

Environmental Noise Assessment - Proposed Tavern

Corner of Sierra Parade and McDonald Road, Baldivis

Reference: 251211064-01A

Prepared for:
Olk + Associates

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EXECUTIVE SUMMARY

Lloyd George Acoustics was engaged by Olk + Associates to undertake a noise assessment for a proposed tavern to be located on the corner of Sierra Parade and McDonald Road, Baldivis in relation to a Development Application. This report considered noise emissions from the proposed tavern to surrounding properties by way of noise modelling of patrons, music, cold deliveries and mechanical plant.

Table E1 provides compliant operation modes based on predicted audibility and noise levels at the surrounding noise-sensitive premises. The proposed operating hours are between 11.00am and 10.00pm on all days, with this extended to 11.30pm on Friday, Saturday and public holidays.

Table E1 – Compliant Operating Modes

Time Period	Compliant Operation Mode	Music*	Windows/Doors Configuration
Friday, Saturday and Public Holiday 10.00pm to 11.30pm	A [#]	DJ/Band music playing at 83 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area.	Only one door open on the north side. Northwest entrance to courtyard closed.
Saturday 11.00am to 7.00pm	B	DJ/Band music playing indoors at 85 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area. Background music playing in Shaded Beer Garden.	All doors/windows open on the north side
Sunday/Public Holiday 11.00am to 10.00pm & Monday to Saturday 7.00pm to 10.00pm	C [#]	DJ/Band music playing at 83 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area.	Only one door open on the north side.
	D	Acoustic music playing at 82 dB(A) $L_{Aeq,5mins}$ at 5 metres from the speakers. Background music playing indoors.	All doors/windows open on the north side
	E [#]	DJ/Band music playing at 85 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area.	Only one door open on the north side. Northwest entrance to courtyard closed.
Allowable during any time	F	Background music playing on all speakers.	Door and bar window open on the north side

*Music assessed as inaudible at residences. If music is audible at residences, a + 10 dB penalty will apply and increased restrictions would be required.

[#]No patrons or music playing in shaded beer garden.

To ensure compliance, it is recommended a noise management plan is incorporated for the tavern that includes these compliant operation modes and other recommendations noted within the assessment.

1. INTRODUCTION

Lloyd George Acoustics was engaged by Olk + Associates to undertake an environmental noise assessment for a proposed tavern to be located on the corner of Sierra Parade and McDonald Road, (refer *Figure 1-1*) to support the Development Application (DA). The site plan is shown in *Figure 1-2* with DA drawings provided in *Appendix A*.



Figure 1-1: Subject Site Location (Source: DPLH PlanWA)

The proposed operating hours are between 11.00am and 10.00pm on all days, with this extended to 11.30pm on Friday, Saturday and public holidays.

With regard to noise emissions, consideration is given to noise from the tavern including mechanical plant, music, patrons and cold deliveries at neighbouring properties, against the prescribed standards of the *Environmental Protection (Noise) Regulations 1997*.

Appendix C contains a description of some of the terminology used throughout this report.

2. CRITERIA

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations).

2.1. Regulations 7, 8 & 9

This group of regulations provide the prescribed standard for noise as follows:

“7. Prescribed standard for noise emissions

- (1) Noise emitted from any premises or public place when received at other premises –*
 - (a) must not cause, or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and*
 - (b) must be free of –*
 - (i) tonality; and*
 - (ii) impulsiveness; and*
 - (iii) modulation,**when assessed under regulation 9.*
- (2) For the purposes of subregulation (1)(a), a noise emission is taken to significantly contribute to a level of noise if the noise emission ... exceeds a value which is 5 dB below the assigned level at the point of reception.”*

Tonality, impulsiveness and modulation are defined in regulation 9 (refer *Appendix C*). Under regulation 9(3), “Noise is taken to be free of the characteristics of tonality, impulsiveness and modulation if -

- (a) the characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and*
- (b) the noise emission complies with the standard prescribed under regulation 7(1)(a) after the adjustments in the table [Table 2-1] ... are made to the noise emission as measured at the point of reception.”*

Table 2-1: Adjustments Where Characteristics Cannot Be Removed

Where Noise Emission is Not Music*			Where Noise Emission is Music	
Tonality	Modulation	Impulsiveness	No Impulsiveness	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

* These adjustments are cumulative to a maximum of 15 dB.

The assigned levels (prescribed standards) for all premises are specified in regulation 8(3) and are shown in *Table 2-2*. The L_{A10} assigned level is applicable to noises present for more than 10% of a representative assessment period, generally applicable to “steady-state” noise sources. The L_{A1} is for short-term noise sources present for less than 10% and more than 1% of the time. The L_{Amax} assigned level is applicable for incidental noise sources, present for less than 1% of the time.

Table 2-2: Baseline Assigned Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area ¹	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial Premises	All hours	60	75	80
Industrial and Utility Premises	All hours	65	80	90

1. **highly sensitive area** means that area (if any) of noise sensitive premises comprising —

- (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
- (b) any other part of the premises within 15 metres of that building or that part of the building.

The influencing factor (IF), in relation to noise received at noise sensitive premises, has been calculated as either 2 or 3 dB, as determined in *Appendix B*. *Table 2-3* shows the assigned levels including the influencing factor at the receiving locations.

Table 2-3: Assigned Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
+2 dB IF (nearby Residences) Noise sensitive premises: highly sensitive area ¹	0700 to 1900 hours Monday to Saturday (Day)	47	57	67
	0900 to 1900 hours Sunday and public holidays (Sunday)	42	52	67
	1900 to 2200 hours all days (Evening)	42	52	57
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	37	47	57
+3 dB IF (2 Chilvers Street) Noise sensitive premises: highly sensitive area ¹	0700 to 1900 hours Monday to Saturday (Day)	48	58	68
	0900 to 1900 hours Sunday and public holidays (Sunday)	43	53	68
	1900 to 2200 hours all days (Evening)	43	53	58
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	38	48	58
Commercial Premises	All hours	60	75	80

1. **highly sensitive area** means that area (if any) of noise sensitive premises comprising —
- a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
 - any other part of the premises within 15 metres of that building or that part of the building.

It must be noted the assigned levels above apply outside the receiving premises and at a point at least 3 metres away from any substantial reflecting surfaces.

The assigned levels are statistical levels and therefore the period over which they are determined is important. The Regulations define the Representative Assessment Period (RAP) as “a period of time of not less than 15 minutes, and not exceeding 4 hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission”. An inspector or authorised person is a person appointed under Sections 87 & 88 of the *Environmental Protection Act 1986* and include Local Government Environmental Health Officers and Officers from the Department of Water Environmental Regulation. Acoustic consultants or other environmental consultants are not appointed as an inspector or authorised person. Therefore, whilst this assessment is based on a 4-hour RAP, which is assumed to be appropriate given the nature of the operations, this is to be used for guidance only.

2.2. Regulation 14A

“14A. Waste Collection and Other Works

- (1) Regulation 7 does not apply to noise emitted in the course of carrying out class 1 works if –*
- (a) The works are carried out in the quietest reasonable and practicable manner; and*
 - (b) The equipment used to carry out the works is the quietest reasonably available;*

class 1 works means specified works carried out between -

- (a) 0700 hours and 1900 hours on any day that is not a Sunday or a public holiday; or*
- (b) 0900 hours and 1900 hours on a Sunday or public holiday.*

specified works means -

- (a) The collection of waste; or*
- (b) The cleaning of a road or the drains for a road; or*
- (c) The cleaning of public places, including footpaths, cycle paths, car parks and beaches;”*

In the case where specified works are to be carried out outside of class 1, a noise management plan is to be prepared and approved by the CEO.

