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PROPOSED CHILDCARE CENTRE

**20 DAVID HILL ROAD
MONBULK, VICTORIA**

**Town Planning Submission
Acoustic Assessment Report**

Client Details:

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Table of Contents

1. Introduction	4
2. Noise Assessment Terminology	5
3. Measurement Equipment.....	6
4. Subject Site and Surrounding Environment	7
5. Proposed Site Layout and Operations	8
6. Outdoor Play Noise Assessment Guideline Discussion.....	9
7. Site Investigations and Existing Acoustic Environment	10
8. Noise Emission Assessment.....	11
8.1 Noise Prediction Methodology.....	11
8.2 Assessment of Noise Emissions Associated with Children Playing in Outdoor Areas.....	12
8.2.1 AAAC Assessment Guidelines	12
8.2.2 Source Noise Levels.....	14
8.2.3 Noise Modelling Input Parameters.....	15
8.2.4 Noise Prediction Results.....	16
8.3 Assessment of Services Equipment and Waste Collection Noise.....	17
8.3.1 Services Equipment Noise Emission	17
8.3.1.1 Assessment Criteria	17
8.3.1.2 Services Equipment Source Noise Levels and Assessment.....	19
8.3.2 Waste Collection.....	20
8.3.2.1 Event Description and Source Noise Levels	20
8.3.2.2 Noise Predictions	22
9. Assessment of Sleep Disturbance Noise Due to Use of Carpark	23
10. Noise Mitigation Strategies	25
10.1 General Environmental Duty Requirements.....	25
10.2 Mechanical Services Equipment	25
10.3 Carparking Area Guidelines	26
10.4 General Noise Management Recommendations.....	26
10.5 Operating Limitations.....	27
10.6 Acoustic Barrier Requirements.....	28



11. Conclusions	30
Appendix 1 – Project Plan Drawings	31
Appendix 2 – Unattended Noise Monitoring Data	33



1. INTRODUCTION

The proposal includes the construction and operation of a new childcare facility at the site described as 20 David Hill Road, Monbulk.

The new facility will include internal and external areas where children will occupy and play, as well as an external carpark and driveway entry abutting Victoria Avenue to the east.

The proposal accommodates up to 80 children at the facility with proposed operating hours between 6:30am and 6:30pm Monday to Friday.

The subject site is located within proximity of existing residential use and therefore has the potential to generate noise emissions which may impact on the acoustic amenity of the surrounding uses.

In consideration of the above, Watson Moss Growcott Acoustics (WMG) has been engaged to undertake a review of the proposal and provide commentary regarding potential noise emissions associated with the proposed use.

This report presents a summary of the assessment and includes practical noise mitigation strategies to minimise noise emissions from the site where appropriate.



2. NOISE ASSESSMENT TERMINOLOGY

Noise assessment terminology used within this report is defined within Table 1 below.

Table 1: Noise Assessment Terminology

Terminology	Definition
dB(A)	Decibels recorded on a sound level meter, which has had its frequency response modified electronically to an international standard, to quantify the average human loudness response to sounds of different character
L_{eq}	The equivalent continuous level that would have the same total acoustic energy over the measurement period as the actual varying noise level under consideration. It is the noise measure defined by the EPA as the measure of the noise to use in assessing compliance with noise limits.
L_{90}	The level exceeded for 90% of the measurement period, which is representative of the typical lower levels in a varying noise environment. It is the noise measure defined by the EPA as the measure of the background noise level to use in determining noise limits.
L_{10}	Commonly described as the average of the higher levels of a range of noise levels. It is the value of a range of values exceeded for 10% of the observation period, <i>i.e.</i> the level exceeded for 6 minutes for every 60 minutes of observation.
L_{max}	The highest instantaneous maximum 'A weighted' noise level.
Sound Power Level (L_w)	The sound power level of a source is a measure of the amount of energy in the form of sound emitted from the source. The sound power level of a source is an inherent characteristic of that source and does not vary with distance from the source or with a different acoustic environment. The sound power level equals the sound pressure level at a distance from the source plus 10 times the logarithm (to base 10) of the measurement surface area (m^2), and is relative to a reference sound power of 1pW, (10-12 Watts).
Sound Pressure Level (L_p)	Sound that we can hear with our ears or measure with a sound level meter is actually small variations in the pressure of the air around us. The magnitude of the pressure fluctuations vary over a very wide range from the very lowest levels we can just hear to the very high levels we need to be protected from, and for that reason sound is measured on a logarithmic scale. The sound pressure level equals 10 times the logarithm (to base 10) of the sound pressure divided by a reference pressure, which is 20 μ Pa. The sound pressure level reduces with increasing distance from a source and is influenced by the surroundings.



3. MEASUREMENT EQUIPMENT

As part of the assessment works, WMG used the equipment described in Table 2 below.

Table 2: Measurement Equipment List

Equipment Designation	Use of Equipment
Rion NA27 Precision Sound Level Meter	Handheld Noise Measurements
Ngara Real Time Sound Acquisition System	Fixed Position Unattended Noise Monitoring

The field calibration of the measurement equipment was checked with a Bruel & Kjaer Type 4230 Sound Level Calibrator at the commencement and completion of the noise measurements and found to be within the correct calibration range.

4. SUBJECT SITE AND SURROUNDING ENVIRONMENT

The site is located at 20 David Hill Road and abuts residential dwellings which occupy low density residential zone land to the west and south, Victoria Avenue to the east and David Hill Road to the north.

When addressing noise emissions from the proposed use, the residential dwellings which immediately about the subject site to the west and south, as well as the nearest dwellings located to the east across Victoria Avenue and to the north across David Hill Road will require consideration.

Based on their proximity to the subject site, the critical receptors will include:

- **R1:** Single level dwelling – 18 David Hill Road, Monbulk.
- **R2:** Single level dwelling – 2 Victoria Avenue, Monbulk.
- **R3:** Single level dwelling – 1 Victoria Avenue, Monbulk.
- **R4:** Single level dwelling – 22 David Hill Road, Monbulk.
- **R5:** Single level dwelling – 25 David Hill Road, Monbulk.
- **R6:** Single level dwelling – 23 David Hill Road, Monbulk.

Whilst still relevant, other sensitive receptors located within proximity of the site will be receive less noise exposure from the site. Therefore, compliance with criteria at the identified receptors would also be expected to result in compliance at all other receptor locations.

An aerial photo of the subject site and relevant sensitive residential receptors is included in Figure 1.



Figure 1: Aerial Photograph of Subject Site and Surrounds



5. PROPOSED SITE LAYOUT AND OPERATIONS

As part of the proposal, WMG has been provided with architectural drawings for the project which have been prepared by On Architecture. The relevant floor plans for the proposal are included within Appendix 1 for reference.

The drawings indicate that the proposal will include a new multi-level building incorporating five internal childrens rooms combined with administration areas, staff room, laundry, kitchen, and reception.

Externally, the new use will include play areas along the southern, eastern, western boundaries as well as a portion of the northern site boundary at ground level.

Vehicle parking is proposed adjacent to the northern site boundary and will be accessed via a crossover from Victoria Avenue along the eastern site boundary. It is understood that the carpark will be used for pick up / drop off, staff parking and waste collection.

The current plan includes perimeter fencing around the subject site including around outdoor play areas.

Based on the documentation provided, the facility will accommodate up to 80 children with various age groups ranging from 'babies' which a less than 1 year old to 5 years.

The proposed operating hours will be between 6:30am and 6:30pm Monday to Friday.



6. OUTDOOR PLAY NOISE ASSESSMENT GUIDELINE DISCUSSION

Many previous VCAT determinations for childcare centres have repeatedly reinforced the principle that childcare centres can and should be a compatible use within residential areas.

