

**AREA SCHEDULE:**  
TOTAL SITE AREA: 1400 SQM

**NEW UNDERCOVER AREA ON LOT 1 RP600326**  
(OVER EXISTING IMPERVIOUS AREA):  
BUILDING HEIGHT (PROP. ROOFED AREA): 4800MM  
NEW GFA: NIL (UNDERCOVER AREA IS UNENCLOSED)  
NEW SITE COVER: 331 SQM  
EXISTING SITE COVER: 621 SQM  
TOTAL SITE COVER: 952 (68% OF SITE AREA)  
LANDSCAPING: 11 SQM

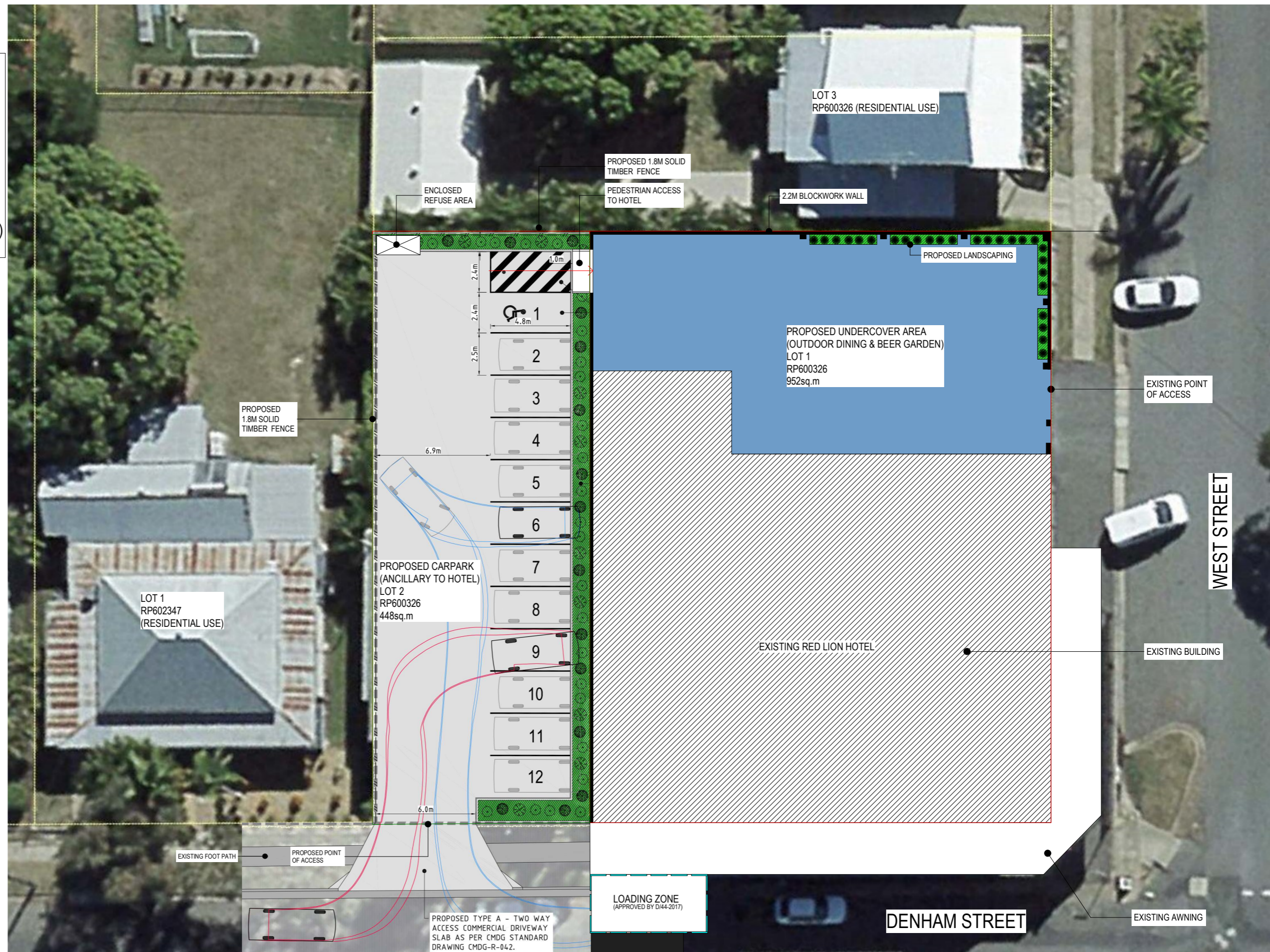
**NEW CAR PARK ON LOT 2 RP600326:**  
NO. OF CAR PARKS: 12  
IMPERVIOUS AREA: 396.5 SQM  
LANDSCAPING: 51.5 SQM

**ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS**

These plans are approved subject to the current conditions of approval associated with

**Development Permit No: D/125-2017**

**Dated: 22 February 2018**



**LEGEND**  
 EXISTING ROOF AREA  
 PROPOSED ROOF AREA

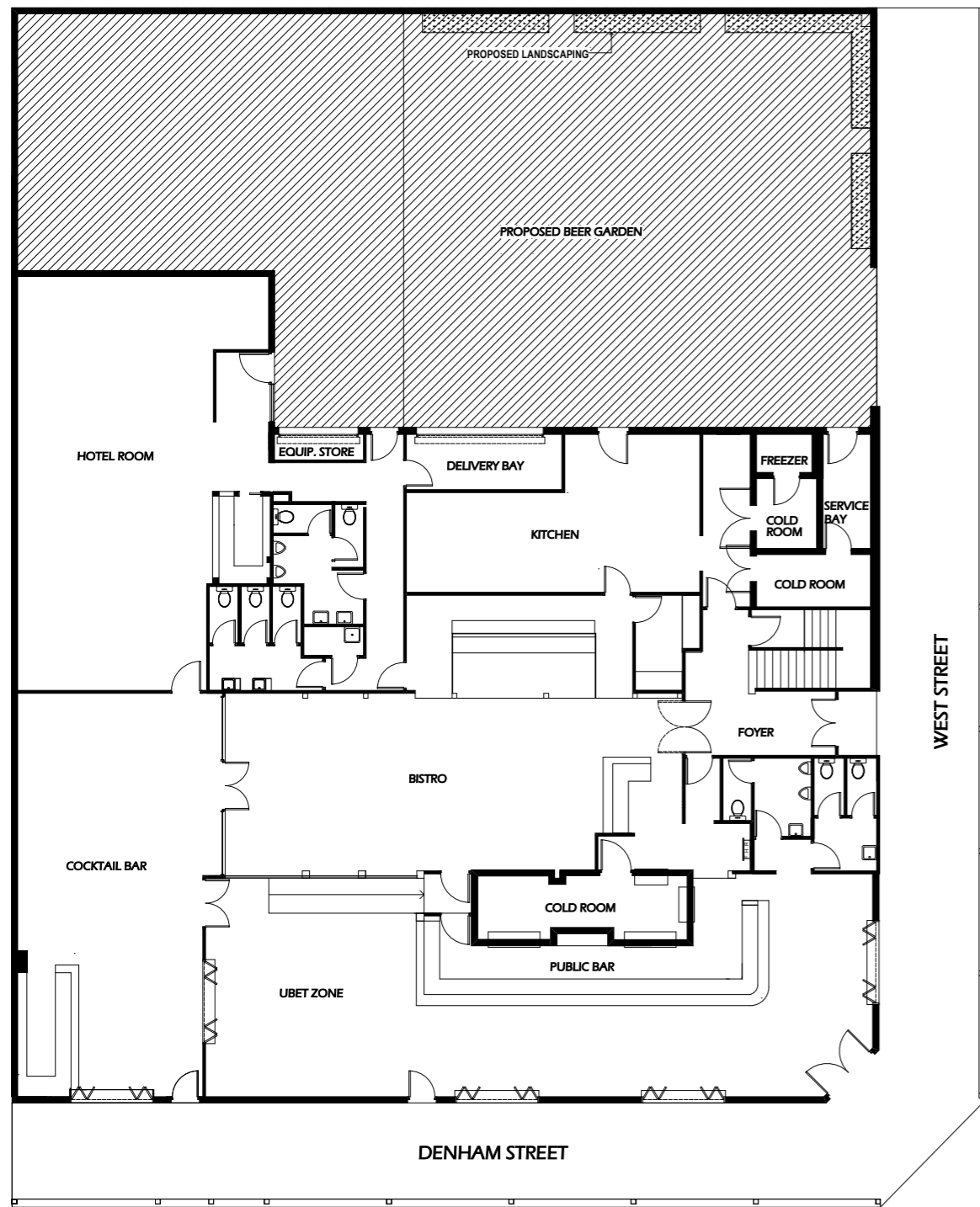
**PROPOSED SITE PLAN**

138 & 140 DENHAM STREET  
ALLENSTOWN  
LOTS 1 & 2: RP600326

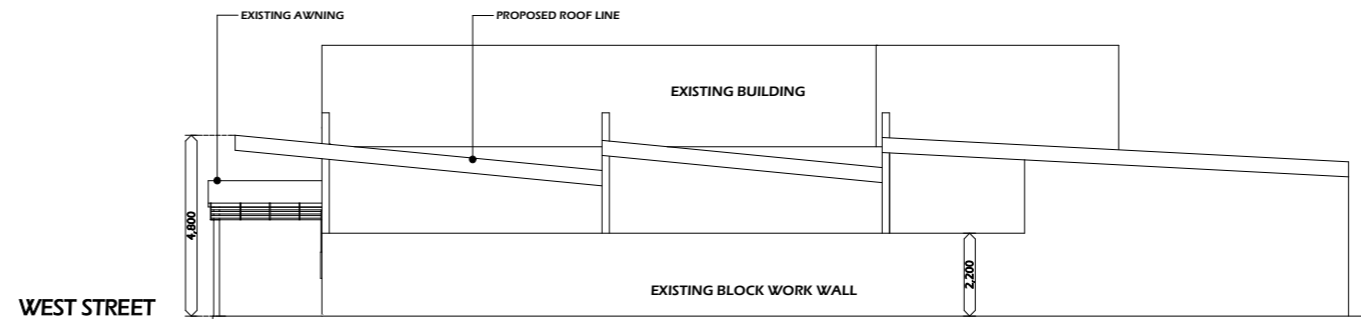
Lotus  
Interior Design & Project Management  
47 Ferguson Street  
Allentown, QLD 4700  
  
