WAVEFORM
ACOUSTICS

PROJECT# 24386

ACOUSTIC REPORT INFORMATION SHEET

PROJECT
5B Kelly Court, Springvale, Cattery

PREPARED FOR
Paws Hotel

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PREPARED BY
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REVISIONS REGISTER	ISSUE DATE
Draft Acoustic Report	15.8.24
Final Acoustic Report	20.8.24
Final Acoustic Report Rev A	28.8.24

DOCUMENT REGISTER	ISSUE DATE
Letter of engagement	1.8.24

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1.0 – EXECUTIVE SUMMARY

Waveform Acoustics has been engaged by The Paws Hotel Du to provide an Acoustic Report in relation to the use of the cattery at 5B Kelly Court, Springvale. In particular, demonstrating that the proposed use and level of noise generated can be appropriately contained in the facility without unreasonable impact on the residences and accommodation in close proximity.

Previously, Waveform Acoustics provided an acoustic report for this site, #23674, however as of writing this report, the business has been sold to Paws Hotel, who wish to increase the capacity to 90 cats (previously 40) on site.

The council have requested the following conditions are approved for the permitting of the site:

- *Condition 4*
  - *Prior to the operation/commencement of the use hereby approved, a revised Acoustic Report to the satisfaction of the Responsible Authority must be submitted to and approved by the Responsible Authority. The Acoustic Report must be prepared by a person or firm with suitable qualifications to the satisfaction of the Responsible Authority. When approved, the Acoustic Report will be endorsed and will form part of this permit. The revised Acoustic Report must generally be in accordance with the Acoustic Report submitted with the application but modified to show:*
    - *4.1 4.2 Identify noise from any external plant or equipment to be installed together with any acoustic measures required, if applicable. Identify noise from the backup power generator to be installed together with any acoustic measures required, if applicable. All to the satisfaction of the Responsible Authority.*
- *Condition 5*
  - *Prior to the operation/commencement of the use hereby approved, a backup power generator must be provided on the site. The generator must be appropriately baffled; and in accordance with the approved Acoustic Report, if applicable.*
- *Condition 15*
  - *The land use must comply with the EPA 1826.4 Noise Protocol Requirements at all times.*
- *Condition 16*
  - *Noise levels emanating from the land must not exceed the permissible noise levels stipulated in the Environment Protection Regulations under the Environment Protection Act 2017 and the Incorporated Noise Protocol (Publication 1826.4, Environment Protection Authority, May 2021) as may be amended from time to time to the satisfaction of the Responsible Authority.*

The facility is within the Greater Dandenong planning scheme, situated in an Industrial 1 Zone (IN1Z) with General Residential Zone Schedule 1 (GRZ1) immediately to the west, north and east. The near Noise Sensitive Receiver (NSR) is located on 25 Stephenson Street, approximately 77m north of the facility. It is our opinion that compliance at this location will be indicative of compliance at all NSR locations.

Testing was conducted as unattended measurements from 24/8/23 to 25/8/23.

It is our opinion that the facility can comply with their EPA 1826.4 Noise Protocol obligations with strict application of the recommendations contained in this report.

Best Regards,

Rohan Barnes MAAS
Principal Consultant

2.0 – LEGISLATION AND GUIDELINES

In the preparation of the report the following legislation and guidelines were used:

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).
This publication provides a protocol for the purpose of determining noise limits for new and existing commercial, industrial and trade premises and entertainment venues as defined by the Regulations. It sets the methodology for assessing the effective noise level to determine unreasonable noise under Regulations 118, 125 and 130. The measurement procedures of this Noise Protocol are also used to determine aggravated noise under Regulations 121, 127 and 131.

Environment Protection Regulations 2021
The objectives of these Regulations are to further the purposes of, and give effect to, the Environment Protection Act 2017 by imposing obligations in relation to environmental protection in Victoria.

State Environmental Protection General Environmental Duty 2021
Environment protection laws will mean that anyone engaging in an activity posing a risk of harm to human health and the environment, from pollution or waste, must manage that risk to prevent harm as far as reasonably practicable. This general environmental duty applies to all Victorians. It means you will need to proactively assess and manage the risks of harm from your activities. Eliminating or reducing risk is important because industry activities could impact - Noise – affecting people's sleep; communication, cognition and learning; domestic or recreational activities; tranquillity and enjoyment inside and outside.

3.0 – ACOUSTIC ASSESSMENT

DETAILS OF TESTING

An ARL Ngara noise logger recorded the environmental noise data calibrated prior to and after measurement. The data was collected when writing the report #23674.

EQUIPMENT REGISTER	S/N	CALIBRATION DATE
ARL Ngara Noise Logger	878153	due 21/11/24
SV 33A Calibrator	73304	due 22/11/23

DATE & TIME	LOCATION
24/8/24, 15:00 – 25/8/23, 13:45	Logger was positioned at a representative location at 16 Kelly Ct (see Appendix – Site Map)

ATMOSPHERIC

DATE	TEMPERATURE (C^O) MIN/MAX	RAIN (mm)	WINDSPEEDS (KM/H), 9AM/3PM
24/8/23	8.7/17.5	0.0	20/**28**
25/8/23	10.9/19.4	0.0	**31**/7

Atmospheric conditions have been taken into consideration when processing data.
See Appendix – BOM Weather Data for more information.

3.1 – ACOUSTIC ASSESSMENT, cont.

1826.4 NOISE PROTOCOL, PLANT & EQUIPMENT

EPA 1826.4 DETERMINED LIMITS FOR MECHANICAL SERVICES

PERIOD*	1826.4 ZONING LEVEL	EXISTING LEVEL, dB L_{A90}	DETERMINED LIMIT, dB L_{Aeq}
DAY	57	48	**57 (Neutral)**
EVENING	50	46	**50 (Neutral)**
NIGHT	45	44	**47 (High)**

**Please refer to Appendix – Operating Time Periods for details of operating periods.*

This table describes the external noise limits set in the EPA 1826.4 Noise Protocol in relation to mechanical services type noise, not music.

DETERMINED LIMITS FOR PLANT & EQUIPMENT:

Day: **57 dB L_{Aeq}**
Evening: **50 dB L_{Aeq}**
Night: **47 dB L_{Aeq}**

DETERMINED LIMITS FOR EMERGENCY EQUIPMENT:

Day: **67 dB L_{Aeq}**
Evening: **55 dB L_{Aeq}**
Night: **52 dB L_{Aeq}**

Any items of plant and machinery such as but not limited to air conditioning systems, exhaust and extraction systems must be within the limits as set out above.

Any new plant or machinery should have positioning, make and model verified by an acoustic consultant to ensure compliance is maintained. Depending on the location and type of equipment, acoustic barriers may be required.

4.0 – SITE DESCRIPTION

From the report #23674:

The facility has a tilt slab wall construction of 170mm, and 3 glazing sections facing the NSR, which we are assuming is at least 4mm in thickness.