In support of the above principle, the writer's firm has previously provided recommendations for practical noise control screening for outdoor play areas to minimise the potential for adverse noise changes when assessed at adjoining existing residences.

In the absence of any regulated quantitative noise assessment procedures, several members of the Association of Australasian Acoustical Consultants (AAAC) in New South Wales developed a qualitative assessment procedure.

This procedure was adopted as a AAAC guideline published document and has included updates during October 2013 and in September 2020.

The guidance within the AAAC document indicates that noise associated with children playing within outdoor areas should not exceed ambient background noise levels by more than 5-10 dB(A) depending on the usage of the outdoor play area.

Previous iterations of the Guideline have nominated more restrictive assessment criteria for centres where children play outside for greater than 2 hours per day. The practical experience for this firm and others adopting the assessment procedures often resulted in a perceived need for excessively tall noise barriers due to typical usage of outdoor areas including greater than 2 hours per day.

The latest iteration of the Guideline has now set a threshold of 4 total hours including 2 hours of play in the morning and 2 hours of play in the afternoon.

Where children play outside for less than four hours per day (two in the morning, two in the afternoon), the Guideline nominates that noise emissions should not exceed the background noise level by more than 10 dB. For greater than four hours, the nominated criteria is reduced to 5 dB.

For this childcare centre and many others, there may be instances where the intent will be for children to play outdoors for greater than four hours, and therefore the guideline assessment procedures would apply the more restrictive criterion of background noise + 5 dB.

Whilst acknowledging that the AAAC Guideline is of assistance, previous VCAT determinations including *Tamoe Investments Pty Ltd v Glen Eira CC [2015] VCAT 719* have identified that the document is not a reference document in the Scheme nor is it an adopted Policy of Council.

In addition to the above, there are various determinations and approvals from Council and VCAT including *Rosenberg v Glen Eira [2016] VCAT 1433* which have considered the background noise + 5 dB(A) as conservative given that typical childcare facilities operate during weekday daytime periods only, and occupation of outdoor areas is often intermittent rather than continuous.

Residual noise levels at sensitive receptors equivalent to background + 10 dB(A) have commonly been considered as appropriate by relevant Authorities.

For this project, the writer has reverted to the principle of practical height noise barriers around child outdoor play areas and then considered the outcomes at sensitive receptors relative to the guidance provided within the AAAC documentation.

7. SITE INVESTIGATIONS AND EXISTING ACOUSTIC ENVIRONMENT

As part of site investigations for the proposal, WMG has attended the site and has undertaken attended and unattended noise monitoring within the boundaries of the site land and within the surrounding area.

The unattended noise monitoring was undertaken during the period Tuesday 17th May to Thursday 26th May 2022 and included continuous measurement of noise levels and recording of audio files. The overall noise level data obtained as part of the unattended monitoring is included within Appendix 2.

The unattended monitoring device was installed adjacent to the southern boundary of the subject site and was considered representative of the acoustic environment at receptor locations which were not directly exposed to noise from vehicle movements along David Hill Road.

Supplementary measurements were also undertaken adjacent to the northern boundary of the subject site and across the road outside 25 David Hill Road, to consider the acoustic environment at the northern receptors, and toward the northern boundaries of the R1 and R4 receptors.

Figure 2 provides an aerial photo of the site including the attended and unattended monitoring locations.



Figure 2: Aerial Photograph including monitoring locations



8. NOISE EMISSION ASSESSMENT

8.1 NOISE PREDICTION METHODOLOGY

Modelling of operational noise emissions associated with the proposal has been conducted using DataKustik CadnaA 2022 environmental noise modelling software.

Relevant information regarding site elevations, site buildings and the surrounding environment has been provided by the client and sourced from online databases including Nearmaps and VicMaps.

The model has been developed and configured with sufficient detail for appropriate noise emission calculations to be undertaken.

For this assessment, the modelling software has implemented the calculation procedures defined within International Standard ISO 9613-2: 1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO 9613).

The described standard has been considered and approved as part of many previous projects requiring noise emission assessment works.

Through implementation of the Standard through CadnaA 2022, the noise emission modelling considers the following attenuation measures:

- Geometrical spreading.
- Atmospheric absorption.
- Ground attenuation.
- Meteorological effects.
- Source / Receiver height effects.
- Attenuation due to the surrounding environment including existing buildings / structures.

The noise modelling input parameters have been adjusted to reflect the Environmental Protection Authority (EPA) Victoria assessment methodology requirements. These include:

- Residual noise levels at noise sensitive receivers have been considered when weather conditions assist with propagation of emissions in the direction of the relevant receptor.
- Predicted values have been considered within 10 metres of the relevant noise sensitive residential external facades.

Based on site observations, it is understood that the surrounding residential receptors considered critical for the assessment are single level, however it is noted that some receptors include elevated outdoor areas or are elevated relative to a conventional single level dwelling.

In consideration of the above, WMG has adopted the assessment height based on information contained within the land survey plan for R2 and adopted a receptor height of 3.5m above ground level for the rear elevated area of the R4 receptor.

For each of the other receptors, WMG has adopted an assessment height of 1.5m above ground level.

The above approach has been considered and approved as part of assessments of a similar nature.



8.2 ASSESSMENT OF NOISE EMISSIONS ASSOCIATED WITH CHILDREN PLAYING IN OUTDOOR AREAS

8.2.1 AAAC Assessment Guidelines

WMG has analysed the measured noise levels recorded as part of the site investigations and determined that vehicle movements along nearby roads are the main source of ambient noise around the site.

In accordance with the AAAC guideline documentation, the ambient background noise levels during assessment periods outlined in the Regulation or Guideline for each State or Territory are considered appropriate for setting noise emission criteria for children playing in outdoor areas at the centre.

EPA Regulations nominate the 'day' period as 7:00am to 6:00pm Monday to Saturday which generally align with the operating hours of the centre and have therefore been adopted for the assessment.

It is noted that the operating hours do extend from 6:30am during the morning and 6:30pm during the evening, however, it is understood that children will not be within outdoor areas at these times.

A summary of the measured ambient background noise levels recorded by the unattended monitoring device is included within Table 3 below.

Table 3: Summary of Measured Ambient Background Noise Levels

Day / Date	Measured Ambient Background Noise Level (7:00am to 6:00pm)	Weather Conditions / Comments
Tuesday 17.05.2022	Not measured.	Calm, minor rain.
Wednesday 18.05.2022	42 dB(A) L ₉₀	Calm, with showers.
Thursday 19.05.2022	38 dB(A) L ₉₀	Calm, minor rain.
Friday 20.05.2022	38 dB(A) L ₉₀	Calm, minor rain prior to 9:00am.
Saturday 21.05.2022	38 dB(A) L ₉₀	Calm, minor rain prior to 9:00am.
Sunday 22.05.2022	36 dB(A) L ₉₀	Calm, minor rain.
Monday 23.05.2022	39 dB(A) L ₉₀	Calm, minor rain prior to 9:00am.
Tuesday 24.05.2022	39 dB(A) L ₉₀	Calm, no rain.
Wednesday 25.05.2022	41 dB(A) L ₉₀	Calm, no rain.
Thursday 26.05.2022	Not measured.	Calm, minor rain.

During deployment of the continuous noise monitoring device, the attending consultant also undertook supplementary measurements within the rear yard of the subject site at a location representative of the R2 receptor.

From analysing the audio files recorded by the continuous noise monitoring device, there are periods of bird noise and construction noise which may influence the measured ambient background noise levels recorded in Table 3 above.