3. METHODOLOGY

Computer modelling has been used to predict the noise emissions from the development to all nearby receivers. The software used was *SoundPLAN 9.1* with the ISO 9613 algorithms (ISO 17534-3 improved method) selected, as they include the influence of wind and are considered appropriate given the relatively short source to receiver distances. Input data required in the model are listed below and discussed in *Section 3.1* to *Section 3.5*:

- Meteorological Information;
- Topographical data;
- Ground Absorption; and
- Source sound power levels.

3.1. Meteorological Conditions

Meteorological information utilised is provided in *Table 3-1* and is considered to represent worst-case conditions for noise propagation. At wind speeds greater than those shown, sound propagation may be further enhanced, however background noise from the wind itself and from local vegetation is likely to be elevated and dominate the ambient noise levels.

Table 3-1: Modelling Meteorological Conditions

Parameter	Day (7.00am to 7.00pm)	Night (7.00pm to 7.00am)
Temperature (°C)	20	15
Humidity (%)	50	50
Wind Speed (m/s)	Up to 5	Up to 5
Wind Direction*	All	All

* The modelling package allows for all wind directions to be modelled simultaneously.

Alternatives to the above default conditions can be used where one year of weather data is available and the analysis considers the worst 2% of the day and night for the month of the year in which the worst-case weather conditions prevail (source: *Draft Guideline on Environmental Noise for Prescribed Premises*, May 2016). In most cases, the default conditions occur for more than 2% of the time and therefore must be satisfied.

3.2. Topographical Data

Topographical data was adapted from publicly available information (e.g. *Google*) in the form of spot heights and combined with the site plan.

Surrounding existing buildings were also incorporated in the noise model, as these can provide noise shielding as well as reflection paths. Single storey residential buildings are modelled at a height of 3.5 metres. The proposed tavern is included in the model as shown in the *Appendix A* plans, and existing commercial buildings are modelled at a height of 6.0 metres. Receivers are modelled at a height of 1.4 metres above floor level.

Solid fencing at a minimum 2.0-metres and 3.0-metres high (relative to the tavern floor level) has been included in the model as shown in *Figure 3-1* and the *Appendix A* plans. Note this includes the northwest entry gate. A canopy is also included in the northwest corner of the shaded beer garden to enclose this area when the northwest entry gate is closed as shown in the *Appendix A* plans. This fencing, the northwest entry gate, and the canopy are assumed to be free of gaps, and have a minimum surface mass of 8 kg/m^2 . Such material includes brick, limestone, sound-rated plexiglass or double sheeted *Colorbond*.

Given the external doors used to access the outdoor smoking terrace will be used infrequently and will not be held open at any time, they are assumed to be closed within the assessment.

Figure 3-1 shows a 2D overview of the noise model with the location of all relevant receivers identified. Point sources are shown as red dots, noting these include outdoor speaker noise, mechanical plant and a refrigerated delivery truck.



Figure 3-1: Overview of Noise Model

3.3. Ground Absorption

The ground absorption has been assumed to be 0.0 (0%) for the entire area, noting that 0.0 represents hard reflective surfaces such as water and 1.0 represents absorptive surfaces such as grass.

3.4. Building Construction

Given the project is at DA Stage, the following assumptions form the basis of the assessment:

- All external glazing to achieve R_w 33, comprising minimum 10.38mm thick laminated glass with acoustic seals;
- Roof and ceiling to achieve R_w 43 performance (likely achievable with metal deck roof and *Anticon 50*, 13mm thick sound-rated plasterboard with R4.0 Bradford Gold insulation above);
- Underside of internal ceiling to incorporate acoustic absorption to minimum 50% of ceiling with an NRC $\geq$ 0.70.

3.5. Source Sound Levels

The source sound power levels used in the modelling are provided in *Table 3-2*. Where different values have been used to develop compliant scenarios, these have been adjusted accordingly.

Table 3-2: Source Sound Power Levels, dB

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	63	125	250	500	1k	2k	4k	8k	
Toilet Exhaust Fan, L_{A10}	60	65	62	63	60	61	56	53	67
Kitchen Exhaust Fan, L_{A10}	50	64	61	70	69	66	62	50	73
AC Plant, double fan unit, L_{A10}	72	74	68	69	63	61	53	47	70
Cool Room Refrigeration, L_{A10}	87	86	89	85	81	77	73	-	87
Tavern Patrons Internal Area - 436, L_{A10}	80	91	95	97	89	87	84	73	97
Tavern Patrons Outdoor Areas - 115, L_{A10}	65	76	80	82	74	72	69	58	92
Background Music, L_{A10}	66	70	67	72	72	70	62	51	76
Acoustic Music, L_{A10}	80	84	86	86	86	81	81	80	90
DJ/Band Music, L_{A10}	110	112	110	105	103	103	100	97	110
Refrigerated Truck Delivery, L_{A1}	100	91	87	88	83	81	79	75	90

The following is noted in relation to *Table 3-2*:

- Mechanical plant sound levels are estimated from previous projects and are modelled as a point source 1.0m above roof level.
- Delivery truck is modelled as a point source 2.3m above ground level in the delivery yard;
- Two speakers for the outdoor acoustic music have been modelled as a point source 2.0 metres above floor level, with typical speaker directivity applied facing towards the east. All other speakers are modelled at ceiling height, with 6 speakers located in the Shaded Beer Garden and 15 speakers located internally.

- Speaker sound levels that represent background type music only are as defined in VCAT decision (*Ref: B2/2005 Whiting v Hosier Bar Pty Ltd*) and reproduced in the Liquor Control Reform Act of Victoria as “a background level requires that music be played at a level enabling normal voice conversation at a distance of 600mm.”
- Each patron is modelled at 1.5m above ground and is assumed to have a sound power level of 75 dB(A), with 1 in 3 patrons talking simultaneously. It is noted that patron noise can be highly variable depending on the number of patrons, background noise level, alcohol consumption and the like.

4. RESULTS AND ASSESSMENT

The noise levels were predicted for the following scenarios:

- Scenario 1 – Includes noise from all mechanical plant operating during the night period.
- Scenario 2 – Includes noise from a cold delivery during the day period only (Monday to Saturday between 7.00am and 7.00pm).
- Scenario 3A – Includes 436 patrons indoors and DJ/Band music playing inside at a level of 83 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area. Includes one door facing north open, and northwest entrance to courtyard closed as shown in *Figure 4-3*.
- Scenario 3B – Includes 571 patrons and DJ/Band music playing inside at a level of 85 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area. Includes all north facing windows and doors open as shown in *Figure 4-6*.
- Scenario 3C – Includes 436 patrons indoors and DJ/Band music playing inside at a level of 83 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area. Includes one door facing north open as shown in *Figure 4-4*.
- Scenario 3D – Includes 571 patrons and acoustic music playing in the Shaded Beer Garden at 82 dB(A) $L_{Aeq,5mins}$ at 5m from the east facing speakers. Also includes background music playing inside and all north facing windows and doors open as shown in *Figure 4-6*.
- Scenario 3E – Includes 436 patrons indoors and DJ/Band music playing inside at a level of 85 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area. Includes one door facing north open, and northwest entrance to courtyard closed as shown in *Figure 4-3*.
- Scenario 3F – Includes 571 patrons and background music playing on all speakers. Includes one door and bar window facing north open as shown in *Figure 4-5*.

4.1. Scenario 1

Mechanical plant noise consists of the exhaust fans, AC and cool room refrigeration. Predicted and assessed noise levels are provided in *Table 4-1*. The critical assigned level is during the night, as the plant may operate during the night period which is between 10.00pm to 7.00am. An adjustment of + 5 dB is included for tonality, since this may be present for such noise sources. A noise contour plot is also provided in *Figure 4-1* showing noise levels at ground floor.