We have modelled these systems using INSUL, and would expect the following attenuation:

MODELLED 170mm CONCRETE WALLS

		OCTAVE BAND CENTRE FREQUENCY (Hz)						
FREQUENCY (Hz)	**R_W**	63	125	250	500	1K	2K	4K
ATTENUATION (dB)	**56**	**43**	**44**	**44**	**52**	**59**	**64**	**69**

MODELLED 4mm/12mm GAP/4mm DOUBLE GLAZE SYSTEM

		OCTAVE BAND CENTRE FREQUENCY (Hz)						
FREQUENCY (Hz)	**R_W**	63	125	250	500	1K	2K	4K
ATTENUATION (dB)	**34**	**20**	**23**	**20**	**30**	**40**	**44**	**37**

**We were unable to confirm the exact specification of the window system, however we have reasonably assumed a 4mm/12mm gap/4mm unit.*

In conducting this modelling, we note the following:

- *The roof/ceiling system is a corrugated metal/polycarbonate system with a foil thermal insulation underneath. Due to the height of the walls, at approx. 7 to 8 metres and the character of the noise expected on site, we would not expect noise to typically flank over, so we have not considered this system's attenuation when identifying the transmission loss to the NSR.*
- *There is some attenuation from the roof system, however based on the wall height, we would expect minimal noise flanking overtop, assuming main operations of the site are at ground level.*
- *As the distance from the midpoint of the tenancy at 5B Kelly Ct is 97m from the boundary of the nearest NSR at 25 Stephenson St, we would anticipate an additional attenuation of 40dB, and the noise decays over distance.*
- *Based on this distance, we would also anticipate the noise generated by the rooftop air conditioner equipment to be inaudible at the NSR, based on the decay of noise over distance and the existing background levels.*

5.0 – PREDICTED NOISE EMISSIONS

NOISE FROM CATS ON SITE
The previous report made predictions of the noise on site, describing a worst-case noise output from 40 cats, however the permit is proposing this number is increased to 90 cats on site.

Noise from a cat could range from a sound power level (SWL) of 50dB to 70dB, depending on the size of the breed, and also the quality of the noise the cat makes.

Assuming a worst-case scenario, where all 90 cats on site were to generate an SWL of 70dB simultaneously, we would expect a total SWL output of 89.5dB, which we would expect to reach 97.5dB SPL @ 1m, with a directivity factor of 2.

Compared to 40 cats, this would be an increase of 3.5dB on site.

Given that the majority of cat noise is from 300Hz to 1KHz (*with notably less low frequency energy noise, which would be expect from a large dog breed*), we can assume that from the modelled attenuation of the wall between the NSR and the facility (see section 4.0), and the distance to the nearest NSR (approx. 97m), that the noise from cats will likely be below measured background levels, indicating that it will most likely be inaudible.

Again, this is based on a worst-case noise output, and is not expected to happen with management intervention.

Based on these calculations, we do not anticipate any notable change in noise levels produced from cats on site, and there is no risk of exceeding the determined limits.

NOISE FROM GENERATORS ON SITE
As per condition 5 of the permit, a backup generator is required to be used on site.

Typically, a petrol generator of sufficient power, we would expect to generate noise levels of approx. 80-85dB. As a petrol generator will be required to be sited outdoors due to carbon monoxide production, we anticipate it will be position at the front of the building at 5B Kelly Ct, putting it approx. Based on the distance to the nearest NSR, we would expect the unit to be approx. 90dB from the nearest NSR.

Based on this distance, and the assumed dB level, and the limits for emergency equipment described in 3.1 of this report, we would expect compliance in all Periods, without the use of a noise barrier.

Notwithstanding, the specific model must be confirmed with the acoustic consultant, and suitability to be determined based on the manufacturer noise data.

6.0 – REQUIREMENTS FOR 1826.4 COMPLIANCE

CONDITION 4
Based on the distance from the site, and the lack of line-of-sight to the nearby NSR, we do not anticipate non-compliance based on the existing plant and equipment at the site. Between the site and other NSR, there are more tilt slab warehouse buildings, all of which will assist in blocking noise propagation.

Any new plant or machinery should have positioning, make and model verified by an acoustic consultant to ensure compliance is maintained. Depending on the location and type of equipment, acoustic barriers may be required.

CONDITION 5
As part of this condition, a generator must be installed at the site for emergency power.

We understand the use of the generator is intended solely for emergency supply of electricity in the event of a power outage to the site. In accordance with the EPA Noise Protocol the noise limit for Emergency Equipment, such as electricity generators, must comply with the limits set out in Section 3.1 of this report.

We would expect a typical petrol generator to produce approx. 80-85dB of noise, however specific information must be provided to the acoustic consultant prior to installation.

If it is determined that an acoustic barrier is required, we would recommend the following:

- The use of the Echo Barrier M1[1] product, which provides 43dB of attenuation
- Alternatively, a barrier system using a proprietary acoustic wall system could be installed as follows:
    - ModularWalls AcoustiSorb75 is installed around all 4 sides of the generator position
    - At a height of 0.5m above the tallest point of the generator

As exhaust from the unit contains poisonous gas (carbon monoxide) it must only be operated outdoors. See Appendix – Site Plan for recommended location.

CONDITION 15 & 16
It is our opinion that, pending the confirmation of new equipment on site, that compliance with the EPA 1826.4 limits should be maintained.

[1] https://echobarrier.com.au/product/m1

6.1 - REQUIREMENTS FOR 1826.4 COMPLIANCE

The following requirements were listed in the previous report #23674, and based on the capacity of 90 cats, no additional requirements are needed at the time of writing this report.

VISUAL STIMULUS
We would recommend that management considers cat placement, and isolate cats generating more noise from other cats. A separate, isolated space with no view of other cats may be required if there are problematic cats, in order to isolate them from all visual stimuli.

FIRE DOOR SYSTEM - AT FRONT OF FACILITY (FACING NSR)
In order to reduce noise from within the facility from travelling to the NSR at 25 Stephenson Street, we recommend acoustic seals be added to the fire door as follows:

The doors should be fitted with:

- Raven acoustic seals
    - RP24 perimeter seal
    - RP38 bottom seal
- There is currently an auto-closing mechanism installed on the door, this should not be removed, to ensure that the door is not held open for extended periods of time.

ROLLER DOOR - AT FRONT OF FACILITY (FACING NSR)
In order to reduce noise from within the facility from travelling to the NSR at 25 Stephenson Street, we recommend the roller door should usually be kept closed except for when deliveries are occurring in order to reduce visual stimulus.

COMPLAINTS MANAGEMENT PROCESS & 24/7 CONTACT
A person responsible for the operation of the facility must be contactable 24 hours per day. This is to ensure that if there are times where there is excessive noise generated by animals on site, management are obliged to investigate and resolve the matter.

