HERRING STORER ACOUSTICS

OXFORD RETAIL PTY LTD

LEEDERVILLE CAMERA HOUSE
ROOFTOP PRIVATE CLUB

ACOUSTIC ASSESSMENT

DECEMBER 2020

OUR REFERENCE: 26351-3-20262

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:
HERRING STORER ACOUSTICS
P.O. Box 219, Como, W.A. 6952
(08) 9367 6200
hsa@hsacoustics.com.au

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ACOUSTIC ASSESSMENT

LEEDERVILLE

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ROOFTOP PRIVATE CLUB

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Author:	George Watts	**Checked By:**	Tim Reynolds
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CONTENTS

APPENDICIES

EXECUTIVE SUMMARY

Herring Storer Acoustics have been commissioned to carry out an acoustical assessment of noise emissions associated with the proposed private club on the roof terrace of the Leederville Camera House.

Noise levels associated with the private club have been calculated to comply with the relevant assigned noise levels under the following conditions :

- The louvred door and screen are to be replaced with a solid construction (i.e. solid door and barrier). Door is to remain normally closed (i.e. self-closer and not to be propped open).

- Music, if any, is to be played through the existing speaker system on the roof terrace and be played at background noise levels only. This is to be restricted to 77 dB(A) at a distance of 1m from the speakers located in the ceiling of the roof terrace. It is understood that music is not proposed to be included in the operations of the development, however, at the levels stipulated here music noise emissions are not audible outside the premises of the roof terrace.

- Given the decrease in calculated noise levels attained by the increase in the balustrading height by 1m, it is recommended to implement this noise control measure.

- Whilst it is understood that the private club is not proposed to be operated past 10pm on any night, given the calculated noise levels, no time restrictions on operations are required - from a compliance with the Environmental Protection (Noise) Regulations 1997 perspective.

- Management measures as listed in the Discussion section below is recommended to be included in any management plan associated with the venue.

1.0 INTRODUCTION

Herring Storer Acoustics have been commissioned by Oxford Retail Pty Ltd, to carry out an acoustical assessment of noise emissions associated with the proposed rooftop private club at the Leederville Camera House, located at 201 Oxford Street, Leederville.

The objectives of the study were to:

- Construct a predictive noise model for noise levels of associated with the proposed rooftop private club.
- Assess the predicted noise levels received at the closest noise sensitive premises, for compliance with the *Environmental Protection (Noise) Regulations 1997*.
- If exceedances are predicted, investigate possible noise control options that will reduce noise emissions to achieve compliance with the regulations.

The work was commissioned to accompany the development application.

2.0 CRITERIA

The *Environmental Protection (Noise) Regulations 1997* stipulate the allowable noise levels at any noise sensitive premises from other premises. The allowable noise level is determined by the calculation of an influencing factor, which is added to the baseline criteria set out in Table 1 of the Regulations. The baseline assigned noise levels are listed in Table 2.1.

TABLE 2.1 – ASSIGNED NOISE LEVELS

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
Noise sensitive premises within 15 metres of a dwelling	0700 - 1900 hours Monday to Saturday	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	35 + IF	45 + IF	55 + IF

Note: The L_{A10} noise level is the noise that is exceeded for 10% of the time.
The L_{A1} noise level is the noise that is exceeded for 1% of the time.
The L_{Amax} noise level is the maximum noise level recorded.

It is a requirement that noise from the site be free of annoying characteristics (tonality, modulation and impulsiveness) at other premises, defined below as per Regulation 9.

"impulsiveness" means a variation in the emission of a noise where the difference between L_{Apeak} and $L_{Amax\ Slow}$ is more than 15dB when determined for a single representative event;

"modulation" means a variation in the emission of noise that –

(a) is more than 3dB $L_{A\ Fast}$ or is more than 3dB $L_{A\ Fast}$ in any one-third octave band;
(b) is present for more at least 10% of the representative assessment period; and
(c) is regular, cyclic and audible;

"tonality" means the presence in the noise emission of tonal characteristics where the difference between –

(a) the A-weighted sound pressure level in any one-third octave band; and
(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

Where the above characteristics are present and cannot be practicably removed, the following adjustments are made to the measured or predicted level at other premises.