Therefore, WMG has adopted the marginally lower value of 36 dB(A) L_{90} which was obtained during the attended site measurements on Tuesday 17th May 2022 as the basis for the assessment.

When observed and measured adjacent to the southern boundary of 25 David Hill Road and the northern boundary of the subject site, the acoustic environment was commonly dominated by noise associated with vehicle movements along David Hill Road with measured values of 45 dB(A) L_{90} being recorded by the attending consultant.

Based on the ambient background noise levels recorded at the subject site, the AAAC guideline values for addressing noise emissions associated with children playing in outdoor areas at the proposed use would be as discussed below:

- At the southern facades of R5 and R6 receptors, and the northern facades of R1 and R4 receptors, in the order of 50 dB(A) L_{eq} for greater than four hours of outdoor play, and 55 dB(A) L_{eq} for less than four hours of outdoor play.
- For the rear areas of the R1 and R4 receptors, and for the R2 and R3 receptors, the guideline would nominate a 'base criteria' of 45 dB(A) L_{eq} , however, in accordance with the 'background plus 10dB' methodologies commonly adopted by Responsible Authorities, values of 46 dB(A) L_{eq} may also be considered as appropriate.



8.2.2 Source Noise Levels

As part of previous investigations at childcare centres, WMG has observed and carried out noise measurements associated with children playing in outdoor areas. The number of children and the noise that they generate in play areas varies from time to time and for different facilities.

Children tend to distribute themselves in groups throughout the available play area and slightly towards the central parts of the play area where items of play equipment will often be located.

For this assessment, WMG has considered the source sound power levels provided within the AAAC Guidelines which are summarised within Table 4 and relate to groups of 10 children playing.

Table 4: AAAC Guideline Values: Effective Sound Power Levels for groups of 10 Children Playing

Number of Age of Children	dB(A)	Sound Power Levels [dB] at Octave Band Centre Frequencies [Hz]							
		63	125	250	500	1000	2000	4000	8000
10 children 0-2 years	78	54	60	66	72	74	71	67	64
10 children 2-3 years	85	61	67	73	79	81	78	74	70
10 children 3-5 years	87	64	70	75	81	83	80	76	72

For effective sound power levels of a specific number of children, the guideline document provides the following formula:

$$\text{Effective Sound Power Level for 'n' children} = \text{Effective Sound Power Level for 10 children} + 10 \log(n/10)$$

The sound power level of a noise source will be independent of environment and is a common method for quantifying the acoustic power of a noise source.

The noise level will be a variable produced at a particular distance and surrounding environment from a source of a particular sound power level.

This is much the same concept as a light bulb having a certain rated power wattage and producing a different level of light at different distances and in differing surrounding environments.

Noise measurements recorded by WMG during previous investigations produced average measured values in the order of 58 dB(A) L_{eq} when measuring a group of 28 pre-school children at 10 metres from a dedicated outdoor play area boundary, and 18 metres from children playing within the outdoor area in the absence of any noise barrier shielding.

In consideration of the above, the measured values recorded by the writer correlate well with the AAAC guideline range of values given for the 2-3 year old children and 3-5 year old children.



8.2.3 Noise Modelling Input Parameters

Noise predictions associated with children playing within outdoor areas has been based on information provided by the client which includes the number of children, the age of the children, and the rooms where those children will be located.

A summary of the information provided to WMG, and the corresponding sound power levels adopted to consider the noise emissions from children playing in the outdoor areas is included within Table 5.

Table 5: Summary of adopted noise model input parameters

Room Designation	Number of Children	Age Group	Adopted Sound Power Level per 10 Children
1	8	1 – 2 years old	78 dB(A) L_{eq}
2	12	0 – 1 years old	78 dB(A) L_{eq}
3	16	2 – 3 years old	85 dB(A) L_{eq}
4	22	3 – 5 years old	87 dB(A) L_{eq}
5	22	3 – 5 years old	87 dB(A) L_{eq}

In determining the residual noise levels at noise sensitive receptors, WMG has modelled simultaneous occupation of the outdoor areas by all children at the facility.

Therefore, using the source data from the AAAC Guideline as a basis, the predicted noise emissions will represent the higher levels of noise which may occur at sensitive receptors.

During other times when fewer children are located within the external areas, lower noise levels would be expected at each of the receptors.

In addition to the above, WMG has utilised the following input parameters for the noise model:

- Barriers constructed around outdoor areas as described in Section 10 of this report.
- Outdoor areas will include soft floor coverings eg: grass or rubber matting (not concrete).
- Children play in external areas within proximity to their designated internal areas.
- Sound power levels have been distributed uniformly around the available outdoor play area.



8.2.4 Noise Prediction Results

Noise emissions associated with the children playing within the outdoor play areas will be reduced by distance separation between the outdoor areas and the sensitive receptors, as well as noise shielding provided by the proposed acoustic barriers and other operational measures.

When addressing noise emissions from the proposal, residual noise levels have been predicted at sensitive residential facades including openable window / door sections.

In addition, predicted values include consideration of external occupiable areas located within 10m of the dwelling external facades which aligns with the assessment methodologies contained within the Environment Protection Act 2017 reference documentation.

External carparking areas and / or driveways have generally not been considered as noise sensitive as part of the assessment.

In consideration of the above, Table 6 below provides a summary of the predicted residual noise levels at each of the critical sensitive receptors located within proximity of the site.

Table 6: Predicted Noise Levels at Critical Receptors Surrounding Subject Site

Receptor	Address	Predicted Noise Level
R1	18 David Hill Road Front of property	44 dB(A) L_{eq}
	18 David Hill Road Rear of property	46 dB(A) L_{eq}
R2	2 Victoria Avenue	45 dB(A) L_{eq}
R3	1 Victoria Avenue	42 dB(A) L_{eq}
R4	22 David Hill Road Front of property	44 dB(A) L_{eq}
	22 David Hill Road Rear of property	46 dB(A) L_{eq}
R5	25 David Hill Road	39 dB(A) L_{eq}
R6	23 David Hill Road	38 dB(A) L_{eq}

The results of the noise model indicate that predicted values at sensitive receptors surrounding the subject site will be in the order 0-10 dB(A) above the measured ambient background noise levels which have been adopted as the basis for the assessment.

When considered relative to the AAAC guideline values, the predicted noise levels generally align with the guideline values applicable for occupancy of outdoor areas for two hours in the morning and two hours in the afternoon. However, in some instances, the predicted values are higher than the guideline values applicable for occupancy greater than two hours in the morning and two hours in the afternoon.

8.3 ASSESSMENT OF SERVICES EQUIPMENT AND WASTE COLLECTION NOISE

8.3.1 Services Equipment Noise Emission

8.3.1.1 Assessment Criteria

Noise emissions associated with services equipment occurring within site boundaries will be assessable in accordance with the Environment Protection Act 2017 (The Act).

Within the Act, residual noise levels at residential receptors require consideration in accordance with EPA Publication 1826.4 *'Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues'* (Noise Protocol).

The Noise Protocol replaced the previously applicable State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No.1 (SEPP N-1) on July 1, 2021.

The subject site land and the sensitive receptors surrounding the subject site are located within the 'major urban area' associated with Monbulk as illustrated below.