Table 4-1: Mechanical Plant Noise Predicted Levels and Assessment, dB L_{A10}

Receiver	Total	Total Adjusted	Assigned Level	Assessment
2 Chilvers Street (childcare) – Ground Floor	40	45	38	+7 dB
2 Chilvers Street (childcare) – Upper Floor	41	46	38	+8 dB
3 Sierra Parade	44	49	37	+12 dB
5 Sierra Parade	45	50	37	+13 dB
7 Sierra Parade	43	48	37	+11 dB
9 Sierra Parade	42	47	37	+10 dB
136 McDonald Road	44	49	37	+12 dB

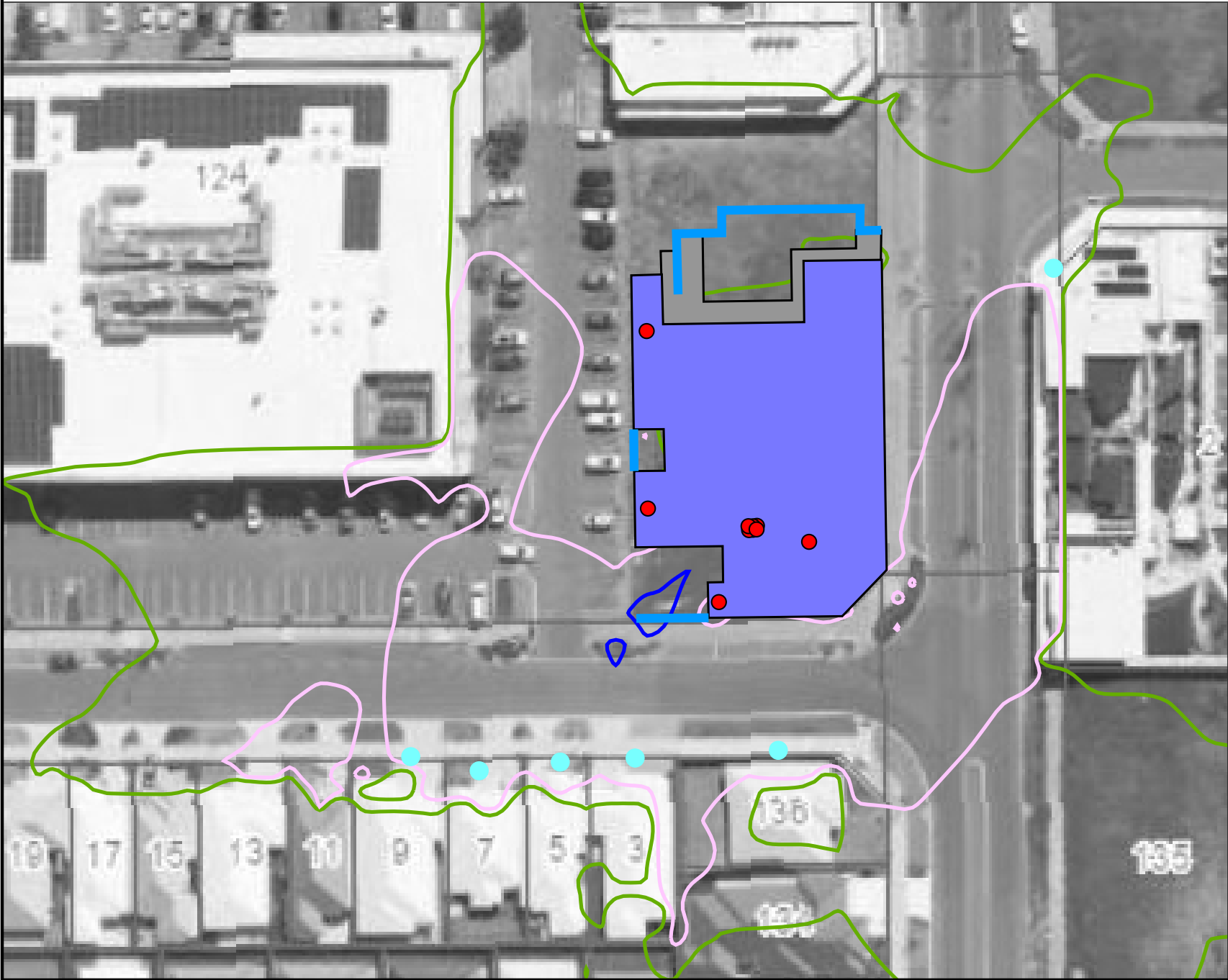
The calculations show exceedances during all periods, noting this is primarily due to noise emitted from the refrigeration plant. Compliance is considered achievable by implementing one or more of the following:

- Reduce fan speeds while operating during sensitive periods;
- Select quieter units than those assumed;
- Install acoustic screening around plant;
- Relocate the plant further from the residences.

It must be noted that the assessment is based on assumptions in relation to the number, location, size and type of mechanical plant. Therefore, once the mechanical plant has been designed and selected, noise is to be reviewed by a suitably qualified acoustical consultant.

Whilst noise has been assessed to the childcare centre during the night, it is unlikely this premises would be occupied during this time and compliance would be achieved during the day at this location.

Figure 4-1: Scenario 1 Noise Contour Plot (1.4m AGL)



Predicted Noise level
dB LA10

- = 37
- = 42
- = 47
- = 52
- = 57

Legend

- Tavern
- Receiver
- Mech Plant
- Solid Fence
- Canopy



Scale 1:700
0 4.5 9 18 27 m

Project No: 251211064
Consultant: MN
Date: 13/04/2026
Algorithm: ISO 9613
SoundPLAN Version: 9.1



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4.2. Scenario 2

Predicted and assessed noise levels from a delivery truck in isolation within the loading bay are provided in *Table 4-2*. It is assessed against the L_{A1} daytime assigned level since deliveries will only occur between 7.00am and 7.00pm Monday to Saturday, and they will take less than 24 minutes in a 4-hour period. Given the noise is daytime only and for a short duration, no penalties are applied for intrusive characteristics. A noise contour plot is also provided in *Figure 4-2* showing noise levels at ground floor.

Table 4-2: Tavern Delivery Noise Predicted Levels and Assessment, dB L_{A1}

Receiver	Delivery Noise	Assigned Level	Assessment
2 Chilvers Street (childcare) – Ground Floor	29	58	Complies
2 Chilvers Street (childcare) – Upper Floor	31	58	Complies
3 Sierra Parade	51	57	Complies
5 Sierra Parade	52	57	Complies
7 Sierra Parade	53	57	Complies
9 Sierra Parade	52	57	Complies
136 McDonald Road	48	57	Complies

The assessment demonstrates compliance is achieved during the day period.

Figure 4-2: Scenario 2 Noise Contour Plot (1.4m AGL)



Predicted Noise level
dB LA1

- = 57
- = 62
- = 67
- = 72
- = 77

Legend

- Tavern
- Receiver
- Delivery Truck
- Solid Fence
- Canopy



Scale 1:700
0 4.5 9 18 27 m

Project No: 251211064
Consultant: MN
Date: 13/04/2026
Algorithm: ISO 9613
SoundPLAN Version: 9.1



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4.3. Scenario 3

The L_{A10} predicted noise levels for each scenario with music and patrons included are provided in *Table 4-3*. Noise contour plots are also provided for each scenario in *Figure 4-7* to *Figure 4-12* showing noise levels at ground floor.