TABLE 2.2 – ADJUSTMENTS FOR ANNOYING CHARACTERISTICS

Where tonality is present	Where modulation is present	Where impulsiveness is present
+ 5 dB	+ 5 dB	+ 10 dB

Where the noise emission is music, then any measured level is adjusted according to Table 2.3 below.

TABLE 2.3 – ADJUSTMENTS TO MEASURED MUSIC NOISE LEVELS

Where **impulsiveness** is not present	Where **impulsiveness** is present
+10 dB(A)	+15 dB(A)

The nearest noise sensitive premises considered in our assessment are as shown in Figure 1 below. It is noted that "R3" is understood to be student accommodation and has been assumed at a height of approximately 7m above ground level.

FIGURE 1 – DEVELOPMENT LOCATION AND SURROUNDS

The influencing factor at the identified noise sensitive premises has been determined at +8 dB, with the calculation based on the following

Secondary Road within Inner Circle	
Oxford Street	+ 2 dB
Major Roads within Outer Circle	
Mitchell Freeway	+ 2 dB
Vincent Street	+ 2 dB
Commercial Premises within Inner Circle	
20%	+ 1 dB
Commercial Premises with Outer Circle	
20%	+ 1 dB

Therefore, the assigned noise levels are listed in Table 2.4.

TABLE 2.4 - ASSIGNED OUTDOOR NOISE LEVELS : R1

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises within 15 metres of a dwelling	0700 - 1900 hours Monday to Saturday	53	63	73
	0900 - 1900 hours Sunday and Public Holidays	48	58	73
	1900 - 2200 hours all days	48	58	63
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	43	53	63

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.

3.0 METHODOLOGY

Noise modelling of the noise propagation from the proposed development was carried out using the environmental noise modelling computer program, "SoundPlan".

Input data for computer modelling included:

- Construction of the rooftop terrace, as observed during a site visit on 16th September 2020.
- EPA standard weather condition for the day and night periods (see Table 6.1).
- Sound power levels, as summarised in Table 6.2.
- Height and structure of the roof terrace above the surrounds.

TABLE 6.1 - WEATHER CONDITIONS

Condition	Day Period	Night Period
Temperature	20 °C	15 °C
Relative humidity	50%	50%
Pasquil Stability Class	E	F
Wind speed	4 m/s*	3 m/s*

* From source to receiver

TABLE 6.2 – SOUND POWER LEVELS OF DELIVERY VEHICLES

DESCRIPTION	dB(A)
Patrons on Rooftop Terrace	66/m2

The noise level assumed in our noise model is akin to a beer garden on a "per square metre" basis for the entirety of the roof terrace space. This assumed noise level is considered to be a very conservative (i.e. over-estimation) of the noise level emissions associated with patrons in this space, when compared to the intended use. Given the "per square metre" basis of the noise source within the rooftop terrace, our calculations are the equivalent of 85 people within the rooftop area. This is understood to be a further conservative assumption in the calculation as it is understood that the premises will only hold 50 people.

The rooftop terrace is understood to operate as a private club, where music (if any) will be played at a background noise level only – i.e. patron noise would be the most significant contributor to noise levels at neighbouring premises. It is further understood that whilst no music is proposed to be utilised within the terrace, there are two speakers within the ceiling of the rooftop area. If the noise level at a distance of 1m from these speakers is set at 77 dB(A), music would not be audible in outside the immediate vicinity of the rooftop and would not be considered audible external to the premises at all.

The speakers are located in the ceiling of the rooftop terrace area, facing downward. This has been factored into the calculation of noise impact.

Noise levels with the current construction of the roof terrace was calculated at the identified neighbouring noise sensitive premises, and additionally with a 1m increase in height to the existing balustrading. The increase in height is proposed to be undertaken with glass pool fencing material (or the like).

