPlant & Car Park - After Noise Controls



Environmental Noise Assessment

Thank & Gar Fark Thiter Noise Controls Continued			
Receptor Location – First Floor (FF) & Ground Floor (GF)	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R2 – 26 Lewis Street (GF)			
- Indoor play area	28		
- Car park	26		
- Mechanical plant	38		
Cumulative Noise Level	39	42	Yes
R3 – Balgowlah Heights PS (GF)	-		
- Indoor play area	45		
- Car park	11		
- Mechanical plant	49		
Cumulative Noise Level	50	55	Yes
R3A – Balgowlah Heights PS (GF)	-		
- Indoor play area	40		
- Car park	23		
- Mechanical plant	43		
Cumulative Noise Level	44	65	Yes
R3B – Balgowlah Heights PS (GF)			
- Indoor play area	38		
- Car park	<10		
- Mechanical plant	44		
Cumulative Noise Level	45	55	Yes
R4 – 54 Beatrice Street (GF)	-		
- Indoor play area	41		
- Car park	<10		
- Mechanical plant	33		
Cumulative Noise Level	42	42	Yes
R4A – 54 Beatrice Street (FF)	-	<u> </u>	
- Indoor play area	38		
- Car park	<10		
- Mechanical plant	33		
Cumulative Noise Level	39	46	Yes

The predicted cumulative  $L_{eq}$  levels of noise from the indoor play areas, car park and mechanical plant during normal operation are summarised in Table 17 at the receptors. Once noise controls are incorporated as recommended in Section 6, the predicted levels of noise at all receptor location comply with the criteria in Section 4.5.1 of this report, and will therefore be acceptable.



#### 8.0 NOISE INTRUSION - ROAD TRAFFIC NOISE

#### 8.1 External Road Traffic Noise Levels – Outdoor Play Areas

The existing external road traffic noise level (*ERTNL*) was measured at ground level in the front yard of the proposed development site, shown as Location 'B' in Figure 1. The area is directly exposed to moderately low levels of traffic noise from Lewis Street.

The calculated LAeq, 1 hour (traffic) noise level at Location 'B' was 56 dBA, as shown in Table 4.

Based on the distances from Lewis Street and proposed sound barriers walls (see Section 5.4 and Appendix C), the calculated equivalent L<sub>Aeq, 1 hour (traffic)</sub> level is 43 dBA in the sandpit located in the eastern most area of the outdoor play area. The L<sub>Aeq, 1 hour (traffic)</sub> level will be lower in the other outdoor play area which are further away, and in most cases provided with more acoustic shielding, from Lewis Street.

The calculated levels are less than the AAAC external noise limit for Child Care Centres of  $L_{eq, 1 hour}$  55 dBA, and is therefore acceptable.

#### 8.2 Road Traffic Noise Intrusion Assessment – Indoor Activity & Sleeping Areas

The calculated  $L_{Aeq, 1 hour (traffic)}$  external road traffic noise levels is 43 dBA in the sandpit located in the eastern most area of the outdoor play area.

We note that the indoor activity areas and sleeping areas (Cot Room) are not directly exposed to traffic noise, or any other notable external noise source.

Standard building construction such as concrete block, brick or lightweight stud walls and metal-deck, concrete or ceramic tile roof with plasterboard ceiling, and 4 mm thick standard glazing can achieve a minimum 20 dB reduction with windows and doors closed, which would reduce an outdoor noise level of 43 dBA to 23 dBA for traffic noise inside an indoor activity area or sleeping area.

Considering the proposed location of the indoor activity areas and sleeping areas (Cot Room), the internal noise levels will comply with the AAAC's internal noise limit for Child Care Centres of  $L_{Aeq, 1 hour}$  40 dBA for indoor activity area and  $L_{Aeq, 1 hour}$  35 dBA for sleeping areas, and are therefore acceptable



#### 9.0 NOISE IMPACT STATEMENT

Day Design Pty Ltd was engaged by Mr George Antoniou on behalf of Oxford Number 1 to carry out an acoustic assessment of a proposed Child Care Centre at 11 Lewis Street, Balgowlah Heights, NSW.