Table 4-3: Music and Patron Noise Predicted Levels, dB L_{A10}

Receiver	Scenario 3A	Scenario 3B	Scenario 3C	Scenario 3D	Scenario 3E	Scenario 3F
2 Chilvers Street (childcare) – Ground Floor	53*	69*	53*	61*	55*	45
2 Chilvers Street (childcare) – Upper Floor	53*	68*	53*	61*	54*	43
3 Sierra Parade	35	44	36	35	37	34
5 Sierra Parade	36	46	41	36	37	35
7 Sierra Parade	35	46	40	36	37	37
9 Sierra Parade	35	46	36	36	36	37
136 McDonald Road	37	47	37	41	39	34

*10 dB penalty has been applied as music is considered likely to be audible

When assessing the predicted noise levels, a +10 dB adjustment would be applicable if music was audible at a receiver. As DJ/Band music will only be played indoors, and the residential receivers are located on the opposite side of the main outdoor/open area, music noise is considered likely to be masked at the residences in all scenarios. However, the +10 dB adjustment has been applied to the receivers at the childcare centre at 2 Chilvers Street for five of the scenarios when music noise is expected to be above background levels.

Based on the predicted levels in *Table 4-3*, music being inaudible at the residences in all scenarios, and the childcare centre at 2 Chilvers Street only being open between 6.30am and 6.30pm Monday to Friday, compliant operation modes are provided in *Table 4-4*.

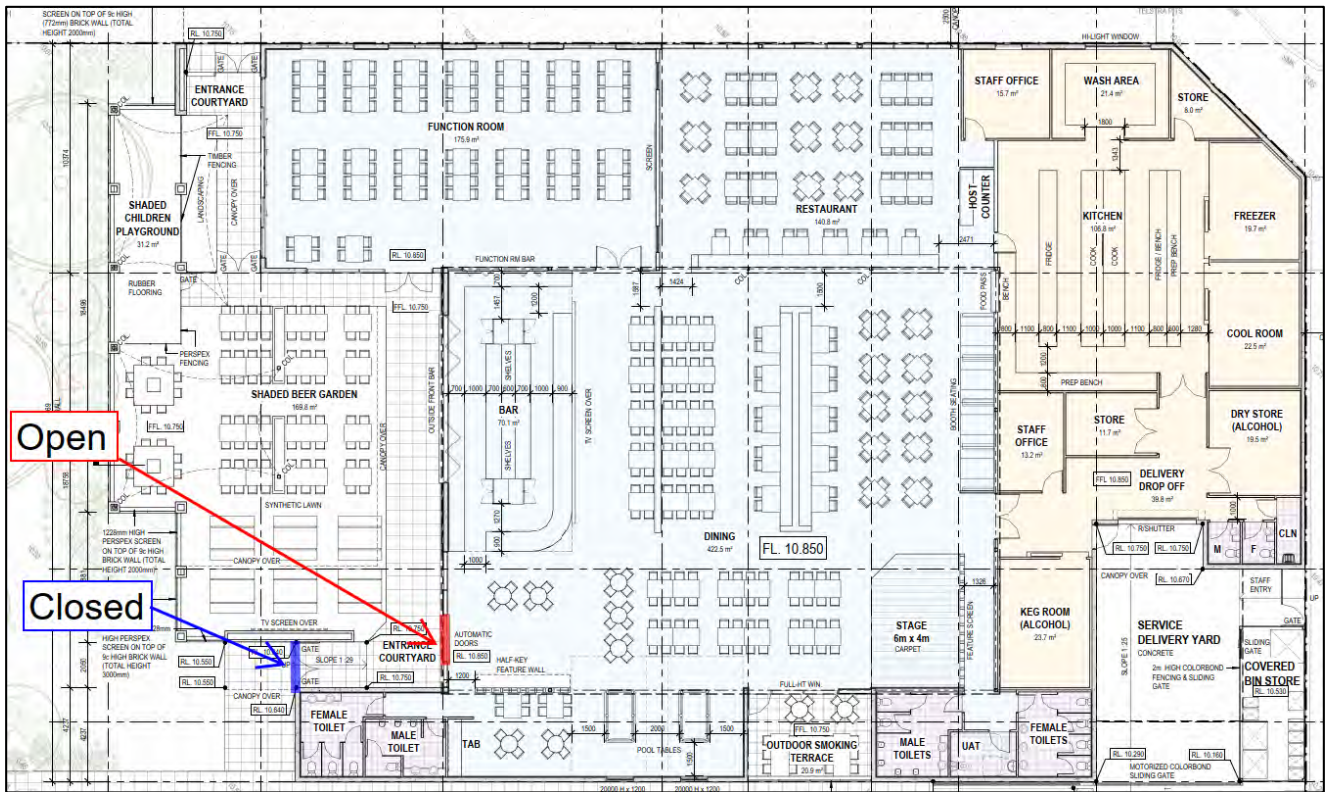


Figure 4-3: One Door Open and Courtyard Entry Closed (Scenario A, E)

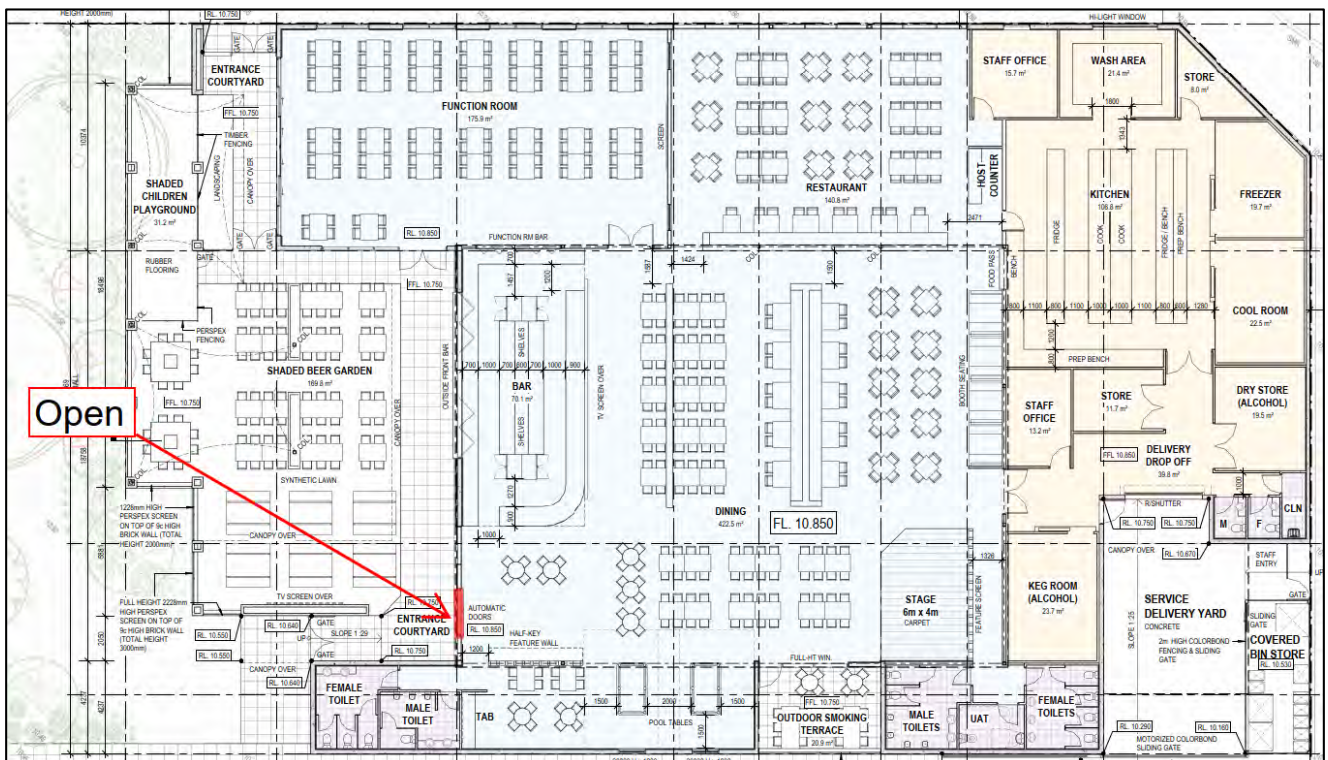


Figure 4-4: One Door Open (Scenario C)