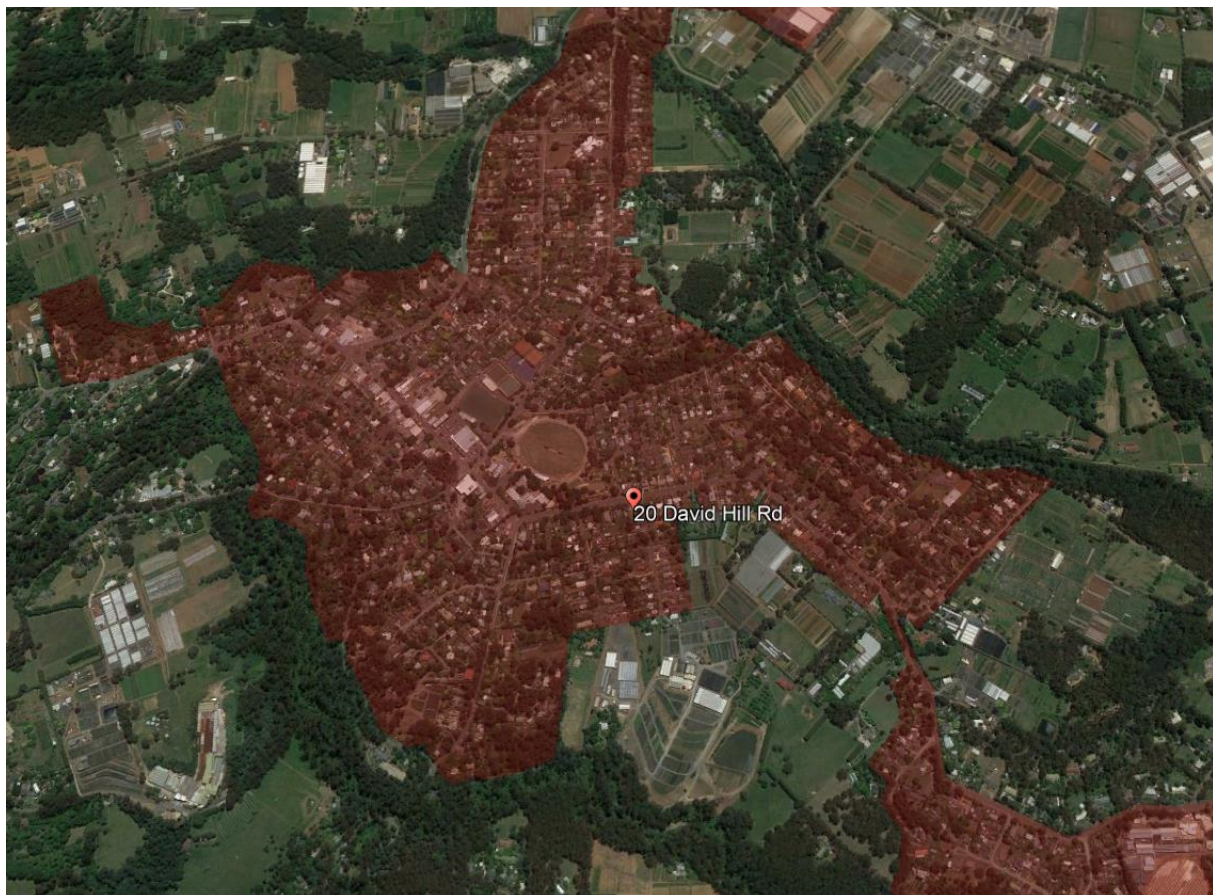


Figure 3: Major urban area boundary of Monbulk

In accordance with the Noise Protocol, noise limits for site operations will be determined in accordance with Part I, A1 of the Noise Protocol document referenced as the 'urban area method'.

Using the 'urban area method', relevant 'zoning levels' are calculated using the area of differing land zoning types surrounding residential receptors as described in Clause 17-15 of the Noise Protocol.

The calculated 'zoning levels' vary depending on the time of the day, evening, or night with the highest permitted values occurring during day periods and the lowest during night periods.



The relevant day, evening, and night assessment periods are shown in Table 7.

Table 7: Details of EPA Assessment Periods

EPA Assessment Period	Relevant Days	Relevant Time Periods
Day	Monday to Saturday	7:00am to 6:00pm
Evening	Monday to Saturday	6:00pm to 10:00pm
	Sunday, Public Holidays	7:00am to 10:00pm
Night	All Days	10:00pm to 7:00am

Further derivation of 'noise limits' applicable for the proposed commercial / industrial use are based on measurement of the existing ambient background noise level at nearby relevant sensitive receptors in accordance with Clause 39-51 of the Noise Protocol.

Where ambient background noise levels at sensitive receptors fall within the range considered 'neutral' in accordance with the Noise Protocol methodologies, the calculated 'zoning levels' will apply as noise limits for the proposed commercial / industrial operations.

The 'neutral' range represents an ambient background noise level which is considered 'typical' for the relevant land zoning types surrounding the receptor location.

Where ambient background noise levels are measured to be higher or lower than the 'neutral range', background level adjusted noise limits will apply for the proposed use.

The proposed operating hours are between 6:30am and 6:30pm Monday to Friday and will therefore generally fall within the day period with extension into the early morning (night), and evening periods.

Based on the land zoning types surrounding each of the critical nearby residential receptors, the noise limits determined for the assessment will be as shown below in Table 8.

Table 8: Calculated Noise Protocol Noise Limits

Assessment Period	Relevant Days	Relevant Time Periods	Calculated Noise Limits	
			R1 (front), R4 (front), R5 and R6	R1 (rear), R2, R3, R4 (rear)
Early Morning (Night)	Monday to Friday	6:30am to 7:00am	40 dB(A) $L_{e/q}$ *	39 dB(A) $L_{e/q}$
Day	Monday to Friday	7:00am to 6:00pm	51 dB(A) $L_{e/q}$	48 dB(A) $L_{e/q}$
Evening	Monday to Friday	6:00pm to 6:30pm	45 dB(A) $L_{e/q}$ *	42 dB(A) $L_{e/q}$

* **Note.** Based on 'neutral' ambient background noise level which aligns with day period measurement.

The noise limits must be met within a 'noise sensitive area', which for this site will be within the boundary of any of the nearby sensitive receptors, and within 10 metres of the outside of the external walls of the dwelling. The relevant assessment period will be 30 minutes.



8.3.1.2 Services Equipment Source Noise Levels and Assessment

The services design for the proposal has not been completed at this stage, however it is anticipated that relevant equipment associated with the proposal will include:

- Exhaust fans associated with toilets, kitchen, laundry etc.
- Outdoor air conditioning equipment.

The current plans do not identify the location of any relevant outdoor equipment, however it would be anticipated that air conditioning equipment could be located at ground level or above the roof of the facility and ventilation fans will likely located above the roof at various locations.

When addressing noise emissions associated with services equipment, the AAAC guideline provides indicative sound power levels to assist with site configuration during the planning phase of a proposal.

The sound power levels are included below.

Table 9: AAAC Guideline Services Equipment Sound Power Levels

Noise Source	Sound Power Level
Small (single fan) condenser (outdoor unit)	65 dB(A)
Medium (double fan) condenser (outdoor unit)	70 dB(A)
Large (double fan) condenser (outdoor unit)	80 dB(A)
Small exhaust fan (toilet, garbage room)	60 dB(A)
Small kitchen exhaust fan	70 dB (A)

Using the above sound power data to provide some basis for calculating noise emissions from the site, it would be recommended that services equipment is located at least 12.0m from residential boundaries with line of sight to the equipment blocked from the sensitive receptor land.

Should a 'large (double fan) condenser (outdoor unit)' form part of the proposal, it is likely that this distance would need to increase to 20.0m in combination with shielding.

The primary recommendation will be that once a services design has been completed, the design is reviewed by an acoustic consultant to ensure compliance with relevant noise criteria.