Calculations show that, provided the recommendations in Section 6.0 of this report are implemented, the level of noise emission by the proposed Child Care Centre will meet the noise level requirements of the State Environmental Planning Policy (SEPP) (Educational Establishments and Child Care Facilities) 2017, the NSW Department of Planning and Environment's *Child Care Planning Guideline,* the Association of Australasian Acoustical Consultant's *Guideline for Child Care Centre Acoustic Assessment* and the NSW Environment Protection Authority's *Road Noise Policy*, and be considered acceptable.

Also, measurements and calculations show that, the intrusive road traffic noise levels will meet the noise level requirements of the NSW Department of Planning and Environment's *Child Care Planning Guideline* and the Association of Australasian Acoustical Consultant's *Guideline for Child Care Centre Acoustic Assessment*, and be considered acceptable.

Adam Shearer, BCT (Audio), MDesSc (Audio and Acoustics), MAAS Senior Acoustical Consultant for and on behalf of Day Design Pty Ltd

#### AAAC MEMBERSHIP

Day Design Pty Ltd is a member company of the Association of Australasian Acoustical Consultants, and the work herein reported has been performed in accordance with the terms of membership.

#### **APPENDICES**

- Appendix A Noise Survey Instrumentation
- Appendix B1 Ambient Noise Survey Front yard, 11 Lewis Street, Balgowlah Heights, NSW, Ground Floor
- Appendix B2 –Ambient Noise Survey Front yard, 11 Lewis Street, Balgowlah Heights, NSW, First Floor
- Appendix B3 Ambient Noise Survey Backyard, 11 Lewis Street, Balgowlah Heights, NSW, Ground Floor
- Appendix C Architectural Drawings
- Appendix D Approximate Noise Source Locations
- Appendix E Sound Barrier Wall Construction Methods



#### **APPENDIX A - NOISE SURVEY INSTRUMENTATION**

Noise level measurements and analysis were made with instrumentation as follows in Table A:

#### Table ANoise Instrumentation

Description	Model No	Serial No
Infobyte Noise Logger(Type 1)	iM4	115
Condenser Microphone 0.5" diameter	MK 250	10312
Infobyte Noise Logger (Type 1)	iM4	121
Condenser Microphone 0.5" diameter	MK 250	6595
Infobyte Noise Logger (Type 1)	iM4	122
Condenser Microphone 0.5" diameter	MK 250	5219
Acoustical Calibrator	CAL200	3646
Modular Precision Sound Analyser	B&K 2270	301 1809
Condenser Microphone 0.5" diameter	B&K 4189	309 9836

An environmental noise logger is used to continuously monitor ambient noise levels and provide information on the statistical distribution of noise during an extended period of time. The Infobyte Noise Monitor iM4's are Type 1 precision environmental noise monitors meeting all the applicable requirements of AS1259 for an integrating-averaging sound level meter.

The B&K 2270 Sound Analysers are a real-time precision integrating sound level meter with octave and third octave filters, that sample noise at a rate of 10 samples per second and provides L<sub>eq</sub>, L<sub>10</sub> and L<sub>90</sub> noise levels using both Fast and Slow response and L<sub>peak</sub> noise levels on Impulse response time settings. The meter is frequency weighted to provide dBA, dBC or Linear sound pressure level readings as required.

All instrument systems had been laboratory calibrated using instrumentation traceable to Australian National Standards and certified within the last two years thus conforming to Australian Standards. The measurement system was also field calibrated prior to and after noise surveys. Calibration drift was found to be less than 0.5 dB for attended measurements and within 1 dB for long-term measurements. No adjustments for instrument drift during the measurement period were warranted.