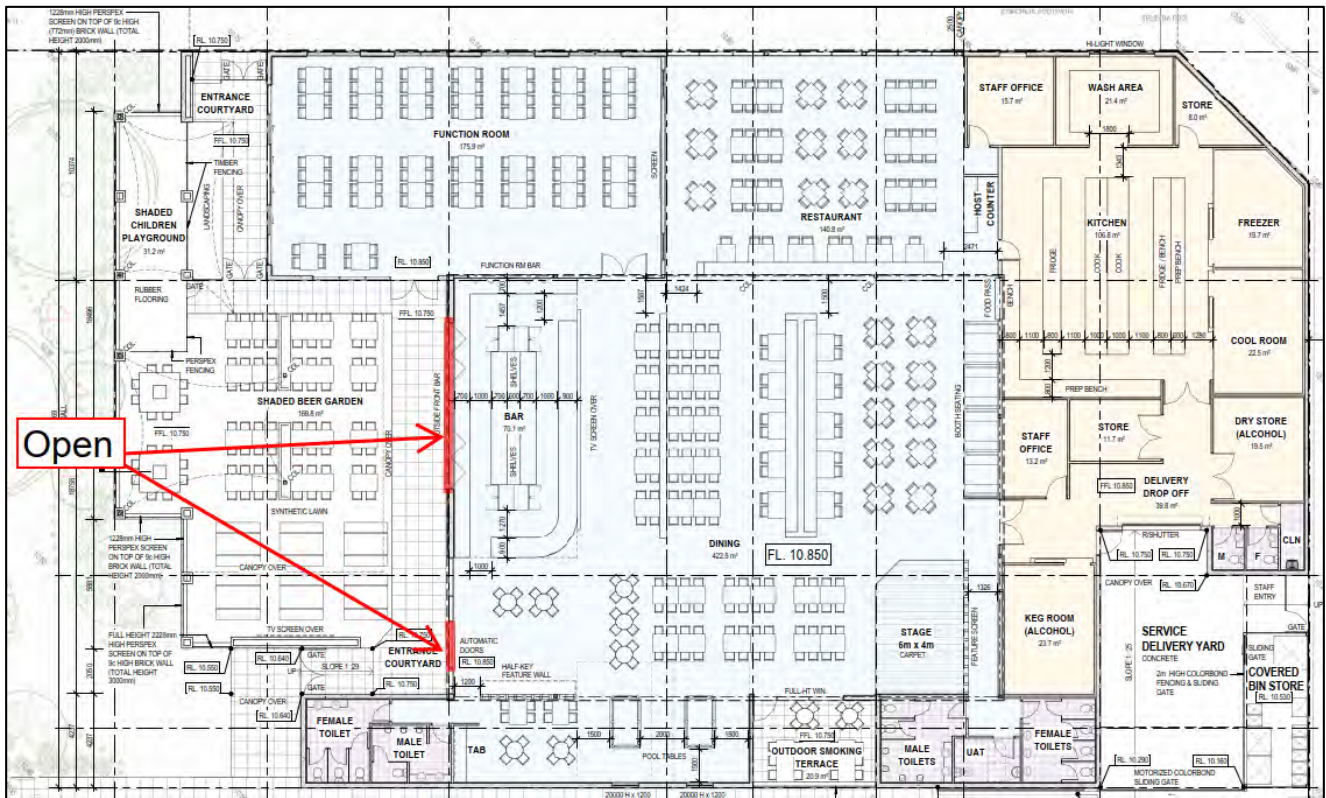


Figure 4-5: Door and Bar Window Open (Scenario F)

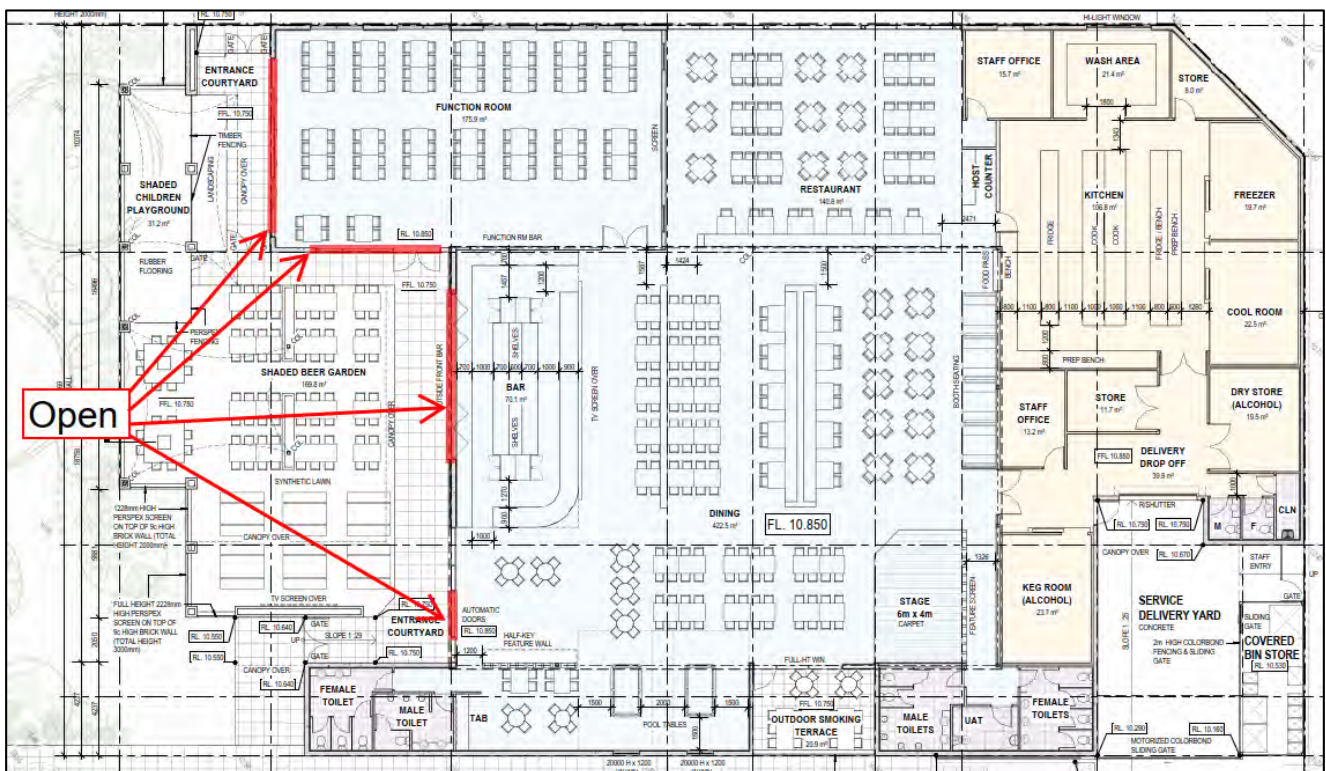


Figure 4-6: North Facing Windows and Doors Open (Scenario B, D)