7.0 – GENERAL ENVIRONMENTAL DUTY (GED)

Environmental laws introduced in 2021 requires that anyone engaging in an activity posing a risk of harm to human health and the environment, from pollution or waste, must manage that risk to prevent harm as far as reasonably practicable. *Refer Appendix – General Environmental Duty for further details regarding the GED.*

The following table provides an assessment of risks from noise hazards associated with the proposed operations in accordance with requirements under the GED.

Risk assessments conducted in conjunction with the table in Appendix – Risk Management Matrix.

IDENTIFIED HAZARD	POTENTIAL CAUSES	INITIAL RISK RATING, WITHOUT CONTROLS	RECOMMENDED CONTROLS	WITH CONTROLS IMPLEMENTED
Day, evening or night time noise from cats potentially impacting amenity of sensitive receptors amenity and potential.	Visual stimulation Feeding in groups Territorial behaviours of cats. Facility doors open during operations	**Medium Risk (B3)** • Moderate (B) • Possible (3)	*See below*	**Low Risk (A2)** • Minor (A) • Unlikely (2)
Noise from equipment on site impacting nearby residents	Improper equipment installation. Incorrect choice or inherently noisy equipment. Faulty equipment due to lack of maintenance.	**Medium Risk (B3)** • Moderate (B) • Possible (3)	*See below*	**Low Risk (A2)** • Minor (A) • Unlikely (2)

NOISE FROM CATS ON SITE

Although we anticipate the noise from cats will typically not be audible at the nearest NSR, the following management procedures must be considered.

- Cat placement and isolation of particularly noisy animals on site.
- Management to be diligent in ensuring cats are not generating excessive noise
- Maintain roller door as closed and ensure an auto-closing mechanism is installed on the fire door
- Complaints management process including 24/7 contact person for monitoring

NOISE FROM EQUIPMENT ON SITE

- Equipment selected is tested for acoustic conformance with EPA Regulations.
- Ensure an ongoing maintenance schedule for equipment.
- Additional testing to confirm compliance.

IN CONDUCTING THIS RISK ASSESSMENT, THE FOLLOWING NOTED:

- As of writing this report, the positioning of a reverse cycle air conditioner has been installed to the upper mezzanine administration office, including rooftop installing.
    - The type of air conditioning unit has not been verified as roof inspection was not conducted.
- We note that facility is considering options to maintain the temperature within the facility for the cats, and that any future selection of equipment will comply with the EPA 1826.4 determined limits.
- Based on our modelling of the wall system between the NSR and the facility, we would expect noise the from the cats and daily operations on site to have very low audibility at the NSR.
- As the cats will stay at the facility overnight, there is always risk of noise causing sleep disturbance, however we would not expect noise emissions to reach the criteria of 65dB L_{Amax} at the window of the NSR or 55dB L_{Amax} measured internally in a sensitive room
    - These are the levels typically used to describe levels that would result in sleep disturbance.

8.0 – SUMMARY

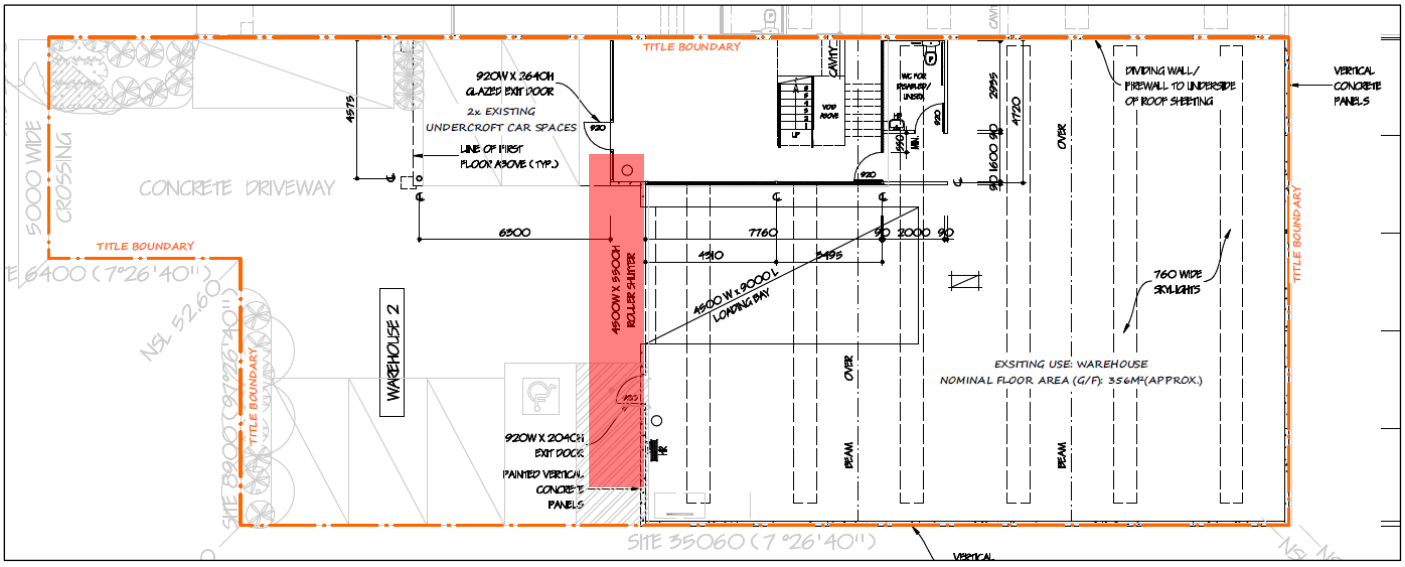
Based on the available environmental noise data and plans received, implementation of the measures outlined in this acoustic assessment report would be expected to minimise the noise impact on the neighbouring residences from the site and any plant and machinery.

This report gives consideration to acoustic matters associated with the operation of the site, with recommended acoustic treatments and relevant practices to maintain compliance to the EPA 1826.4 Noise Protocol.