P 0438 840 734  
E ginab@live.com.au  
  
ABN 83 254 142 806

CLIENT:	RED LION HOTEL
TITLE:	PROPOSED SITE PLAN
ADDRESS:	138 & 140 DENHAM STREET ALLENSTOWN
	09/10/17
	REV: B

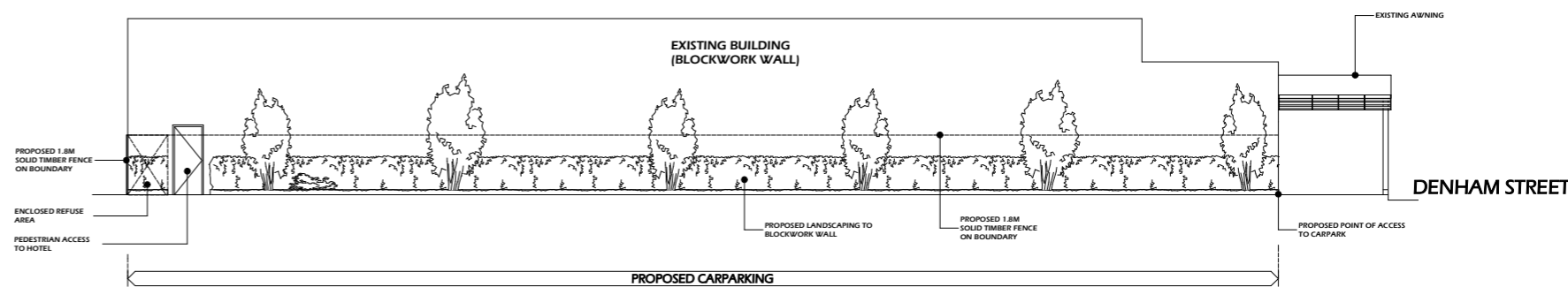




**RED LION FLOOR PLAN**



**RED LION NORTH ELEVATION**



**RED LION WEST ELEVATION**



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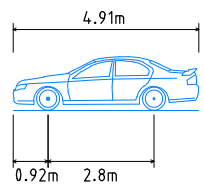
**FLOOR PLAN & ELEVATIONS**

138 & 140 DENHAM STREET  
ALLENSTOWN  
LOTS 1 & 2: RP600326

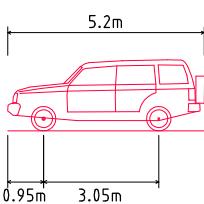