Table 4-4: Compliant Operation Modes

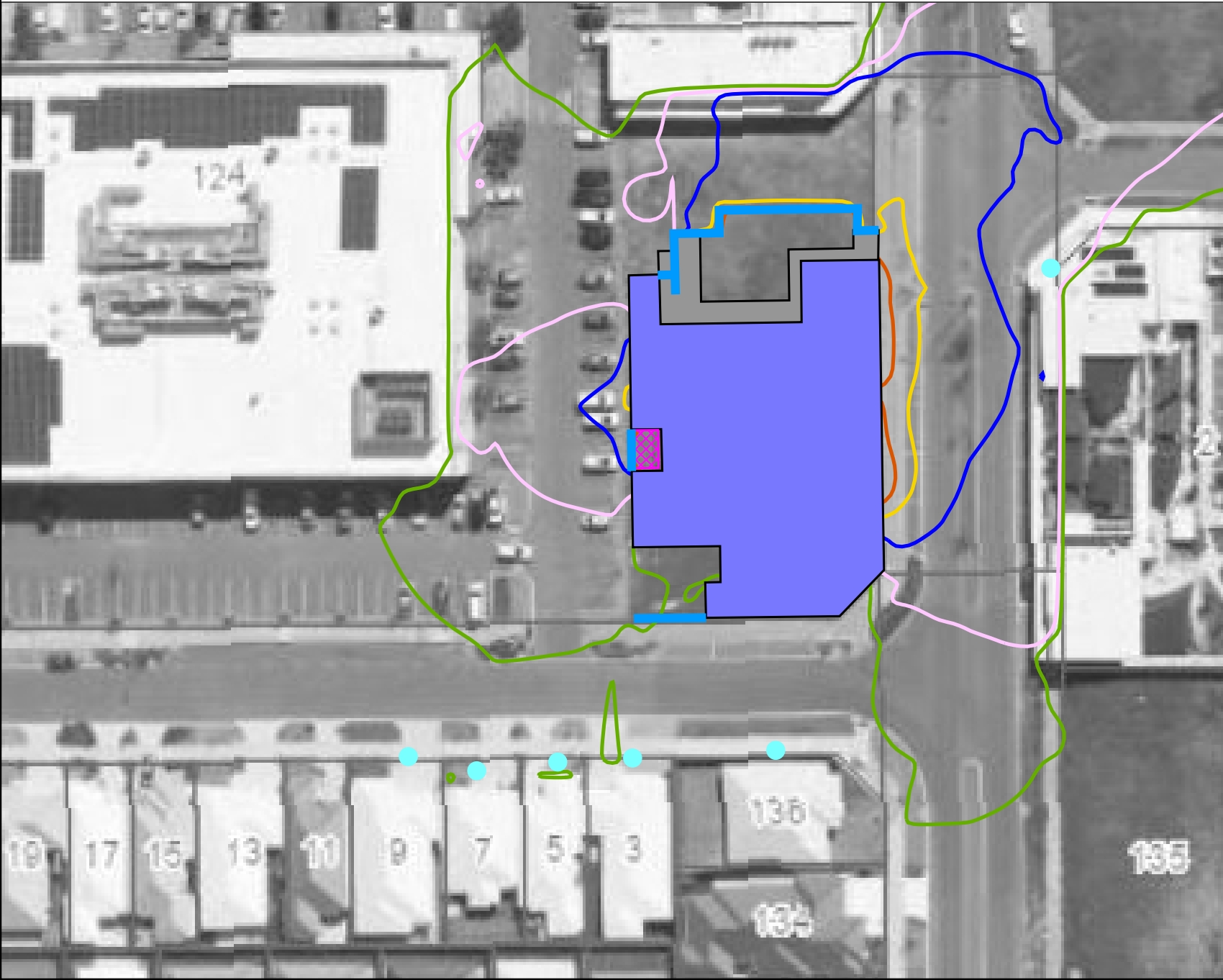
Time Period	Compliant Operation Mode	Music*	Windows/Doors Configuration
Friday, Saturday and Public Holiday 10.00pm to 11.30pm	A [#]	DJ/Band music playing at 83 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area.	Only one door open on the north side. Northwest entrance to courtyard closed.
Saturday 11.00am to 7.00pm	B	DJ/Band music playing indoors at 85 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area. Background music playing in Shaded Beer Garden.	All doors/windows open on the north side
Sunday/Public Holiday 11.00am to 10.00pm & Monday to Saturday 7.00pm to 10.00pm	C [#]	DJ/Band music playing at 83 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area.	Only one door open on the north side.
	D	Acoustic music playing at 82 dB(A) $L_{Aeq,5mins}$ at 5 metres from the speakers. Background music playing indoors.	All doors/windows open on the north side
	E [#]	DJ/Band music playing at 85 dB(A) $L_{Aeq,5mins}$ measured in the centre of the Dining Area.	Only one door open on the north side. Northwest entrance to courtyard closed.
Allowable during any time	F	Background music playing on all speakers.	Door and bar window open on the north side

*Music assessed as inaudible at residences. If music is audible at residences, a + 10 dB penalty will apply and increased restrictions would be required.

[#]No patrons or music playing in shaded beer garden.

Management should maintain a noise management plan to ensure compliance. Such a plan could include instructions regarding noise level spot observations and window configurations among other strategies.

Figure 4-7: Scenario 3A Noise Contour Plot (1.4m AGL)



Predicted Noise level
dB LA10

- = 37
- = 42
- = 47
- = 52
- = 57

Legend

- Tavern
- Receiver
- Outdoor Speaker
- Outdoor Patrons
- Solid Fence
- Canopy



Scale 1:700



Project No: 251211064
Consultant: MN
Date: 13/04/2026
Algorithm: ISO 9613
SoundPLAN Version: 9.1



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Figure 4-8: Scenario 3B Noise Contour Plot (1.4m AGL)



Predicted Noise level
dB LA10

- = 47
- = 52
- = 57
- = 62
- = 67

Legend

- Tavern
- Receiver
- Outdoor Speaker
- Outdoor Patrons
- Solid Fence
- Canopy



Scale 1:700



Project No: 251211064
Consultant: MN
Date: 13/04/2026
Algorithm: ISO 9613
SoundPLAN Version: 9.1



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Figure 4-9: Scenario 3C Noise Contour Plot (1.4m AGL)



Predicted Noise level
dB LA10

- = 42
- = 47
- = 52
- = 57
- = 62

Legend

- Tavern
- Receiver
- Outdoor Speaker
- Outdoor Patrons
- Solid Fence
- Canopy



Scale 1:700



Project No: 251211064
Consultant: MN
Date: 13/04/2026
Algorithm: ISO 9613
SoundPLAN Version: 9.1



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Figure 4-10: Scenario 3D Noise Contour Plot (1.4m AGL)



Predicted Noise level
dB LA10

- = 42
- = 47
- = 52
- = 57
- = 62

Legend

- Tavern
- Receiver
- Outdoor Speaker
- Outdoor Patrons
- Solid Fence
- Canopy



Scale 1:700
0 4.5 9 18 27 m

Project No: 251211064
Consultant: MN
Date: 13/04/2026
Algorithm: ISO 9613
SoundPLAN Version: 9.1



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Figure 4-11: Scenario 3E Noise Contour Plot (1.4m AGL)



Predicted Noise level
dB LA10

- = 42
- = 47
- = 52
- = 57
- = 62

Legend

- Tavern
- Receiver
- Outdoor Speaker
- Outdoor Patrons
- Solid Fence
- Canopy



Scale 1:700



Project No: 251211064
Consultant: MN
Date: 13/04/2026
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Figure 4-12: Scenario 3F Noise Contour Plot (1.4m AGL)



Predicted Noise level
dB LA10

- = 37
- = 42
- = 47
- = 52
- = 57

Legend

- Tavern
- Receiver
- Outdoor Speaker
- Outdoor Patrons
- Solid Fence
- Canopy



Scale 1:700



Project No: 251211064
Consultant: MN
Date: 13/04/2026
Algorithm: ISO 9613
SoundPLAN Version: 9.1



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5. RECOMMENDATIONS

5.1. Mechanical Plant

At this stage, mechanical plant has not been designed such that the assessment has been based on nominal sound levels. Using these nominal sound levels, compliance is considered achievable by implementing one or more of the following:

- Reduce fan speeds while operating during sensitive periods;
- Select quieter units than those assumed;
- Install acoustic screening around plant;
- Relocate the plant further from the residences.