Weather Affected ..... Lmax ----- L 1 ----- L10 ----— Leg **—** L90

### 7102-1 Appendix B



**AMBIENT NOISE SURVEY** 



Weather Affected Lmax ----- L1 ------ L10 — Leg \_ L90

7102-1 Appendix B



### **AMBIENT NOISE SURVEY**



Weather Affected Lmax ----- L1 ------ L10 ----- Leg ----- L90

7102-1 Appendix B





De	evelopment Application NOT For Constru		<b>NOT For Constructi</b>
Rev	Description	Date	
А	Issue for Development Application	17.12.2020	
В	Without Prejudice Submission	10.05.2021	
С	Revised Issue for Development Application	28.06.2021	
D	Revised Issue for Development Application	02.07.2021	
Е	Revised Issue for Development Application	12.07.2021	
F	Revised Issue for Development Application	10.08.2021	
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LEVEL 4, 111-117 DEVONSHIRE STREET, SURRY HILLS, NSW 2010 T.02 9318 8400 F.02 9318 8480 STEPHEN J. NORDON Registration No. NSW - 4704 GRAHAM P. JAGO Registration No. NSW - 4926



10m

Lanscape. Refer to Landscape architecuture Plans

Storm Water. Refer to Civil engineer plans

### **NOT For Construction**

### DA Applicant : George Antoniou Site Address : Lot B DP 369977 11 Lewis Street Balgowlah Heights NSW 2093



TITLE

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# 7102-1 Rev C Appendix C

#### General Notes:

Architectural Drawings To Be Read In Conjunction With All Other Design Consultants Detailed Drawings, Reports And Specifications.

Site Survey Carried Out *Cibar Surveying* - Refer To Drawing - **Ref. No: 20148\_LD Date 06.11.2020** All Levels Indicated Taken To Australian Height Datum (AHD) (AHD) Levels Prefixed With \*RL. Are Interpreted From Existing Survey Information, Final Levels To Be Determined On Detail Review Of Existing Footpath Levels

All Dimensions to Be Verified On Site (VOS) Prior To Construction / Manufacture. Refer All Discrepancies To Nordon Jago Architects Pty. Ltd. -

J:\BVR00120 Lewis Street\4 NJA Documentation\5 CADD\3 DA\01 Model\BVR00120 DA 210810.rvt	JOB No.		BVR00120
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Proposed Lower Ground	SCALE	A1 @	1 : 100
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10m







### **NOT For Construction**

### DA Applicant : George Antoniou Site Address : Lot B DP 369977 11 Lewis Street Balgowlah Heights NSW 2093



TITLE

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# 7102-1 Rev C Appendix C

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All Dimensions to Be Verified On Site (VOS) Prior To Construction / Manufacture. Refer All Discrepancies To Nordon Jago Architects Pty. Ltd. -

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Proposed Ground and Level 1 Plans	SCALE	A1 @	1 : 100
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10m



### Development Application

### **NOT For Construction**

0m 1m 2m 3m 4m 5m

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Rev	Description	Date
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LEVEL 4, 111-117 DEVONSHIRE STREET, SURRY HILLS, NSW 2010 T.02 9318 8400 F.02 9318 8480 STEPHEN J. NORDON Registration No. NSW - 4704 GRAHAM P. JAGO Registration No. NSW - 4926



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# 7102-1 Rev C Appendix C

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All Dimensions to Be Verified On Site (VOS) Prior To Construction / Manufacture. Refer All Discrepancies To Nordon Jago Architects Pty. Ltd. -

### DA Applicant : George Antoniou Site Address : Lot B DP 369977 11 Lewis Street Balgowlah Heights NSW 2093

		DA.190 E
r reposed roof r lan	DWG No.	
Proposed Roof Plan	SCALE	A1 @ 1 : 100
	DATE	December 2020
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Proposed Southern Elevation



## Development Application

# RevDescriptionDateAIssue for Development Application17.12.2020BWithout Prejudice Submission10.05.2021CRevised Issue for Development Application28.06.2021DRevised Issue for Development Application02.07.2021ERevised Issue for Development Application12.07.2021FRevised Issue for Development Application10.08.2021