CLIENT:	RED LION HOTEL
TITLE:	EXISTING FLOOR PLAN & PROPOSED ELEVATIONS
ADDRESS:	138 & 140 DENHAM STREET ALLENSTOWN
	09/10/17
	REV: B

1 2 3 4 5 6 7 8 9 10 11 12

A B C D E F G H



OVERALL LENGTH 4.910m  
 OVERALL WIDTH 1.870m  
 OVERALL BODY HEIGHT 1.421m  
 MIN BODY GROUND CLEARANCE 0.159m  
 TRACK WIDTH 1.770m  
 LOCK-TO-LOCK TIME 4.00s  
 CURB TO CURB TURNING RADIUS 5.750m  
**B85 VEHICLE (REALISTIC MIN RADIUS)**  
 SCALE 1:100(A1) 1:200(A3)

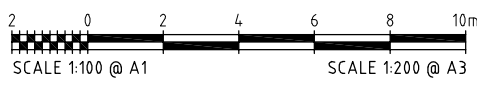
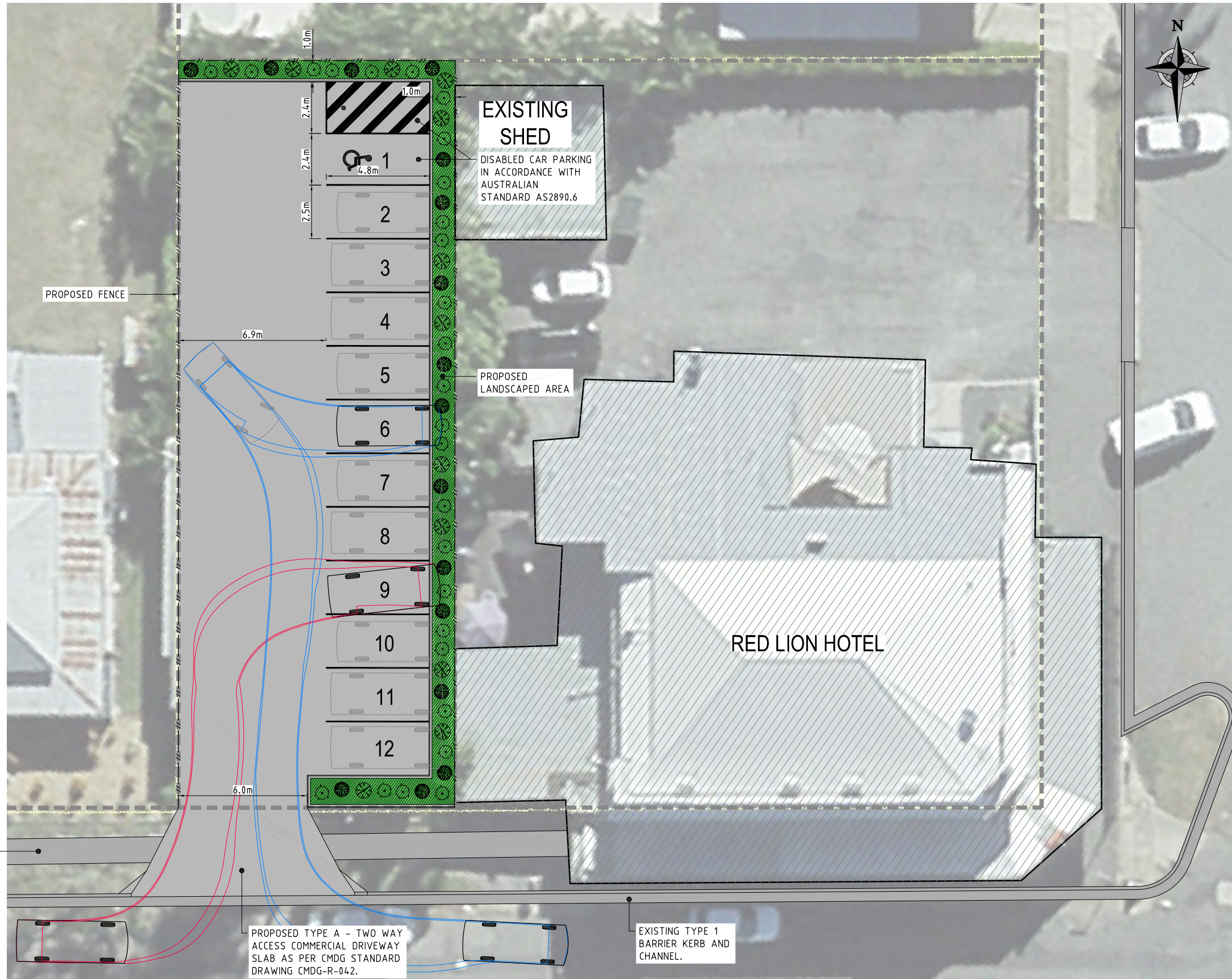