Hence, the following scenarios were considered :

Scenario 1 : Roof terrace at maximum occupancy with existing construction.

Scenario 2 : Roof terrace at maximum occupancy with 1m height extension to balustrading.

Note : The louvred door facing west (as shown in Figure 2 below) has been assumed to be replaced with a solid door for the calculations. Similarly, the louvred section facing south has also been assumed to be replaced with a solid structure.

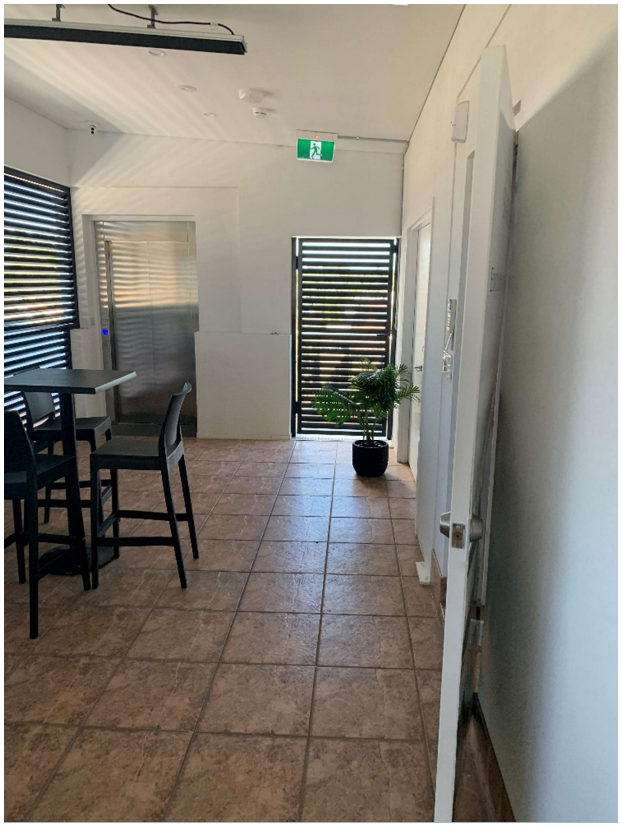

FIGURE 2 – LOUVRED DOOR AND BARRIER

4.0 RESULTS

Noise levels at the identified noise sensitive premise associated with the proposed function centre operations are as listed below in Table 4.1. Noting "R3" is at approximately 6m.

TABLE 4.1 – CALCULATED NOISE LEVELS AT NOISE SENSITIVE PREMISES

Location	Scenario	
	1 : Current Construction	2 : 1m increase in balustrading height
R1	38	32
R2	38	32
R3	39	33

Noise contour plots at both 2m above ground level and 6m above ground level are included for information purposes in Appendix A, noting the single point noise levels above are more accurate, with the noise contour plots being an approximation over the area.

5.0 ASSESSMENT

Noise levels associated with the various scenarios considered have been examined for the potential to contain annoying characteristics in accordance with the *Environmental Protection (Noise) Regulations 199*7.
As music on the roof terrace is to be controlled such that it will be background noise levels only (i.e. conversation would be the dominant noise source on the terrace) no adjustments are applicable to the calculated noise levels..

Hence, Tables 5.1 –and 5.2 summarise the assessment of the calculated noise levels against the pertinent Assigned Noise Levels.

TABLE 5.1 – ASSESSMENT – SCENARIO 1

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L_{A10} Assigned Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	38	Day	53	Complies
		Sunday / Public Holiday Day Period	48	Complies
		Evening	48	Complies
		Night	43	Complies
R2	38	Day	53	Complies
		Sunday / Public Holiday Day Period	48	Complies
		Evening	48	Complies
		Night	43	Complies
R3	39	Day	53	Complies
		Sunday / Public Holiday Day Period	48	Complies
		Evening	48	Complies
		Night	43	Complies