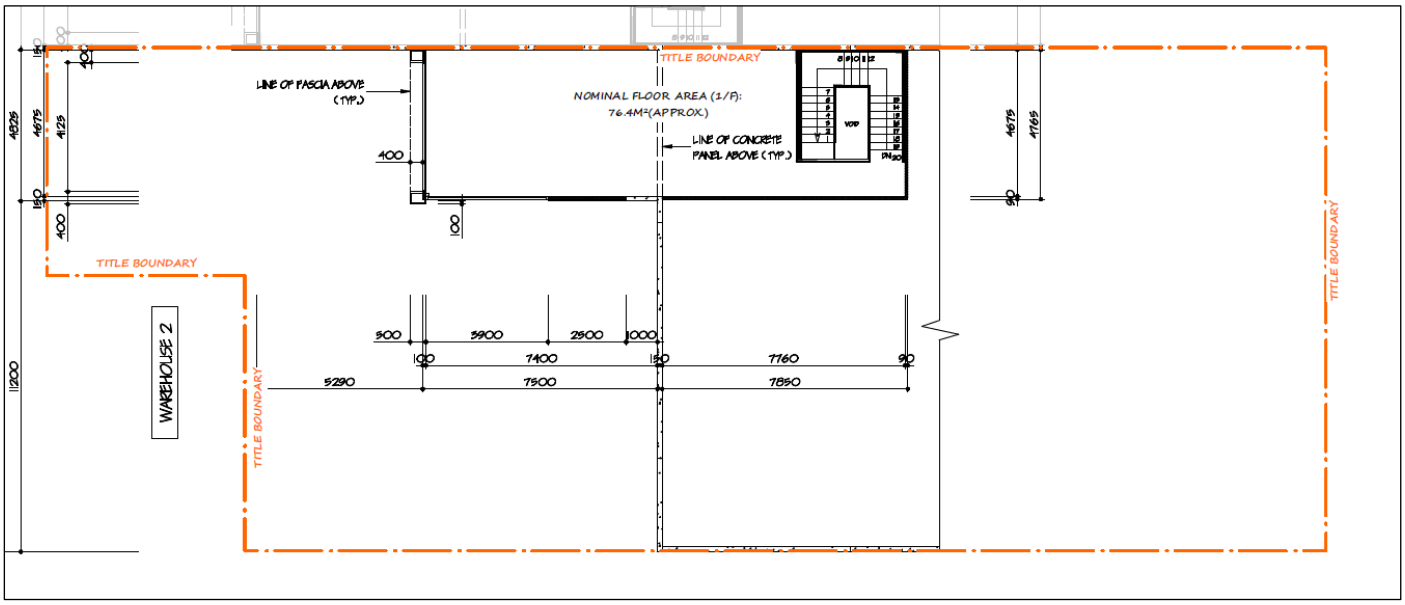
Where clarification is required or the recommended acoustic treatments may be found to impact on other services or statutory requirements, independent advice, as appropriate, is to be sought in respect to any such impact that these acoustic works may have on the building design and construction.

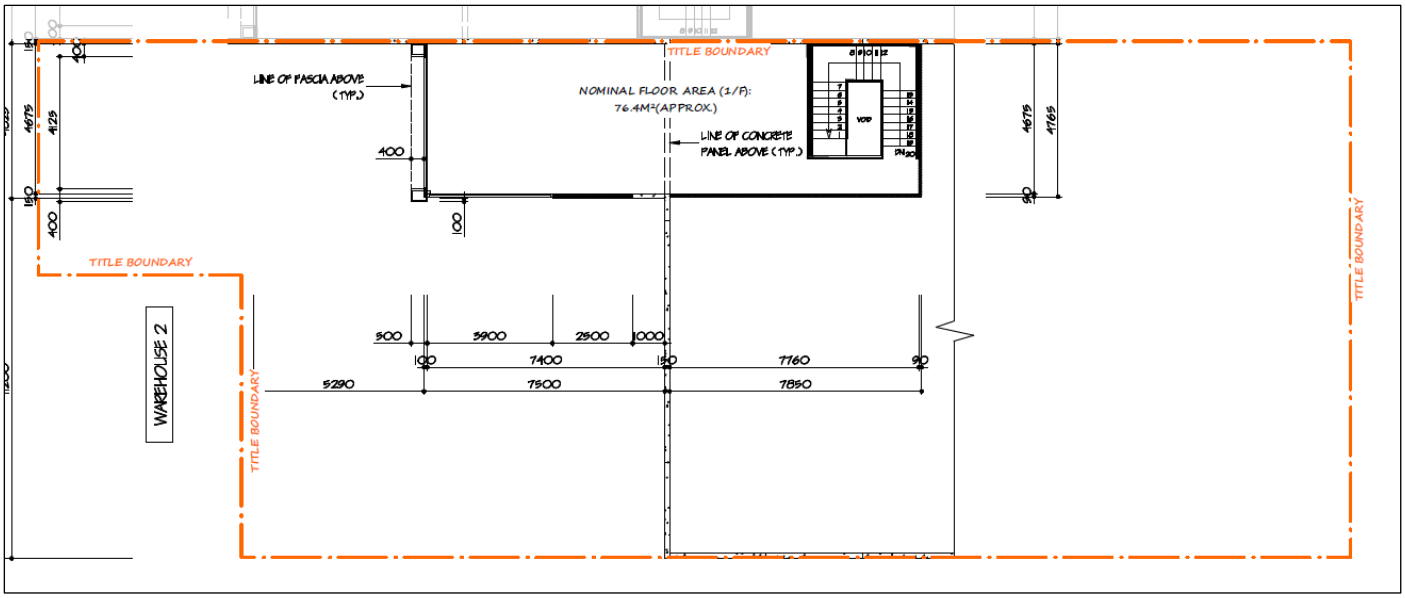
Rohan Barnes
Waveform Acoustics

APPENDIX – SITE PLAN



In red, recommended area to install the generator, outdoors.





APPENDIX – SITE MAP

NOTES:

- *In red, the approx. position of the cattery at 5B Kelly Ct*
- *In green, the surrounding residential area*
- *The satellite imagery was prior to the construction of the buildings in the industrial zone.*