OVERALL LENGTH 5.200m  
 OVERALL WIDTH 1.940m  
 OVERALL BODY HEIGHT 1.878m  
 MIN BODY GROUND CLEARANCE 0.272m  
 TRACK WIDTH 1.840m  
 LOCK-TO-LOCK TIME 4.00s  
 CURB TO CURB TURNING RADIUS 6.250m  
**B99 VEHICLE (REALISTIC MIN RADIUS)**  
 SCALE 1:100(A1) 1:200(A3)

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EXISTING CONCRETE FOOTPATH



PLAN  
 SCALE 1:1000(A1) 1:2000(A3)

**INFORMATION ONLY**

SURVEYOR		BY		DATE		CLIENT		PREPARED BY		CLIENT		REVISION	
N/A						RED LION PROPERTY HOLDINGS PTY LTD		mcmurtrie CONSULTING ENGINEERS		RED LION PROPERTY HOLDINGS PTY LTD		A	
ADDRESS:		REVIEWED						63 Charles Street		RED LION PROPOSED CARPARK		A	
CO-ORDINATE DATUM		RPEQ ENG						NORTH ROCKHAMPTON QLD 4701		PROPOSED CARPARK AND SWEEP PATH ANALYSIS		A	
HEIGHT DATUM		RPEQ No:						PO BOX 2149, WANDAL QLD 4700		SHEET 1 OF 1		A	
A		RC		RC		SCALE: AS SHOWN		Phone: (07) 4921 1780		DRAWING NUMBER		REVISION	
18.07.2017		DRAFT		DESIGN		© MCMURTRIE & ASSOCIATES PTY LTD		Mobile: 0407 631 066		A1		A	
SUBMITTED FOR INFORMATION								Fax: (07) 4921 1790		0071718-SK-0001			
REVISION DESCRIPTION								mail@mcmengineers.com					

DRAWING LOCATION: S:\PROJECT RECORDS\17-18\071718\CARPARK\INDIVIDUAL DRAWINGS\RED LION PROPOSED CARPARK.DWG  
 PLOT DATE: 11/02/2017 12:27:44 PM



CONSULTING ACOUSTICAL ENGINEERS

PO Box 700 Margate Beach QLD 4019 AUSTRALIA

ABN 22 180 702 408

p: (07) 3885 2380

m: 0420 935 874

e: [info@alphaacoustics.com.au](mailto:info@alphaacoustics.com.au)

w: [alphaacoustics.com.au](http://alphaacoustics.com.au)

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**Dated: 22 February 2018**

# NOISE IMPACT ASSESSMENT

## Proposed Beer Garden

**Red Lion Hotel**

**138 Denham St, Allenstown, Rockhampton**

**QLD 4700**

Date: 25 September 2017

Number of Pages: 22 (inc.)