To ensure compliance, the following is also recommended:

- Once the mechanical plant has been designed and selected, the noise levels shall be reviewed prior to Building Permit;
- All exhaust fans shall be located inside the ceiling void and shall be axial fan type, allowing the incorporation of an attenuator if required;
- All fans shall be variable speed drive so that maximum speed is only occurring when necessary with demand;
- Air-conditioning shall have a 'night' / 'quiet' mode option, in case required for prior to 7.00am operation, subject to final detailed analysis;
- All plant shall be selected for quiet operation;
- All plant is to be appropriately vibration isolated to 95% isolation efficiency.

5.2. Deliveries

The assessment demonstrates compliance is achieved provided deliveries will:

- Only occur Monday to Saturday between 7.00am and 7.00pm; and
- Take less than 24 minutes in a 4-hour period.

Fencing at 2.0-metres high (relative to the tavern floor level) has been included along the south side of the delivery yard as shown in the *Appendix A* plans. This fencing is assumed to be solid, and have a minimum surface mass of 8 kg/m².

5.3. Tavern Patrons and Music

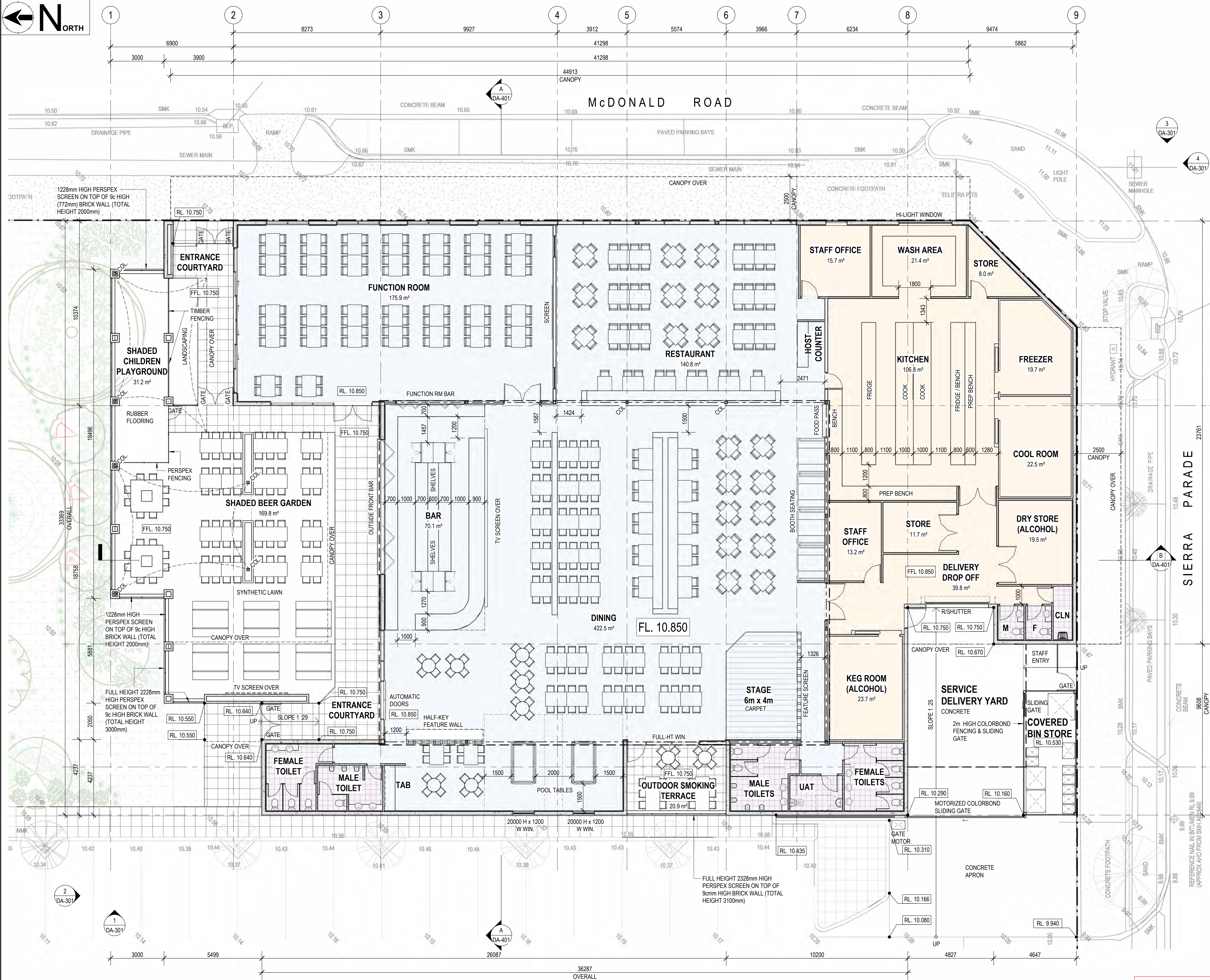
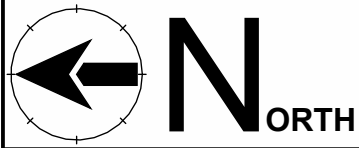
The predicted noise from the tavern patrons and music have been assessed and may exceed the assigned levels at the nearby receivers, as determined in accordance with the *Environmental Protection (Noise) Regulations 1997* and based on full capacity. To ensure compliance, a Noise Management Plan is to be prepared by the venue operator to include the following noise control measures as follows:

- Instructions to restrict the configurations of the venue to the compliant operation modes shown in *Table 4-4*. Note these may be varied somewhat depending on actual patron numbers and the extent to which windows and doors are kept closed.
- Doors to the outdoor smoking terrace shall be fitted with automatic door closers. This is also recommended for the entry door for good practice.
- If noise complaints are received, conduct noise observations at the boundary and at nearby receivers to determine if the music is audible. Where music is perceived as audible, music levels will need to be reduced further.
- Speaker and amplifier system to be owned and supplied by the venue. This will be operated at set limits. The sound limiter is to be kept in a locked cabinet so that this cannot be increased in volume by general staff.
- Ensure glass is emptied into outdoor bins during daytime hours.

It is noted that *Table 4-4* provides compliant operation modes based on predicted music audibility. Since audibility will depend on background noise levels, which are currently unknown and can vary (due to weather conditions etc.), there may be changes required in regards to music type/volume and window/door openings. However, this would need to be confirmed through measurements and/or trials once operational. In any case, the analysis shows that the venue can practicably comply during all periods.

Solid fencing at 2.0-metres and 3.0-metres high (relative to the tavern floor level) is to be included as shown in *Figure 3-1*. Note this includes the northwest entry gate. A canopy at 3.0-metres high is also included in the northwest corner of the shaded beer garden to fully enclose this area when the northwest entry gate is closed. This fencing, the northwest entry gate, and the canopy are to be free of gaps, and have a minimum surface mass of 8 kg/m². Such material includes brick, limestone, sound-rated plexiglass or double sheeted *Colorbond*.