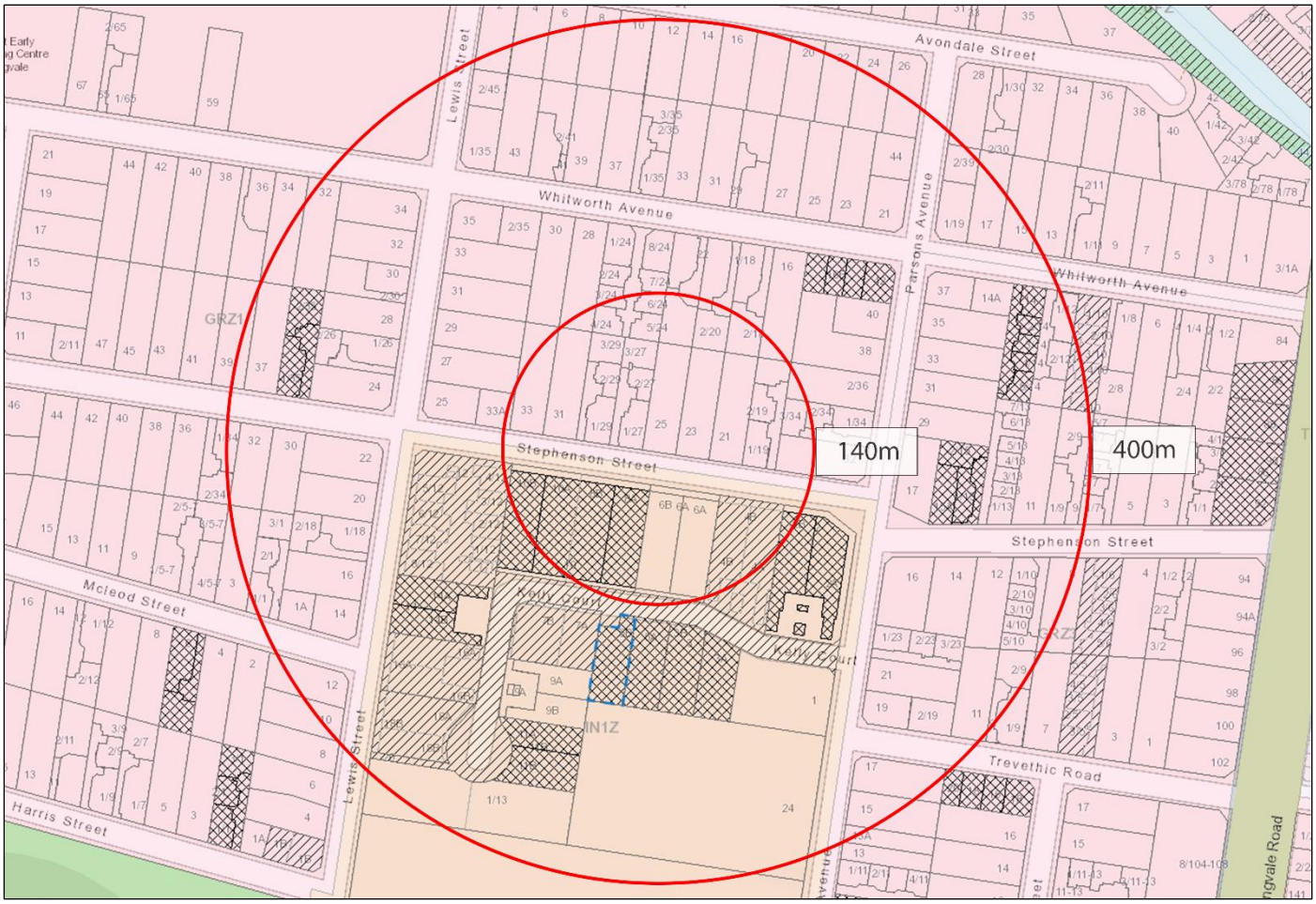
APPENDIX – SITE PHOTOS

Logger position nearby site to collect background levels.

Nearest NSR relative to the site, 25 Stephenson St.

Tilt slab walls and roof construction within the site.

APPENDIX – ZONING MAP



APPENDIX – BOM WEATHER DATA

Moorabbin, Victoria
August 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Tu	11.0	16.1	0.2			WNW	35	00:14	11.3	92	8	W	17	1028.8	14.2	61	8	SW	11	1030.1
2	We	3.6	17.8	0			N	37	14:48	9.6	83		N	13	1033.6	17.3	52		N	24	1029.4
3	Th	9.0	20.2	0			N	63	13:07	13.6	70		N	26	1028.8	20.0	37		N	46	1023.9
4	Fr	13.6	18.3	0			N	78	11:27	17.7	51	8	N	33	1021.3	16.7	60	8	NNW	44	1019.8
5	Sa	8.6		1.0			WNW	30	02:33	9.7	84	8	WSW	15	1033.5	12.4	65	7	WSW	13	1033.5
6	Su	7.6	13.2	0			SSW	46	15:13	10.2	94	8	WNW	7	1035.3	12.5	85	8	SSW	13	1033.7
7	Mo	6.8		0.2						10.9	87	8		Calm	1033.8	12.4	70	7	SSW	13	1032.3
8	Tu	2.1	12.2				SW	17	12:32	6.9	99	8	N	9	1033.8	11.9	77		SW	9	1030.5
9	We	2.3	18.9	0			N	74	14:24	9.9	85	5	NNW	11	1027.0	18.2	40		NNW	39	1020.6
10	Th	9.8	14.9	4.0			NNW	54	02:26	11.7	79	5	W	20	1019.1	13.1	62	8	WSW	19	1020.8
11	Fr	9.1	15.7	0			NW	35	12:49	12.5	67	1	NNW	17	1022.5	14.9	53	8	NW	15	1019.6
12	Sa	10.5	15.0	0.2			N	33	00:37	11.0	81	8	NNW	19	1019.1	12.9	76	8	SW	13	1017.1
13	Su	5.2	13.5	0.8			SW	24	14:55	9.7	95	8	NW	9	1021.6	11.7	67		SW	17	1019.7
14	Mo	1.7	12.6	0			SSW	26	11:44	7.3	88	8	NNW	6	1019.8	11.6	62	7	SW	20	1018.5
15	Tu	2.1	13.3	0.2			NW	22	10:10	7.4	85		N	9	1024.3	12.1	57		SSW	15	1022.9
16	We	0.0	15.6	0			N	39	15:42	6.9	80		N	15	1022.0	14.8	44		N	24	1016.6
17	Th	6.9	13.9	0.2			N	50	14:08	10.4	67	7	N	20	1012.4	12.3	52	7	N	31	1007.5
18	Fr	8.7	12.6	6.8			SW	56	14:17	9.7	84	8	WNW	20	1004.9	11.5	63	3	SW	26	1008.9
19	Sa	8.8	17.2	3.2			WNW	39	08:24	12.5	85	8	WNW	20	1015.7	15.5	72	8	W	20	1016.9
20	Su	11.8	16.8	0			W	33	08:07	12.7	81	7	NW	13	1023.5	15.9	55		SW	17	1021.9
21	Mo	9.4	18.8	0.2			NNW	61	12:07	14.7	74	6	N	24	1020.7	16.4	66	4	N	26	1016.4
22	Tu	12.4	14.2	0			NNW	39	03:01	14.1	80	8	NW	13	1015.2	11.9	93	7	SW	17	1015.8
23	We	5.4	16.4	3.0			NW	30	09:49	10.2	74		N	15	1025.8	15.6	58	2	W	13	1025.2
24	Th	8.7	17.5	0			N	44	15:05	12.2	70		N	20	1028.5	16.4	51	6	N	28	1024.3
25	Fr	10.9	19.4	0			N	43	08:58	13.8	64		N	31	1026.0	18.3	48		W	7	1025.2
26	Sa	10.4	15.7	0			ESE	31	10:53	11.9	68	6	ESE	17	1030.5	14.6	68	8	SE	17	1027.3
27	Su	8.5	17.1	0			SE	30	18:26	10.8	78	8	SE	13	1028.0	16.7	66		SE	17	1024.2
28	Mo	9.1	16.1	0			SW	26	13:35	11.3	93	8	NNW	7	1023.8	13.9	81	1	WSW	17	1020.9
29	Tu	9.6	18.8	0.2			N	52	20:21	15.3	70	8	N	28	1016.4	17.5	65	8	N	31	1013.0
30	We	12.2	14.4	3.0			N	54	02:27	12.5	95	8	SW	11	1011.4	13.1	71	8	WSW	13	1013.3
31	Th	6.6	16.1	0.4			WNW	37	11:16	10.5	77	8	NNW	15	1018.7	13.6	84	8	WSW	19	1018.0
Statistics for August 2023																					
Mean		7.8	15.9							11.3	80	7		15	1023.4	14.5	63	6		20	1021.5
Lowest		0.0	12.2							6.9	51	1		Calm	1004.9	11.5	37	1	W	7	1007.5
Highest		13.6	20.2	6.8			N	78		17.7	99	8	N	33	1035.3	20.0	93	8	N	46	1033.7
Total				23.6																	

Observations were drawn from Moorabbin Airport (station 086077)
Some cloud observations are from automated equipment; these are somewhat different to those made by a human observer and may not appear every day.