## DOCUMENT CONTROL

Rev No.	Issue Date	Revision Description	Author	Review
0	25/09/2017	Noise Impact Assessment	MF	MF

## CLIENT

Report Issued	Attention	Phone	Email
Red Lion Holdings	Manager	0418 799 825	rob@thecarrgroup.com.au

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

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

The integrity of acoustic structures is very dependent on installation techniques. For example, a small crack between the top of a wall and a ceiling can reduce the effective sound transmission loss of a wall from  $R_w$  50 to  $R_w$  40. Therefore, the use of contractors that are experienced in acoustic construction is encouraged. Furthermore, two insulation products may have the same thermal R rating but the sound absorption of one may be entirely deficient, therefore the use of materials and equipment that are supported by acoustic laboratory test data is encouraged.



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## 1 INTRODUCTION AND SITE DESCRIPTION

Alpha Acoustics Pty Ltd has been engaged to provide a noise impact assessment of the proposed beer garden at the licensed premise, Red Lion Hotel, located at 138 Denham St, Allenstown QLD 4700.

Potential noise impacts are assessed in accordance with the noise criteria set out in the Acoustic Quality Objectives of the Environmental Protection (Noise) Policy 2008 (EPP Noise).

### Scope of Work

- Inspect the site and environs
- Measure the background noise levels at nominated sensitive receivers
- Establish acceptable noise level criterion
- Quantify noise emissions from premises at the nominated residences
- Prepare a Noise Impact Report

**Figure 1.1 Street View of Red Lion Hotel Rockhampton (Google Maps)**



## 2 PROJECT DESCRIPTION

The main noise sources at the proposed beer garden include:

- People talking
- Amplified entertainment music
- Mechanical plant noise

**Table 2.1 Receiver Assessment Locations**

Receiver ID	Receiver Type	Receiver Address
ML2	Residential	148 West Street
ML3	Residential	129 West Street

Background noise was measured in octave bands at the sensitive assessment locations. During the background noise measurements, the venue was not operating. Figure 2.1 below displays the venue and surrounds.

**Table 2.2 Venue Operational Hours**

Operational Days	Open	Close
Monday – Sunday	10:00	00:00



Figure 2.1 Location Map 138 Denham St, Allenstown (Google Earth)



### 3 NOISE SURVEY AND INSTRUMENTATION

All instrument systems had been laboratory calibrated using instrumentation traceable to Australian National Standards and certified within the last two years thus conforming to Australian Standards. The measurement system was also calibrated prior to and after the noise survey. Calibration drift was found to be less than 0.3 dB during attended measurements. No adjustments for instrument drift during the measurement period were warranted.

**Table 3.1 Noise Instrumentation**

Description	Model No.	Serial No.
Modular Precision Sound Analyser	B&K 2260	245 9227
Condenser Microphone 0.5" diameter	B&K 4189	245 8107
Acoustical Calibrator	B&K 4231	267 1553
Microphone Windscreen	Acoustically transparent foam	

The Bruel & Kjaer 2260 Sound Analyser is a real-time precision integrating sound level meter with octave and third octave filters that samples noise at a rate of 10 samples per second. Measurements are stored as  $L_{eq}$ ,  $L_1$ ,  $L_{10}$ ,  $L_{50}$  and  $L_{90}$  statistical data at 15 minute intervals (longer or shorter intervals optional) over the desired monitoring period.

## 4 MEASURED BACKGROUND NOISE LEVELS

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

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

The times of worst possible annoyance are likely to be during the evening and night time operation of the venue when ambient noise levels are typically at their lowest.