8.3.2 Waste Collection

8.3.2.1 Event Description and Source Noise Levels

Based on discussions with the client, and previous involvement in similar facilities, it is understood that waste collection associated with the subject site will include the following:

- A private collection service is proposed to collect all waste streams from within the property.
- The vehicle will enter and exit the site onto Victoria Avenue to the east.
- The nominated waste collection vehicle will be a mini rear loader 6.4m in length.
- The nominated waste collection times will be between 7:00am to 8:00pm Monday to Friday, and 9:00am to 8:00pm on weekends and public holidays.
- The waste contractor will be responsible for retrieving, emptying, and returning bins from the bin store at the time of collection.

A swept path has not been provided for review, however, based on the site configuration, Figure 4 below provides a markup of the expected waste collection vehicle route.

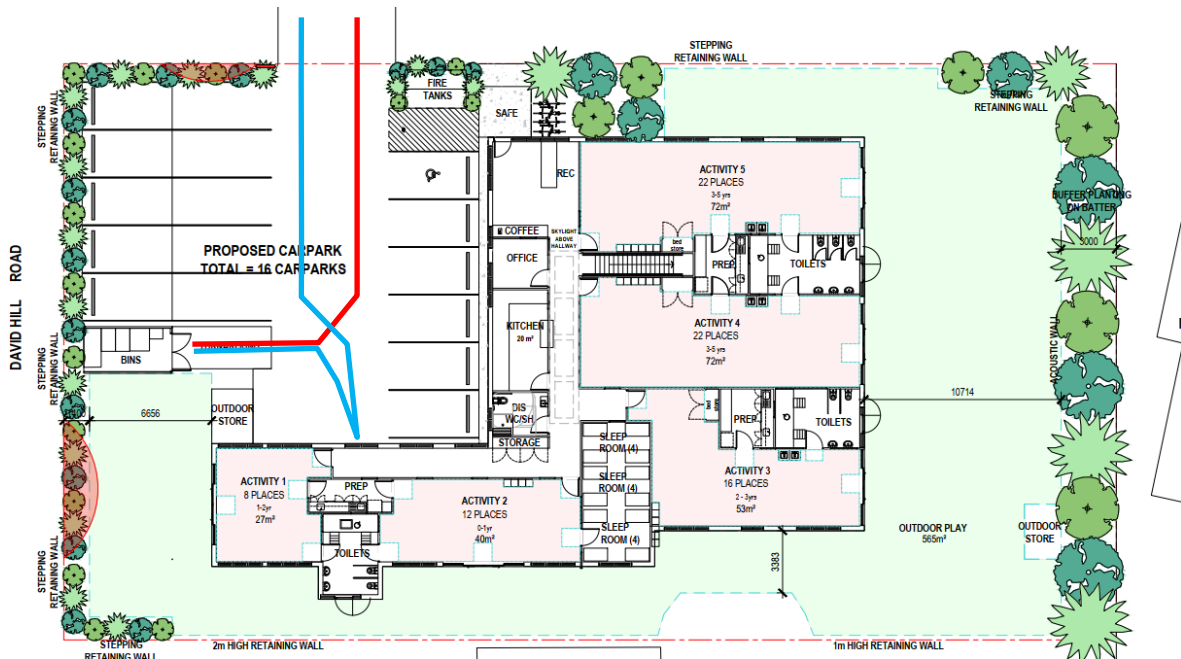


Figure 4: Expected waste collection truck route

The waste collection vehicle will therefore travel in a forward direction on site, however, will be required to reverse in order to depart the site.

When addressing noise associated with waste collection, typical noise sources requiring consideration will include truck movement noise, reversing safety alarm beepers and the actual waste collection event.

WMG has previously undertaken noise measurements of various heavy vehicle types travelling within private land where speeds have been generally limited to under 20km/h consistent with the proposal.

Measurements have shown variation in truck noise levels based on the vehicle type, vehicle speed and the manner in which the driver is operating their vehicle. Measured values equating to a sound power level of 84 dB(A) to 110 dB(A) have been obtained as part of these previous investigations.

The truck type nominated within the report is a mini rear loading light rigid vehicle.



From discussions with several waste collection operators, rear compactors associated with a 'mini' type vehicle are often sourced from Garwood International and could be either a 'Miner' unit or a 'Bantam' unit each of which use a light rigid vehicle consistent with a Hino 300 or equivalent.

WMG has measured a Bantam unit previously as part of an independent investigation.

Given the site configuration, and space available for the vehicle to move within the carpark, it would be expected that the vehicle will be travelling at very slow speeds in the order of 5km/h whilst on site and will likely be rolling into position with engine revs close to idle.

Based on previous site measurements and observations, it is expected that if drivers maintain their general environment duty to operate their vehicles reasonably, sound power levels in the order of 90-92 dB(A) will be achievable during slow speed forward movement.

For the waste collection event, a range of values due to the event which typically varies based on the truck type, operator of the vehicle, the contents of the bin, the contents of the truck, and whether the bin includes any additional elements which may generate impact noise when the bin is raised and tipped.

From previous experience including a Bantam rear loading vehicle, the waste collection event including the emptying of a single bin occurred for in the order of 60 seconds and equated to a sound power level in the order of 92 dB(A).

The above values have been considered as the basis for the assessment.

Despite including impulse type noise character, an impulsive adjustment has not been applied as the event is considered 'sporadic' in accordance with EPA assessment methodology.



8.3.2.2 Noise Predictions

Due to the location of the carpark, the critical receptors will be the dwellings located to the east at 22 David Hill Road, to the north at 23 and 25 David Hill Road, and to the west at 18 David Hill Road.

Based on calculations implementing noise prediction methodology described within ISO 9613, predicted noise levels at each of the described receptors will be as shown below in Table 10.

Table 10: Predicted Noise Levels

Receptor	Address	Predicted Noise Level
R1	18 David Hill Road Front of property	35 dB(A) L_{eq}
	18 David Hill Road Rear of property	<25 dB(A) L_{eq}
R4	22 David Hill Road Front of property	41 dB(A) L_{eq}
	22 David Hill Road Rear of property	41 dB(A) L_{eq}
R5	25 David Hill Road	39 dB(A) L_{eq}
R6	23 David Hill Road	39 dB(A) L_{eq}

Due to the tonal nature of the reverse beepers which will likely be attributable to the waste collection vehicle, it could be deemed reasonable to apply a +2 dB tonal adjustment to the predicted noise levels in accordance with the Noise Protocol.

Including the described tonal adjustment, the calculated values are predicted to comply with the Noise Protocol noise limits during the day period between 7:00am and 6:00pm Monday to Saturday, however, may marginally exceed the noise limits during the defined 'evening' periods by 1dB at the rear of the R4 receptor.

The events may be infrequent (ie once per day or twice per week), however, strictly in accordance with the Noise Protocol, there is the potential for noise levels at the residential receptors to exceed the relevant criteria if events occur outside the described day period.



9. ASSESSMENT OF SLEEP DISTURBANCE NOISE DUE TO USE OF CARPARK

Where operations are proposed to commence prior to 7:00am, WMG commonly consider the potential for sleep disturbance to occur at noise sensitive receptor locations due to vehicles using the carpark.

The approach taken by this firm and others in relation to potential for sleep disturbance is based on a review of numerous sleep disturbance studies set out in the *NSW Road Noise Policy* (March 2011), issued by the Department of Environment, Climate Change and Water NSW.

From the research on sleep disturbance to date, the document concludes the following:

- maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep.
- one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.

The noise levels referred to are the noise levels within rooms used for sleeping.

Based on the outcomes described above, Table 10 below presents a summary of the equivalent outdoor and indoor noise levels which have the potential to cause sleep awakening and / or affect health and wellbeing.