IDCJDW3052.202308 Prepared at 13:01 UTC on 11 Jul 2024

APPENDIX – GENERAL ENVIRONMENTAL DUTY

EPA General Environmental Duty 2021 sets out the following guidelines to follows:

- Understand your duties under the EP Act
- Identify Hazards
- Assess Risks
- Manage the Risks
- Implement Controls

UNDERSTAND YOUR DUTIES UNDER THE EP ACT

Anyone engaging in an activity that poses risk of harm to human health and the environment, from pollution or waste, or noise must eliminate or reduce that risk. You also need to eliminate or reduce risk as far as reasonably practicable. You can do this by putting appropriate controls in place that are proportionate to the risk.

Your approach to managing risk will depend on the complexity and scale of your activities or project, as well as the nature of the risks you need to manage.

EPA Victoria specifies a four (4) step risk management process, involving: identifying the hazards, assessing risk, implementing controls and ongoing checking. The process is outlined by the Victorian EPA[2] and is summarised as follows:

[2] Environmental Protection Authority Victoria, Assessing and controlling risk: A guide for business. Publication 1695.1, August 2018

STEP ONE: IDENTIFY HAZARDS

Hazards associated with commercial and industrial activities include anything that can cause harm to people or the environment. Common hazards include:

- Noise
- Odour
- Dust
- Chemical hazards
- Fire hazards

STEP TWO: ASSESS THE RISKS

The hazards identified during step 1 must be assessed to determine how they could lead to harm, how severe that harm could be and how likely it is to happen.
Risk assessment is a process for building knowledge and understanding of hazards and their associated risks so decisions can be made on how best to control them.

The following steps should be taken:

- Assess the likelihood of a hazard causing an impact
- Assess the consequences, or severity, of each impact
- Calculate a risk rating for each hazard

STEP THREE: IMPLEMENT CONTROLS

The options for controlling risk are prioritised from the highest level of effectiveness to the lowest.

When selecting controls the following hierarchy should be followed:

STEP FOUR: CHECK CONTROLS

Controls that are put in place to prevent or mitigate risks must be monitored to ensure they work as planned.

Checking controls involves the same methods as in the initial hazard identification step (step 1), and 'closes the loop' in which risk control measures can be maintained.

Common methods used to check the effectiveness of controls are:

- Regular site inspections and audits
- Consulting with employees, contractors, occupants and landlords
- Inspecting, testing and maintenance of risk control systems
- Using available information, such as manufacturer/supplier instructions
- Analysing records and data, such as incident and near miss reports

If these checks are made on a regular basis, then failures in controls can be identified as well as opportunities for improvement.

APPENDIX – RISK ASSESSMENT MATRIX

	CONSEQUENCE					
	A – Minor	**B – Moderate**	**C – Major**	**D – Severe**	**E – Extreme**	
	First aid treatment. Fully recoverable.	Medical / professional treatment required. Fully recoverable	Extensive / professional medical treatment. Fully recoverable over an extended period.	Severe injury, permanent incapacitation. Impact requires change to work function.	Catastrophic, single or multiple deaths.	**HUMAN HEALTH, HEALTH & SAFETY**
LIKELIHOOD	Negligible or no environmental damage. No residual pollution impacts.	Impacts within the immediate vicinity of the impact; and short-term residual impact <1 year	Impacts are within the local area; and /or medium-term residual impact (2-5yrs)	Impact extends across the region (within a state); and/or longer-term residual impact (5-20yrs	Impacts extends beyond the region (e.g. between states or nationally); and/or long term residual impacts >20yrs	**ENVIRONMENT**
(5) Almost Certain Expected to occur. High probability of occurring, e.g. >90%.	Medium	High	High	**Extreme**	**Extreme**	
(4) Likely Likely (e.g. >75% chance) of occurring under normal circumstances.	Medium	Medium	High	High	**Extreme**	
(3) Possible Could reasonably be expected under normal circumstances.	Low	Medium	Medium	High	High	
(2) Unlikely Unusual, not likely to occur under normal circumstances	Low	Low	Medium	Medium	High	
(1) Very unlikely. Rare circumstance, highly unusual.	Low	Low	Low	Medium	High	

APPENDIX – ASSESSING NOISE FROM COMMERCIAL, INDUSTRIAL AND TRADE PREMISES

1. Assessment location, alternative assessment location and alternative assessment criteria.

1.1 Assessment location

(56) Noise from commercial, industrial and trade premises must be assessed at a location in a noise sensitive area where the maximum effective noise level occurs or, for proposed premises, is predicted to occur.

1.2 Alternative assessment location

(57) Notwithstanding clause 56, an alternative assessment location may be specified where:

a. two or more premises contribute to the effective noise level and a measurement point is required that is not influenced by any noise source from any other commercial, industrial or trade premises;

b. atmospheric conditions affect the effective noise level at the noise sensitive area and a measurement point is required closer to the commercial, industrial or trade premises under investigation that is not affected by atmospheric conditions;

c. a measurement point in a noise sensitive area is not readily accessible and a more suitable measurement point is required; or

d. extraneous noise affects the effective noise level at the noise sensitive area and a measurement point is required at a location that is not affected by extraneous noise.

(58) The alternative assessment location must be chosen so that the noise at the alternative assessment location is representative of the noise exposure within noise sensitive areas.

(59) An alternative assessment location may be specified either within or outside a commercial, industrial or trade premises.

1.3 Alternative assessment criterion

(60) Where an alternative assessment location is used, an alternative assessment criterion must be determined for that location, for each relevant operating time period.

(61) The alternative assessment criterion must be set so that compliance with this noise level will result in the noise limit at the noise sensitive area not being exceeded, for the relevant operating time period.