LEVEL 4, 111-117 DEVONSHIRE STREET, SURRY HILLS, NSW 2010 T.02 9318 8400 F.02 9318 8480 STEPHEN J. NORDON Registration No. NSW - 4704 GRAHAM P. JAGO Registration No. NSW - 4926

pof	
	Glass Block Glazing

### **NOT For Construction**

### DA Applicant : George Antoniou Site Address : Lot B DP 369977 11 Lewis Street Balgowlah Heights NSW 2093

0m 1m 2m 3m 4m 5m 10m Scale Bar 1:100 TITLE

# 7102-1 Rev C Appendix C



#### General Notes:

Architectural Drawings To Be Read In Conjunction With All Other Design Consultants Detailed Drawings, Reports And Specifications.

Site Survey Carried Out *Cibar Surveying* - Refer To Drawing - **Ref. No: 20148\_LD Date 06.11.2020** All Levels Indicated Taken To Australian Height Datum (AHD) Levels Prefixed With \*RL. Are Interpreted From Existing Survey Information, Final Levels To Be Determined On Detail Review Of Existing Footpath Levels

All Dimensions to Be Verified On Site (VOS) Prior To Construction / Manufacture. Refer All Discrepancies To Nordon Jago Architects Pty. Ltd. -

J:\BVR00120 Lewis Street\4 NJA Documentation\5 CADD\3 DA\01 Model\BVR00120 DA 210810.rvt	JOB No.	BVR0	0120
Proposed Elevations	DATE	December	2020
	SCALE	A1 @ 1	: 100
	DWG No.		
		DA.300	F











### **Development Application**

Rev	Description	Date	
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### **NOT For Construction**

### DA Applicant : George Antoniou Site Address : Lot B DP 369977 11 Lewis Street Balgowlah Heights NSW 2093

0m 1m 2m 3m 4m 5m 10m Scale Bar 1:100

TITLE

# 7102-1 Rev C Appendix C

Level Roof Eaves - RL 91230

Level 1 - RL 88830

Ground - RL 85830

Lower Ground - RL 81542

#### General Notes:

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Site Survey Carried Out *Cibar Surveying* - Refer To Drawing - **Ref. No: 20148\_LD Date 06.11.2020** All Levels Indicated Taken To Australian Height Datum (AHD) (AHD) Levels Prefixed With \*RL. Are Interpreted From Existing Survey Information, Final Levels To Be Determined On Detail Review Of Existing Footpath Levels

All Dimensions to Be Verified On Site (VOS) Prior To Construction / Manufacture. Refer All Discrepancies To Nordon Jago Architects Pty. Ltd. -

J:\BVR00120 Lewis Street\4 NJA Documentation\5 CADD\3 DA\01 Model\BVR00120 DA 210712.rvt	JOB No.	BVR001	20
Proposed Elevations	DATE	December 2020	
	SCALE	A1 @ 1 : 1	00
	DWG No.		
		DA.301 E	









1 : 100

LEVEL 4, 111-117 DEVONSHIRE STREET, SURRY HILLS, NSW 2010 T.02 9318 8400 F.02 9318 8480 STEPHEN J. NORDON Registration No. NSW - 4704 GRAHAM P. JAGO Registration No. NSW - 4926

Scale Bar 1:100

Section C-C 3 1 : 100

10m

### **NOT For Construction**



TITLE

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# 7102-1 Rev C Appendix C

#### General Notes:

Architectural Drawings To Be Read In Conjunction With All Other Design Consultants Detailed Drawings, Reports And Specifications.