Table 11: Summary of Sleep Disturbance Assessment Criteria Values

Reaction	Noise Level Inside Habitable Room	Equivalent Noise Levels Outside Habitable Room	
		Windows closed	Windows open
Unlikely to cause sleep awakening	50 – 55 dB(A)	73 – 78 dB(A)	60 – 65 dB(A)
1 –2 events per night not likely to affect health and wellbeing	65 – 70 dB(A)	88 – 93 dB(A)	75 – 80 dB(A)

The values are based on the generally accepted 10 dB noise reduction from outside to inside provided by an open window and will be applicable outside windows of spaces used for sleep.

From the previous experience of the writer’s firm, noise caused by patrons and their vehicles will generally be associated with conversational noise, closing of doors associated with their vehicles and starting their vehicle engines in a reasonable or unreasonable manner.

Commonly, a sound power level in the order of 95 dB(A) has been adopted for reasonable behaviour, with unreasonable behaviour resulting in noise levels in the order of 8 dB(A) higher.

The described values are generally applicable where parking spaces form part of a commercial premises as instantaneous noise emissions associated with vehicles travelling at slow speeds within the site boundaries are typically much lower and of a more constant nature.

Generally, WMG consider the sound power levels associated with ‘reasonable’ behaviour relative to the NSW Road Noise Policy (2011) values ‘unlikely to cause sleep disturbance’, and the more infrequent, ‘unreasonable’ behaviour noise level impacts relative to the values where ‘1-2 events per night not likely to affect health and wellbeing’.



Unreasonable behaviour is more commonly considered for commercial facilities including service stations and convenience restaurants which may extend operating hours in the night period or perhaps 24 hour operations.

With suitable provisions from facility management, it would be expected that unreasonable behaviour at a facility consistent with the proposal could be avoided.

The facility carpark will be located in the north eastern corner of the subject site abutting Victoria Avenue and will include vehicle carparks within approximately 20.0m of the nearest residential facades.

Based on noise level calculations, residual noise levels at a distance of 20.0m will be in the order of 61 dB(A) L_{max} which would be within the range of values 'unlikely to cause sleep awakening' during times when residential windows are open.

Further to the above, and in accordance with the general environmental duty of the client, it is considered appropriate that practical noise control treatments be implemented where possible to minimise the potential for significant adverse change in the acoustic amenity at surrounding sensitive receptors.

Specific details regarding what will likely be considered practical noise control strategies are discussed in Section 10.



10. NOISE MITIGATION STRATEGIES

Suitable strategies for reducing noise emissions associated with the proposed are included below.

The strategies described within this report are tentative in nature.

Should other initiatives or provisions be incorporated within the development which ensure that the outcomes of the assessment remain unchanged, the treatments herein may be amended at the approval of a qualified acoustic consultant.

10.1 GENERAL ENVIRONMENTAL DUTY REQUIREMENTS

In accordance with the requirements of The Act, the client would be deemed to be in breach of the GED if the client fails to do any of the following in the course of conducting the business or the undertaking so far as reasonably practicable:

- use and maintain plant, equipment, processes and systems in a manner that minimises risks of harm to human health and the environment from pollution and waste;
- use and maintain systems for identification, assessment and control of risks of harm to human health and the environment from pollution and waste that may arise in connection with the activity, and for the evaluation of the effectiveness of controls;
- use and maintain adequate systems to ensure that if a risk of harm to human health or the environment from pollution or waste were to eventuate, its harmful effects would be minimised;
- ensure that all substances are handled, stored, used or transported in a manner that minimises risks of harm to human health and the environment from pollution and waste;
- provide information, instruction, supervision and training to any person engaging in the activity to enable those persons to comply with the general environmental duty.

The described items will likely be internal processes involving training and documentation to address any potential emissions from the site in the event that they occur.

10.2 MECHANICAL SERVICES EQUIPMENT

Given the early stages for the project, definitive strategies cannot be provided regarding noise control and equipment operating parameters.

Based on the site configuration, it is expected that noise emissions can be adequately controlled through the selection of low noise equipment setback from residential boundaries by in the order of 12-20m and including noise shielding elements.

The primary recommendation will be that the client engage the services of an acoustic consultant to review the services design and ensure that noise emissions comply with relevant noise protocol noise limits at residential receptors.



10.3 CARPARKING AREA GUIDELINES

To minimise the potential for adverse impacts on the surrounding noise sensitive receptors, WMG provide the following construction guidelines for the proposed car parking area:

- Road surfaces must not include surface coverings which promote tyre squeal.
- Speed humps should be avoided, however, if required must include smooth transitions with minimal gradient.
- If a spoon grate is installed as part of the proposal, it must be bolted into position rather than rely on gravity to be held in place.
- Driver's angle of view from the car parking area to be sufficient to ensure that horns are not required to alert pedestrians when exiting the site. Angled mirrors may also assist with minimising the need for horns.
- Ensure than pedestrian gates are fitted with rubber stops or slow closing mechanisms to minimise the potential for impact generated noise.

The current proposal does not include any access gate providing access to the carpark. If this is to be introduced, then the operating mechanism / motor would need to be reviewed by an acoustic consultant.

10.4 GENERAL NOISE MANAGEMENT RECOMMENDATIONS

Part of controlling noise emissions associated with the proposed use will rely on facility management being active and aware of potential noise issues.

Guideline recommendations for general operations include the following:

- Implementing management plans for non-typical events (eg. crying) within outdoor areas to ensure that the events are relocated to indoor areas and resolved promptly.
- Communication with parents / guardians relating to expectations during arrival and departure from the subject site. This will include minimising loud communication, and operating vehicles in 'reasonable' manner.
- Clear signage within car parking areas which notifies parents / guardians to be aware of their surroundings and to conduct themselves in a 'reasonable' manner.
- Provision of facility contact details for parents and neighbours to facilitate communication and to resolve any neighbourhood issues that may arise due to operation of the Centre.
- Staff to be educated to control their volume of voice when located outdoors.

It may be suitable for the facility to prepare a noise management plan which identifies potential issues and includes set processes to minimise noise emissions which includes the above.



10.5 OPERATING LIMITATIONS

In order to minimise noise emissions associated with the proposed use, WMG recommend that the following operating limitations are suitable for inclusion in noise management of the proposed use.

- Operating hours are limited to 6:30am to 6:30pm Monday to Friday.
- It is understood that a maximum of 80 children will occupy the facility at any stage, and that the children will be up to 5 years of age.
- During maximum capacity, external areas will be occupied by 80 children (but not before 7:00am or after 6:00pm). The assessment has been based on children being distributed relatively uniformly throughout the outdoor areas adjacent to their respective indoor areas and not gathered as a single large group immediately adjacent to sensitive receptors.
- Waste collection services should be undertaken in accordance with the guidance provided within EPA Publication 1254.2 (Noise Control Guidelines) as shown below:
 - Annoyance created by industrial waste collection tends to intensify in the early-morning period. To this end, early-morning collections should be restricted to non-residential areas to minimise early morning disturbances. Where a residential area is impacted by noise from the collection of refuse, then collections should be restricted to the times contained within the schedule.
 - Refuse bins should be located at sites that provide minimal annoyance to residential premises.
 - Compaction should be carried out while the vehicle is moving.
 - Bottles should not be broken up at collection site.
 - Routes which service predominantly residential areas should be altered regularly to reduce early morning disturbances.
 - Noisy verbal communication between operators should be avoided where possible.
- Based on the results of the noise model, waste collection should be limited to the EPA defined day period in order to comply with Noise Protocol noise limits at sensitive receptors.