(62) The alternative assessment criterion must be calculated having regard to:

a. the sound paths to the noise sensitive area and other factors which may affect the propagation of sound.

b. the character of the noise from commercial, industrial and trade premises that will be experienced in noise sensitive areas, and the value of the relevant duration or noise character adjustments as described in clauses 79 to 81 and clauses 82 to 88.

c. the cumulative contribution from other industrial, commercial or trade premises affecting noise sensitive areas, as required in Regulation 119.

d. the uncertainty of the calculation method used.

Note: The value of a specific alternative assessment criterion is determined from the relevant noise limit, the difference between the sound paths from the industry being assessed to the noise sensitive area, and the sound paths to the alternative assessment location. It may also be influenced by the character of the noise. However, to ensure that meeting an alternative assessment criterion is consistent with complying to the relevant noise limit that applies within the considered noise sensitive area, an alternative assessment criterion is not subject to the base noise limits set out in Regulation 118(2) or to the maximum value of 55 dB(A) for the night period set out in Regulation 118(3).

2. Effective noise levels

(63) The effective noise level is determined, for noise from commercial, industrial and trade premises, as a 30-minute equivalent sound pressure level LAeq,30min adjusted, where relevant for:

a. duration (A_{dur})

b. noise character i. tonality (A_{tone})

ii. impulse (A_{imp})

iii. intermittency (A_{int})

c. measurement position

i. reflection (A_{refl})

ii. indoor (A_{ind})

(64) The effective noise level is calculated using Equation 1:

ENL = L_{Aeq} + A_{dur} + A_{tone} + A_{imp} + A_{int} + A_{refl} + A_{ind} (Equation 1)

(65) For the purpose of determining the effective noise level the noise is measured using the Fast time weighting and the A-frequency weighting network.
(66) The L_{Aeq} and relevant adjustments must be applied to one decimal place.
(67) The effective noise level is rounded to the nearest decibel.

Existing premises
(68) For existing premises, the effective noise level is determined based on measurements within the noise sensitive area or at an alternative assessment location, in accordance with clauses 71 to 90.
(69) Notwithstanding clause 68 the effective noise level for existing premises can be calculated in accordance with clause 70 to facilitate the assessment of noise.

Proposed premises or proposed extensions of existing premises
(70) For proposed premises or proposed extensions of existing premises, the effective noise level must be calculated having regard to:
a. all existing noise sensitive areas or future noise sensitive areas relevant to approved developments;
b. the sound paths to the noise sensitive area and other factors which may affect the propagation of sound;

c. the character of the noise that will be experienced in noise sensitive areas, and the value of the relevant duration and noise character adjustments to apply (clauses 79 to 81 and clauses 82 to 88);
d. the cumulative contribution from existing and approved premises affecting noise sensitive areas;
e. the uncertainty of the calculation method used.

3. Measurement of noise from commercial, industrial and trade premises

3.1 Measurement point

Outdoor measurement
(71) The measurement point must be located within a noise sensitive area or at any alternative assessment location.
(72) If the measurement point is in a noise sensitive area, it must be located outdoors unless the conditions for an indoor measurement apply in accordance with clause 74.
(73) The measurement point within a noise sensitive area must be located at a point where the maximum effective noise level occurs.

Indoor measurement
(74) The measurement point must be located indoors, in a sensitive room within a noise sensitive area, when:
a. the noise (including vibration induced noise) is transmitted into the affected room through a solid wall, floor or ceiling from another part of the same building or an adjoining building; or
b. an outdoor measurement that represents noise exposure within the noise sensitive area cannot be made (neither within the noise sensitive area, nor at an alternative assessment location), even when a microphone is placed through a window opening on a boom. (75) If an indoor measurement is made in a sensitive room, all its windows and doors must be closed.

3.2 Atmospheric conditions
(76) Where the effective noise level at the noise sensitive area is likely to be affected by atmospheric conditions, an alternative assessment location located near to the commercial, industrial or trade premises must be used unless there is no appropriate alternative assessment location (refer clause 77).
(77) If an alternative assessment location is not appropriate, the effective noise level is calculated as the arithmetic average of three measurements taken on different days within a 30-day period at the noise sensitive area.
(78) The measurements in clause 77 must represent the worst-case scenario of exposure, giving regard to the operation conditions of the noise source and atmospheric conditions favourable to the propagation of sound.

3.3 Duration adjustment

(79) If noise emissions from the commercial, industrial or trade premises investigated do not occur over the whole continuous 30-minute period, the duration adjustment applies.
(80) The duration adjustment is determined from the ratio of the total time for which the source is operating over the measurement period (per cent on time) using Equation 2:

A_{dur} = 10 log10 (total time source operating / measurement period) dB (Equation 2)
(81) When determining the duration adjustment for noise that is impulsive in nature, any impulse noise emission is deemed to be audible for 10 seconds after the occurrence of the emission.

3.4 Adjustments for noise character

Tonality adjustment

(82) When the noise is tonal in character then an adjustment is made based on observations of the noise.
(83) The following adjustments apply –
a. when the tonal character of the noise is just detectable then A_{tone} = +2 dB;
b. when the tonal character of the noise is prominent then A_{tone} = +5 dB. (84) When a tone is present, but observations do not provide certainty with regards to the value to apply for the tonal adjustment, the adjustment may be determined using the objective tonal method in accordance with Annex C.

Impulse adjustment
(85) When the noise is impulsive in character the following adjustments apply:
a. when the impulsive character of the noise is just detectable then A_{imp} = +2 dB.
b. when the impulsive character of the noise is prominent then A_{imp} = +5 dB. (86) When determining the duration adjustment for noise that is impulsive in character, any impulse noise emission is deemed to be audible for 10 seconds after the occurrence of the emission.

Intermittency adjustment
(87) An intermittency adjustment applies when the noise:
a. increases in level rapidly, and by at least 5 dB, on at least two occasions during a 30-minute period; and
b. maintains the higher level for at least a one-minute duration. (88) The intermittency adjustment is determined using Table 5.

Table 5: Intermittency adjustment for noise from commercial, industrial and trade premises

Time Period	Increase in level	Adjustment
Day period	> 10 dB	+ 3 dB
Evening period or Night period	5-10 dB	+ 3 dB
	> 10 dB	+ 5 dB

3.5 Adjustments for measurement position

Reflection adjustment
(89) If the microphone position is located between 1, and 2 metres from an acoustically reflective surface, the reflection adjustment is applied by subtracting 2.5 dB from the measured noise level, so that A_{refl} = -2.5 dB.

Indoor adjustment
(90) If the measurement is conducted indoors, an indoor adjustment applies and is determined using Table 6.

Note: The intent of the indoor adjustment is to allow for the assessment of noise emissions from commercial, industry and trade premises, against the noise limits that are defined as outdoor noise levels, when an outdoor measurement would not allow for this assessment. The indoor adjustment is not meant to be used to determine or assess the effectiveness of the design response and construction of buildings affected by noise from commercial, industry and trade premises.