TABLE 5.2 – ASSESSMENT – SCENARIO 2

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L_{A10} Assigned Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	32	Day	53	Complies
		Sunday / Public Holiday Day Period	48	Complies
		Evening	48	Complies
		Night	43	Complies
R2	32	Day	53	Complies
		Sunday / Public Holiday Day Period	48	Complies
		Evening	48	Complies
		Night	43	Complies
R3	33	Day	53	Complies
		Sunday / Public Holiday Day Period	48	Complies
		Evening	48	Complies
		Night	43	Complies

6.0 CONDITIONS FOR COMPLIANCE TO BE ACHIEVED

As can be seen from the assessment in Section 5, noise level emissions associated with the proposed roof terrace private club have been calculated to comply with the relevant assigned noise levels.

To achieve compliance, the following measures need to be implemented :

Louvred Doors/Screen
The louvred door and screen shown in Figure 2 above are to be replaced with a solid construction (i.e. solid door and barrier). Door is to remain normally closed (i.e. self-closer and not to be propped open).

Music
Music, if any, is to be played through the existing speaker system on the roof terrace and be played at background noise levels only. This can be set at a noise level of 77 dB(A) at a distance of 1m from the speakers in the ceiling of the roof terrace. It is noted that it is understood that no music is proposed to be utilised in the roof terrace area.

Balustrading
Given the decrease in calculated noise levels attained by the increase in the balustrading height by 1m, it is recommended to implement this noise control measure.

7.0 DISCUSSION

The following commentary is provided in terms of the potential noise impact of the proposed development on the area :

No noise measurement of existing ambient noise levels have been undertaken in the area, as the Assigned Noise Levels stipulated by the Regulations does not account for the current existing ambient noise environment. However, it is noted that noise levels in the area are considered highly likely to be higher than the Assigned Noise Levels in the area surrounding the proposed development due to both traffic and breakout noise from venues in the vicinity.

Patrons exiting the premises have not been assessed in this report, as the noise emissions associated with these events are outside the responsibility of the venue. Notwithstanding this, it is recommended that management measures be put in place to ensure patrons leave the venue in a responsible fashion, with signage reminding personnel of this need at the exit points. Further, it is understood that the external staircase to the east of the roof terrace is proposed to be utilised in the event of an emergency only.

Mechanical plant has not been considered in this assessment as no additional services are proposed to be included within the development. Further, any existing mechanical services are associated with the commercial premises below the roof terrace and are switch off during the “day period” as stipulated by the Regulations (i.e. prior to 7pm).

8.0 CONCLUSION

Based on the above assessment, noise level emissions associated with the roof terrace private club comply with the relevant assigned noise levels stipulated by the *Environmental Protection (Noise) Regulations 1997.*

It is noted that for the above finding to hold true, the operational restrictions and construction measures listed above must be implemented and followed.

APPENDIX A

Noise Contour Plots

D:\DATA\ActiveProjectsGW\20262 - 201 Oxford Street Leederville Rooftop Private Club\Leederville Cameras Rooftop\2mAGL.sgs

Customer:
Lidio Fiore
Project: Leederville Cameras Rooftop Private Club
Project-No. 20262

Map
1

GNM - Noise levels to neighbours 2m AGL
Result number 3
Calculation in 2 m above ground

Project engineer: George Watts
Created: 10/12/2020
Processed with SoundPLAN 8.2, Update 28/01/2020

Levels L10Regs
in dB(A)