Appendix A – Development Plans



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REV	DATE	DESCRIPTION	BY
F	10.04.26	PLANNING APPLICATION	YX
E	04.03.26	PRELIMINARY	KW
D	20.01.26	PRELIMINARY	KW
C	16.01.26	PRELIMINARY	KW
B	12.01.26	PRELIMINARY	KW
A	17.12.25	PRELIMINARY	KW
REVISIONS			



ISSUED FOR:
DEVELOPMENT APPROVAL

4/44 Belmont Street Rivervale wa 6103
po box 1427 kalamunda wa 6926
t 08 9293 0296
f 08 9293 0543
olk.com.au

CLIENT:
THE LAST LOCAL

PROJECT:
**THE LAST LOCAL
CORNER OF SIERRA PARADE & McDONALD
ROAD, BALDIVIS**

DRAWING TITLE:
GROUND FLOOR PLAN

DRAWN BY: - CHECKED BY: - ENGINEER: - CLIENT REP: -

PROJECT No:
C-LOC-BAL-01

DWG NO.
DA-201

SCALE:
1: 100

REV
F

PRELIMINARY
NOT FOR CONSTRUCTION

GROUND FLOOR PLAN
1: 100

C-LOC-BAL-01
DA-201
REV
F

4/10/2026 12:40:44 PM

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REVISIONS			



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4/44 Belmont Street Rivervale wa 6103
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f 08 9293 0543
olk.com.au

CLIENT:
THE LAST LOCAL
PROJECT:
**THE LAST LOCAL
CORNER OF SIERRA PARADE & McDONALD
ROAD, BALDIVIS**
DRAWING TITLE:
ELEVATIONS

DRAWN BY: - CHECKED BY: - ENGINEER: - CLIENT REP: -

PROJECT No:
C-LOC-BAL-01
SCALE:
1: 100
DWG NO.
DA-301
REV
F

PRELIMINARY
NOT FOR CONSTRUCTION

Appendix B – Influencing Factor Calculation

The assigned levels combine a baseline assigned level with an influencing factor, with the latter increasing the assigned level on the basis of the existence of significant roads and commercial or industrial zoned land within an inner circle (100 metre radius) and an outer circle (450 metre radius) of the noise sensitive premises. The calculation for the influencing factor is:

$$= \frac{1}{10} (\% \text{ Type A}_{100} + \% \text{ Type A}_{450}) + \frac{1}{20} (\% \text{ Type B}_{100} + \% \text{ Type B}_{450})$$

where:

% Type A₁₀₀ = the percentage of industrial land within
a 100m radius of the premises receiving the noise

% Type A₄₅₀ = the percentage of industrial land within
a 450m radius of the premises receiving the noise

% Type B₁₀₀ = the percentage of commercial land within
a 100m radius of the premises receiving the noise

% Type B₄₅₀ = the percentage of commercial land within
a 450m radius of the premises receiving the noise

+ Transport Factor (maximum of 6 dB)

= 2 for each secondary road (6,000 to 15,000 vpd) within 100m

= 2 for a major road (> 15,000 vpd) within 450m

= 6 for a major road within 100m

The nearest noise sensitive premises have been grouped as follows:

- 2 Chilvers Street (childcare); and
- Nearby residences, which include:
 - 3 Sierra Parade;
 - 5 Sierra Parade;
 - 7 Sierra Parade;
 - 9 Sierra Parade;
 - 136 McDonald Road.

Table B-1 shows the percentage of industrial and commercial land within the inner (100 metre radius) and outer (450 metre radius) circles of the noise sensitive premises for the nearby residence.

Table B-1: Percentage of Land Types within 100m and 450m Radii

Receiver	Land Type	Within 100m	Within 450m
2 Chilvers Street (childcare)	Type A - Industrial and Utility	0	0
	Type B – Commercial	49	5
Nearby Residences	Type A - Industrial and Utility	0	0
	Type B – Commercial	35	5



Figure B-1: Land Types within 100m and 450m Radii of Nearby Residences

Table B-2 combines the percentage land types and Transport Factor to calculate the influencing factor.

Table B-2: Influencing Factor Calculation, dB

Receiver	Industrial Land	Commercial Land	Transport Factor	Total
2 Chilvers Street (childcare)	0	2.7	0	3
Nearby Residences	0	2.0	0	2

The influencing factor calculated in Table B-2 is combined with those baseline assigned levels of Table 2-2, resulting in the project assigned levels provided in Table 2-3.

Appendix C – Terminology

The following is an explanation of the terminology used throughout this report:

- **Decibel (dB)**

The decibel is the unit that describes the sound pressure levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

- **A-Weighting**

An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A , dB.

- **Sound Power Level (L_w)**

Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure level at known distances. Noise modelling incorporates source sound power levels as part of the input data.

- **Sound Pressure Level (L_p)**

The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc. and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

- **L_{ASlow}**

This is the noise level in decibels, obtained using the A-frequency weighting and the S (slow) time weighting. Unless assessing modulation, all measurements use the slow time weighting characteristic.

- **L_{AFast}**

This is the noise level in decibels, obtained using the A-frequency weighting and the F (fast) time weighting. This is used when assessing the presence of modulation.

- **L_{APeak}**

This is the greatest absolute instantaneous sound pressure level in decibels using the A-frequency weighting.

- **L_{Amax}**

An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

- **L_{A1}**

The L_{A1} level is the A-weighted noise level exceeded for 1 percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

- **L_{A10}**

The L_{A10} level is the A-weighted noise level exceeded for 10 percent of the measurement period and is considered to represent the “intrusive” noise level.

- **L_{A90}**

The L_{A90} level is the A-weighted noise level exceeded for 90 percent of the measurement period and is considered to represent the “background” noise level.

- **L_{Aeq}**

The equivalent steady state A-weighted sound level (“equal energy”) in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the “average” noise level.

- **One-Third-Octave Band**

Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20000 Hz inclusive.

- **Representative Assessment Period**

Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

- **L_{Amax} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded at any time.

- **L_{A1} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 1 percent of the representative assessment period.

- **L_{A10} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 10 percent of the representative assessment period.

- **Tonal Noise**

A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

- 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.

This is relatively common in most noise sources.

- **Modulating Noise**

A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

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

- **Impulsive Noise**

An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness means:

- a variation in the emission of a noise where the difference between L_{Apeak} and L_{Amax} is more than 15 dB when determined for a single representative event.

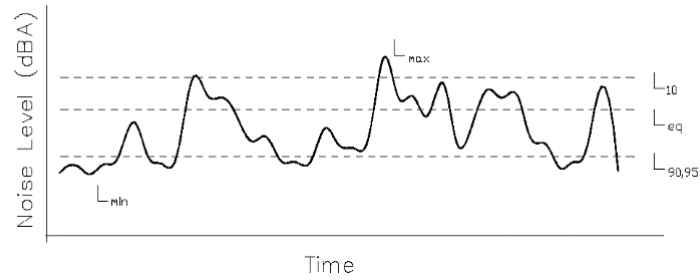
- **Major Road**

Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

- **Secondary / Minor Road**

Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

- Chart of Noise Level Descriptors



- Austroads Vehicle Class

VEHICLE CLASSIFICATION SYSTEM AUSTROADS	
CLASS	DESCRIPTION
1	Light Cars, vans, light trucks, mopeds, off-highway motorcycles
2	Light Trucks Buses, coaches, trucks
3	Heavy Trucks Two axle trucks or buses
4	Heavy Trucks Three axle trucks or buses
5	Heavy Trucks Four axle trucks
6	Heavy Trucks Three axle articulated
7	Heavy Trucks Four axle articulated
8	Heavy Trucks Five axle articulated
9	Heavy Trucks Six axle articulated
10	Heavy Trucks Seven axle articulated
11	Heavy Trucks Eight axle articulated
12	Heavy Trucks Nine axle articulated

- Typical Noise Levels