Table 6: Indoor adjustment for noise from commercial, industrial and trade premises

Circumstances		Adjustment
• The noise reduction performance of the building envelope is known, in octave or one third octave bands, from design specifications, calculations or measurements, and; • The frequency spectrum of the indoor noise has been measured.		Site specific adjustment based on the noise reduction performance of the building envelope (taking into account the volume and acoustic properties of the room).
• Where the noise reduction performance is unknown, the adjustment is based on the following assessment of the building envelope:	- Meets or exceeds energy efficiency requirements set out in the Building Code of Australia 2006 (BCA 2006) including sealing requirements.	+20 dB
	- Does not meet energy efficiency requirements or sealing requirements set out in the BCA 2006.	+15 dB

APPENDIX – HOW TO TEST FOR NOISE LEVEL COMPLIANCE

As described in EPA Noise Protocol 1826.4 – Commercial Noise Control Music and Equipment

Indoor entertainment venues during operation

(125) For the purpose of determining the effective noise level, the measurement must be made at a time when the greatest intrusion of music noise into a noise sensitive area is likely to occur, and include at least 15 cumulative minutes of music audible at the measurement point. The music noise is measured –

- for the day and evening period using the Fast time weighting and the A-frequency weighting network;
- for the night period using the Fast time weighting, and the linear weighting network.

(126) Where the measurement point is outdoors and is between 1 and 2 metres from an acoustically reflecting surface an adjustment of -2.5 dB must be made to the effective noise level.

(127) Where an indoor measurement is required, in accordance with clause 106 –

a. for the purposes of clause 106(a)(i) the measurement must be made within the sensitive room, with all windows that are not major sound transmission paths closed.
b. for the purposes of clause 106(a)(ii), the measurement must be made within the sensitive room with
i. any openable external window which is a major sound transmission path fully open during the measurement, and
ii. all windows that are not major sound transmission paths closed.

c. for the purposes of clause 106(a)(iii), the measurement must be made within the sensitive room with windows and doors closed.

Proposed indoor entertainment venues:

(128) For proposed indoor entertainment venues or proposed extensions of existing indoor entertainment venues, the effective noise level of music noise must be calculated having regard to –

a. all existing noise sensitive areas or future noise sensitive areas relevant to approved developments;
b. the frequency spectrum of the music noise;
c. the frequency-dependent sound insulation performance of the building within which the venue is located, as relevant;
d. the sound paths to the noise sensitive area and other factors which may affect the propagation of sound; and
e. the cumulative contribution from existing and approved entertainment venues or events affecting noise sensitive areas.

Using an outdoor noise measurement to assess indoor noise levels

(129) An outdoor measurement conducted directly outside a sensitive room can be used to assess the effective noise level indoors when –

a. assessing music noise from a live music entertainment venue and, in application of clause 53.06 of the VPPs, the agent of change is a noise sensitive residential use; or

b. assessing music noise from an outdoor entertainment venue in a noise sensitive area within the Docklands Noise Attenuation Area. (130) For the purpose of clause 129 the indoor effective noise level is determined by subtracting the noise reduction performance of the building envelope from the measured outdoor noise level, having regard to the frequency spectrum of the music noise and the specific acoustic conditions of the sensitive room within which the assessment is conducted.

Measurement Point

(106) Where the measurement is to be made in a noise sensitive area, the measurement point must be located outdoors near a sensitive room unless –

a. For indoor entertainment venues:

i. the main transmission path of the music noise entering the sensitive room consists of a floor, ceiling or wall with no openings;

ii. an outdoor measurement does not represent the noise exposure within the sensitive room; or

iii. the noise sensitive residential use is the agent of change, in application of clause 53.06 of the VPPs.

APPENDIX – OPERATING TIME PERIODS

From the Environmental Protection Regulations 2021:

116 Definitions—operating time periods
In this division (3), in relation to noise emitted from *commercial, industrial and trade premises*—
day period means –

- Monday to Saturday (except public holidays), from 07:00 to 18:00

evening period means –

- Monday to Saturday, from 18:00 to 22:00; and
- Sunday and public holidays, from 07:00 to 22:00

night period means –

- 22:00 to 07:00 the following day.

GLOSSARY OF ACOUSTIC TERMS

Decibel (dB)	A logarithmic unit used to express the ratio between two sound pressures or powers. It is a relative measurement with reference to a specific threshold (usually 0 dB for sound pressure).
dB(A)	A-weighted decibels, which apply a frequency weighting to sound measurements to better represent the human ear's sensitivity to different frequencies.
dB(C)	C-weighted decibels, the C-weighting curve is relatively flat and does not emphasize any specific frequency range. It covers the entire audible frequency range with equal weighting. C-weighting is less commonly used in general sound level measurements, but it may be used in specific applications, such as measuring peak sound levels or when the sound being measured contains substantial low-frequency content.
Octave Band	A frequency band in which the upper frequency is twice the lower frequency (e.g., 63 Hz - 125 Hz).
Third-Octave Band	A frequency band with higher resolution, splitting each octave into 3 centre frequency measurement points.
LAeq	Equivalent Continuous Sound Level, an average sound level over a specific time period, often used to represent overall noise exposure.
LAmax	Maximum A-weighted sound level, the highest instantaneous sound level during a particular time period.
LAmin	Minimum A-weighted sound level, the lowest instantaneous sound level during a particular time period.
LA90	The A-weighted sound pressure level which is exceeded for 90% of the time interval considered.
LOCT10	The 'C' weighted or linear sound pressure level for a specified octave band that is exceeded for 10% of the time.
Sound Pressure (SPL)	The amplitude of sound waves in a specific medium, typically measured in decibels (dB).
Sound Power (SWL)	The total amount of acoustic energy radiated by a sound source, measured in watts (W) or decibels (dB).
Frequency	The number of complete cycles of a sound wave occurring per second, measured in Hertz (Hz).
Sound Level Meter (SLM)	An instrument used to measure sound pressure levels in decibels.
Reverberation Time (Rt)	The time it takes for a sound to decay by 60 dB after the sound source has stopped, indicating the acoustic characteristics of a room.
Tonality	Refers to the presence of a distinct pitch or frequency in the noise. It suggests that the noise contains specific frequencies that are more pronounced or dominant than others. For example, a steady hum or whine might exhibit tonality because it has a clear and consistent pitch.
Impulsiveness	Describes sudden, brief bursts of noise or sound energy within a continuous noise environment. These bursts are often characterized by their rapid onset and short duration. Examples of impulsive noise include the bang of a door slamming or the roar of an engine starting.
Intermittency	Refers to the irregular or sporadic nature of noise, where there are periods of sound interspersed with periods of relative quiet or lower sound levels. It's the quality of being occasional or not continuous. This could include noise sources that turn on and off intermittently, such as machinery operating in cycles or intermittent traffic noise.