Variations to either of the input parameters adopted as the basis for this assessment may result in increased noise emissions associated with the facility and will require further review.



10.6 ACOUSTIC BARRIER REQUIREMENTS

The recommendation will be to include acoustic barriers around the perimeter of the site at ground level.

To provide noise reduction qualities, the barriers and balustrades must be constructed as follows:

- Manufactured from materials weighing at least 10 kg/m².
- Suitable materials will include 25mm thick timber, 6mm glass, 15mm polycarbonate, 9mm cement sheet, or 3 layers of 0.48mm Colorbond steel sheeting. Masonry options including brickwork and precast concrete will also be acceptable. Other materials must be reviewed prior to approval.
- If constructed from timber or plywood be stable so that the materials do not crack or warp (thus potentially creating gaps between panels) during the life of the fence.
- Installed in a manner that does not allow gaps between panels, and between the fence panels and the ground below. This will typically require the installation of a barge board partially buried in the ground. For timber fences, gaps should be overlapped with timber cover pieces, glued and screwed.

For glazed elements, gaps should be sealed using resilient mastic eg: Sikaflex Pro.

- A common acoustic paling fence will be constructed from a minimum of 25 mm thick 150 mm wide treated vertical timber boards, butted together and with 50 mm cover strips. The fencing will include a barge board partially buried in the ground.
- If access doors are to form part of acoustic barrier fences, then the doors must be constructed as per the fence and include an overlapping section to minimise the gaps around the perimeter of the openable section.
- Rubber seals must also be included to eliminate gaps between the openable section and the ground below and well as the adjoining fixed panels.
- The location of the barriers must align with site boundaries which typically have the highest ground elevation to maximise the noise reduction provided by the barrier.
- Sections of the barrier must include sound absorption (as marked up in Figure 5). The relevant sound absorption must be installed to 100% of the acoustic barrier as nominated and must achieve an NRC 0.9 performance. The finalised product and configuration must be reviewed and approved by an acoustic consultant. Suitable suppliers will include Acoufelt Pty Ltd, Autex Acoustics Pty Ltd, Sontext, Megasorber and Soundblock Solutions.

The nominated acoustic barriers are included below within Figure 5.

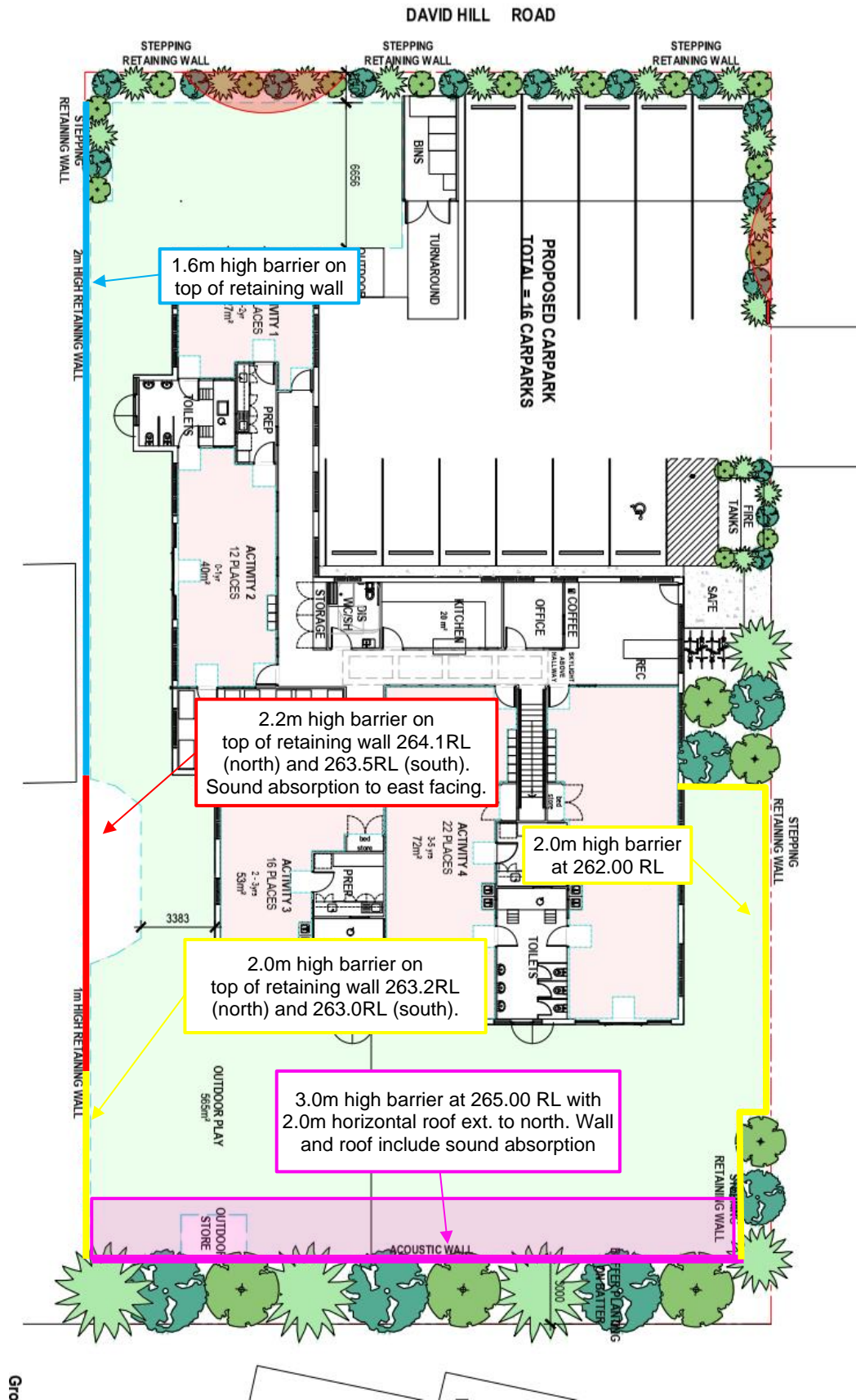


Figure 5: Ground Level Acoustic Barrier Markup



11. CONCLUSIONS

WMG has undertaken an assessment to address noise emissions from the proposed construction and operation of a new childcare centre at the site described as 20 David Hill Road, Monbulk.

The assessment works have included noise modelling to calculate noise emissions associated with the proposed use including due to services equipment, carpark use during the early morning and noise due to children occupying outdoor areas associated with the proposal.

The findings of the assessment conclude:

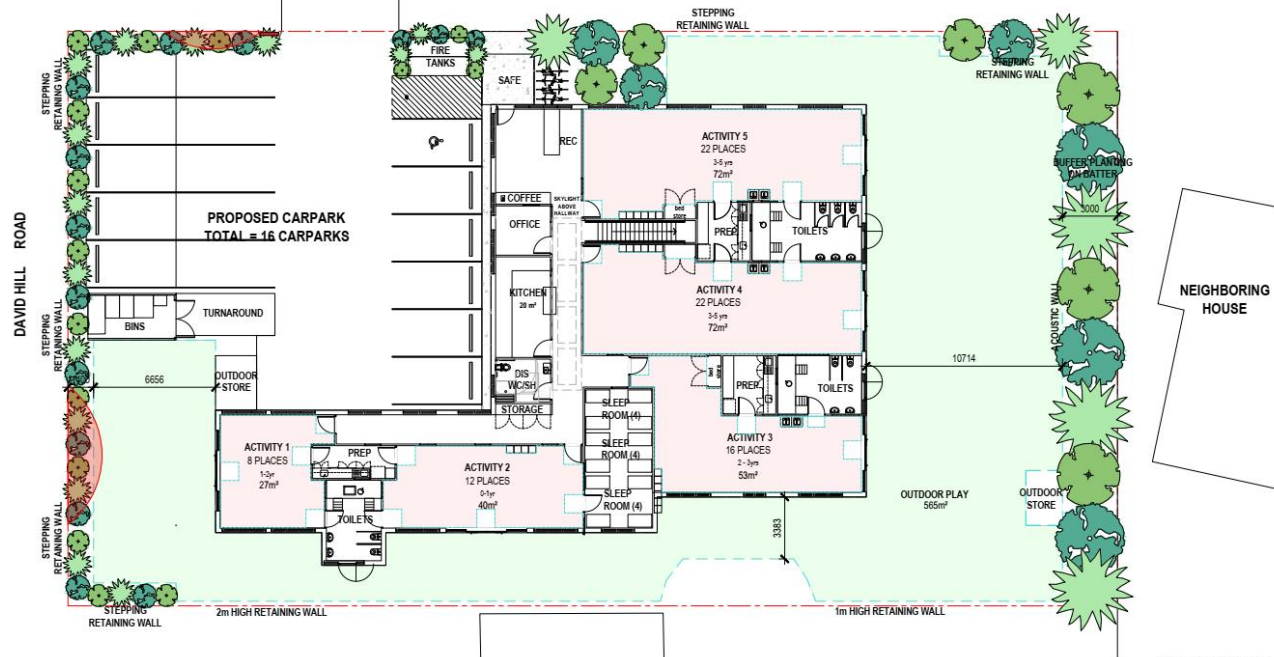
- Practical height barriers have been incorporated in the design, which on this occasion result in residual noise levels consistent with the AAAC guideline values commonly adopted by Victorian Responsible Authorities and in VCAT determinations.
- With suitable equipment selections, setbacks from residential boundaries, and noise shielding noise associated with services equipment at the site can be adequately attenuated to comply with Noise Protocol noise limits at sensitive residential receptors.
- Due to the configuration of the base building, and setbacks from residential dwellings, instantaneous noise associated with use of the carpark has been calculated to result in values 'unlikely to cause sleep disturbance' at the critical nearby sensitive receptors.
- Waste collection events must be limited to the EPA defined day period in order to comply with Noise Protocol noise limits at each of the nearby residential receptors.

WMG would recommend that the finalised proposal is reviewed by an acoustic consultant once relevant services equipment selections have been made to ensure that the proposal aligns with the findings of this report and complies with relevant criteria at sensitive receptors.

JORDAN GROWCOTT
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APPENDIX 1 – PROJECT PLAN DRAWINGS

SITE DATA		ACTIVITY AREA SCHEDULE							OUTDOOR PLAY AREA SCHEDULE							
ITEM	VALUE	ROOM	PLACES	AGE	STAFF RATIO	STAFF No.	AREA REQ	UNENNUMBERED AREA	ENNUMBERED AREA	TOTAL AREA PROVIDED	ROOMS	PLACES	AREA REQ	UNENNUMBERED AREA	ENNUMBERED AREA	TOTAL AREA PROVIDED
SITE AREA	1798sqm															
BUILDING AREAS (GFA)																
• Ground	564sqm	ROOM 1	8	0-2	1:4	2	27sqm	8sqm	35sqm		ROOM 1	8	560	565sqm	12sqm	572sqm
• First	65sqm	ROOM 2	12	2-3	1:4	3	40sqm	8sqm	48sqm		ROOM 2	12				
TOTAL	629sqm	ROOM 3	16	2-3	1:4	4	53sqm	8sqm	61sqm		ROOM 3	16				
PROPOSED CHILD CARE PLACES	80	ROOM 4	22	4-5	1:11	2	71.5 sqm	9sqm	81sqm		ROOM 4	22				
SITE COVER	590sqm = 31.3%	ROOM 5	22	3-4	1:11	2	71.5 sqm	9sqm	81sqm		ROOM 5	22				
IMPERVIOUS COVER	1000sqm = 55.6%	TOTALS	80			15	286	290sqm	43sqm	333sqm						
REQUIRED CARPARKING	0.22 per place = 17.6 cars required															
PROPOSED CARPARKING	16 Carparks															



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CHILD CARE FACILITY
20 Davids Hill Road, Monbulk

Job No: S429
Dwg No: SK06.1
Date: April 2022

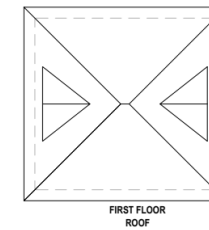
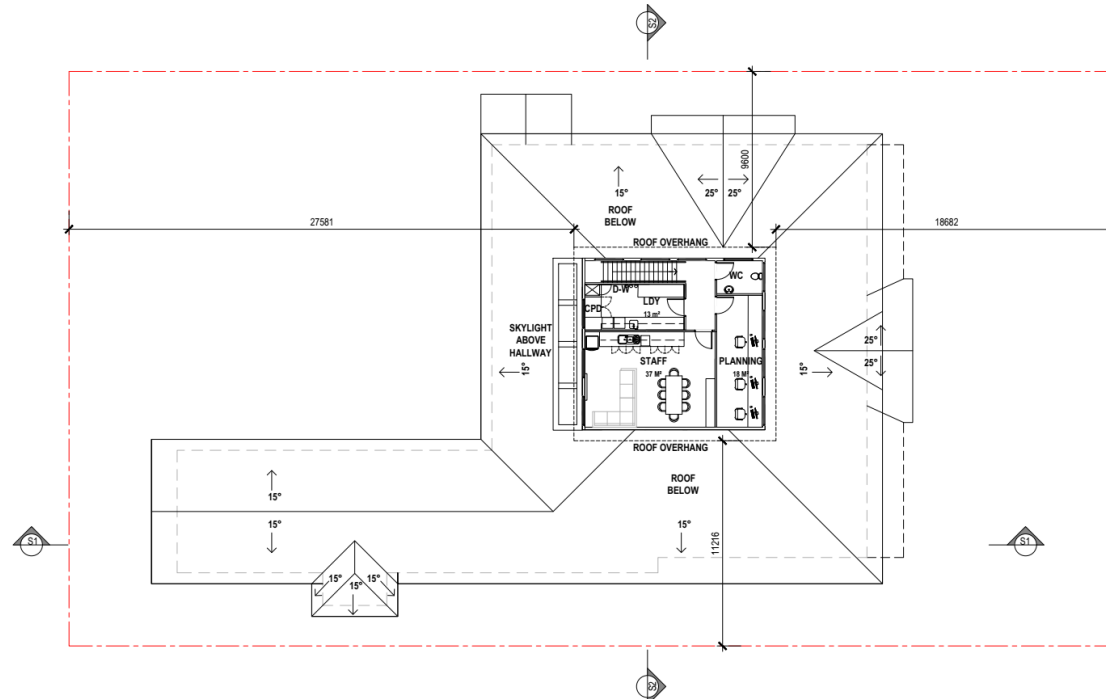
Ground Floor Plan
Scale: 1:200 @ A3





PLANNING ISSUE

Rev	Amendment	Date



FIRST FLOOR
ROOF

ROOF PLAN
1:200



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Project
CHILD CARE FACILITY
20 Davids Hill Road, Monbulk

Drawing
PROPOSED ROOF PLAN

Scale: As indicated Drawn: HT
Client: DDM/YYYY
Date: 20/06/22
Job No: 20220028
Sheq No: DA06 Rev: AS SHEET



APPENDIX 2 – UNATTENDED NOISE MONITORING DATA