- = 30
- = 32
- = 34
- = 36
- = 38
- = 40
- = 42
- = 44
- = 46

0 5 10 20 30 4

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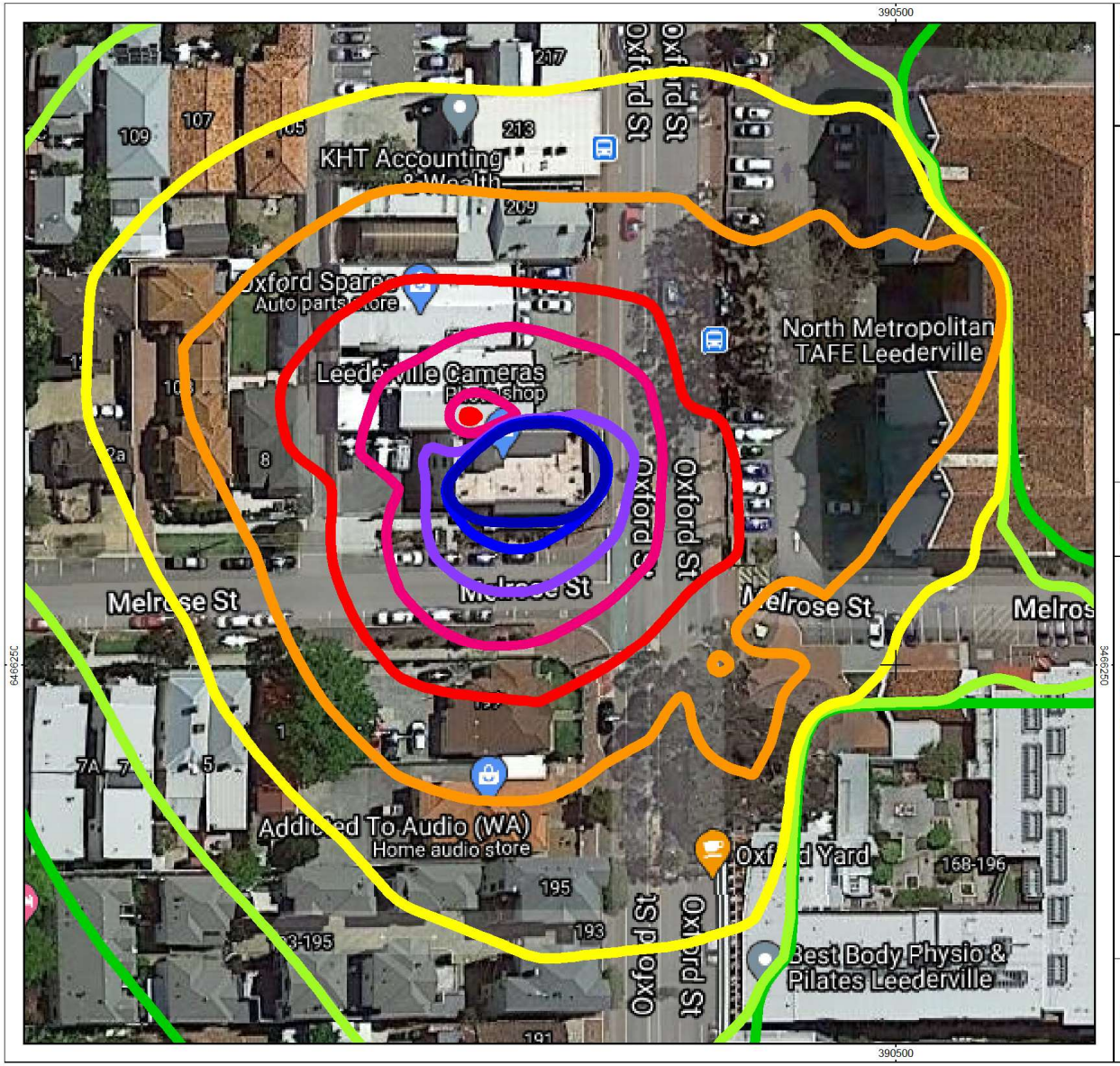

Customer:
Lidio Fiore
Project: Leederville Cameras Rooftop Private Club
Project-No. 20262

Map
2

GNM - Noise levels to neighbours 6m AGL
Result number 4
Calculation in 6 m above ground

Project engineer: George Watts
Created: 10/12/2020
Processed with SoundPLAN 8.2, Update 28/01/2020

Levels L10Regs
in dB(A)

- = 30
- = 32
- = 34
- = 36
- = 38
- = 40
- = 42
- = 44
- = 46

0 5 10 20 30 4

HERRING STORER ACOUSTICS