Site Survey Carried Out *Cibar Surveying* - Refer To Drawing - **Ref. No: 20148\_LD Date 06.11.2020** All Levels Indicated Taken To Australian Height Datum (AHD) (AHD) Levels Prefixed With \*RL. Are Interpreted From Existing Survey Information, Final Levels To Be Determined On Detail Review Of Existing Footpath Levels

All Dimensions to Be Verified On Site (VOS) Prior To Construction / Manufacture. Refer All Discrepancies To Nordon Jago Architects Pty. Ltd. -

### DA Applicant : George Antoniou Site Address : Lot B DP 369977 11 Lewis Street Balgowlah Heights NSW 2093

		DA.200 F	
	DWG No.		
Proposed Sections	SCALE	A1 @ 1 : 100	
	DATE	December 2020	
J:\BVR00120 Lewis Street\4 NJA Documentation\5 CADD\3 DA\01 Model\BVR00120 DA 210810.rvt	JOB No.	BVR00120	











### **NOT For Construction**

10m

### DA Applicant : George Antoniou Site Address : Lot B DP 369977 11 Lewis Street Balgowlah Heights NSW 2093



TITLE

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# 7102-1 Rev C Appendix D

#### General Notes:

Architectural Drawings To Be Read In Conjunction With All Other Design Consultants Detailed Drawings, Reports And Specifications.

Site Survey Carried Out *Cibar Surveying* - Refer To Drawing - **Ref. No: 20148\_LD Date 06.11.2020** All Levels Indicated Taken To Australian Height Datum (AHD) Levels Prefixed With \*RL. Are Interpreted From Existing Survey Information, Final Levels To Be Determined On Detail Review Of Existing Footpath Levels

All Dimensions to Be Verified On Site (VOS) Prior To Construction / Manufacture. Refer All Discrepancies To Nordon Jago Architects Pty. Ltd. -

Proposed Ground and Level 1 Plans	DWG No.		
	SCALE	A1 @	1 : 100
	DATE	December 2020	
J:\BVR00120 Lewis Street\4 NJA Documentation\5 CADD\3 DA\01 Model\BVR00120 DA 210810.rvt	JOB No.	E	BVR00120



10m



### Development Application

### **NOT For Construction**

0m 1m 2m 3m 4m 5m

Scale Bar 1:100

Rev	Description	Date
А	Issue for Development Application	17.12.2020
В	Without Prejudice Submission	10.05.2021
С	Revised Issue for Development Application	28.06.2021
D	Revised Issue for Development Application	02.07.2021
Е	Revised Issue for Development Application	12.07.2021

LEVEL 4, 111-117 DEVONSHIRE STREET, SURRY HILLS, NSW 2010 T.02 9318 8400 F.02 9318 8480 STEPHEN J. NORDON Registration No. NSW - 4704 GRAHAM P. JAGO Registration No. NSW - 4926



TITLE

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# 7102-1 Rev C Appendix D

#### General Notes:

Architectural Drawings To Be Read In Conjunction With All Other Design Consultants Detailed Drawings, Reports And Specifications.

Site Survey Carried Out *Cibar Surveying* - Refer To Drawing - **Ref. No: 20148\_LD Date 06.11.2020** All Levels Indicated Taken To Australian Height Datum (AHD) (AHD) Levels Prefixed With \*RL. Are Interpreted From Existing Survey Information, Final Levels To Be Determined On Detail Review Of Existing Footpath Levels

All Dimensions to Be Verified On Site (VOS) Prior To Construction / Manufacture. Refer All Discrepancies To Nordon Jago Architects Pty. Ltd. -

### DA Applicant : George Antoniou Site Address : Lot B DP 369977 11 Lewis Street Balgowlah Heights NSW 2093

		DA.190	Е
Proposed Roof Plan	DWG No.		
	SCALE	A1 @ 1	: 100
	DATE	December	2020
J:\BVR00120 Lewis Street\4 NJA Documentation\5 CADD\3 DA\01 Model\BVR00120 DA 210712.rvt	JOB No.	BVR	00120

### CHILD CARE CENTRE FENCES Sound Barrier Wall Boundary Treatment

#### **OUTDOOR PLAY AREA**





DAY DESIGN PTY LTD

S

### CHILD CARE CENTRE FENCES 7102-1 Sound Barrier Wall Stepped In Boundary Treatment Appendix E2

#### **OUTDOOR PLAY AREA**



Not To Scale

DAY DESIGN PTY LTD

C