The background sound pressure levels used in this assessment were based on attended measurements taken on Monday 21<sup>st</sup> August 2017 (see Figure 4.1 below for measurement locations). Noise measurements were taken at the background noise measurement location(s) with the octave band centre frequency results (where applicable) of those measurements.

**Figure 4.1 Background Level Receivers – Noise Measurement Locations**



**Table 4.1 Background L<sub>90</sub> Noise Levels**

ID	Location of Measurement	Time	Background Noise Levels L <sub>90</sub> at Octave Band Centre Frequencies (Hz)						
			dB(A)	63	125	250	500	1k	2k
<b>Day and Evening</b>									
ML2	148 West Street	10:00 – 22:00	34	45	41	34	31	30	23
ML3	129 West Street	10:00 – 22:00	34	45	41	34	31	30	23
<b>Night Time</b>									
ML2	148 West Street	22:00 – 00:00	36	46	43	37	33	31	25
ML3	129 West Street	22:00 – 00:00	35	44	42	37	32	31	24

**Table 4.2 Meteorological Conditions During Testing**

<b>Meteorological Parameter</b>	<b>Monday 21<sup>st</sup> August 2017 Weather Conditions</b>	<b>Suitable for Testing</b>
Skies	Clear	Yes
Temperature	15 °C	Yes
Humidity	39 %	Yes
Wind Speed	0 - 1 m/s	Yes
Precipitation	0 mm	Yes

Atmospheric conditions were ideal for noise monitoring. Noise measurements were therefore considered reliable and typical for the receptor area.

## 5 ACCEPTABLE NOISE LEVELS

### 5.1 Environmental Protection (Noise) Policy

The Acoustic Quality Objectives and the Background Creep requirements of the Environmental Protection (Noise) Policy 2008 (EPP Noise) have been used as the assessment criteria for the development. Operational activities for the proposed use have been assessed against the Acoustic Quality Objectives as shown in **Table 5.1**.

**Table 5.1:** Acoustic Quality Objectives of EPP Noise

Sensitive Receptor	Time of Day	Acoustic Quality Objective (Measured at the Receptor) dB(A)			Environmental Value
		LAeq,adj,1hr	LA10,adj,1hr	LA01,adj,1hr	
Dwellings (for outdoors)	Daytime and evening (7am to 10pm)	50	55	65	Health and wellbeing
Dwellings (for indoors)	Daytime and evening (7am to 10pm)	35	40	45	Health and wellbeing
Dwellings (for indoors)	Night-time (10pm to 7am)	30	35	40	Health and wellbeing in relation to the ability to sleep
Commercial and retail activity	When activity is open for business	45			Health and wellbeing in relation to the ability to converse

Introduced plant have the potential to increase background noise levels in the area. These have been assessed against the Background Creep requirements of EPP Noise.

To the extent that it is reasonable to do so, noise from an activity must not be:

- For continuous noise (e.g. fan noise) – Measured by LA90,T more than nil dB(A) greater than the existing acoustic environment measured by LA90,T.
- For noise that varies over time (i.e. vehicle movements) – Measured by LAeq,adj,T more than 5 dB(A) greater than the existing acoustic environment measured by LA90,T.

Noise emission limits for the control of background creep, based on measured background levels are shown in **Table 5.2** below.

**Table 5.2:** Background creep requirements of EPP Noise

Time of Day	Measured Background Level LA90 dB(A) At ML2	Permitted Noise Emission dB(A)	
		Continuously Operating Plant LA90,T	Time Varying Noise LAeq,adj,T
Daytime (7am to 6pm)	34	34	39
Evening (6pm to 10pm)	34	34	39
Night (10pm to 7am)	34*	34	39

The daytime background noise level is used to assess night time levels as the daytime background noise level was 1 dB(A) less than the night time background noise level.

## 5.2 Project Specific Noise Criteria

Considering the criteria discussion above, the project specific noise criteria is summarised in **Table 5.3.3** below.

**Table 5.3.3:** Project Specific Noise Levels

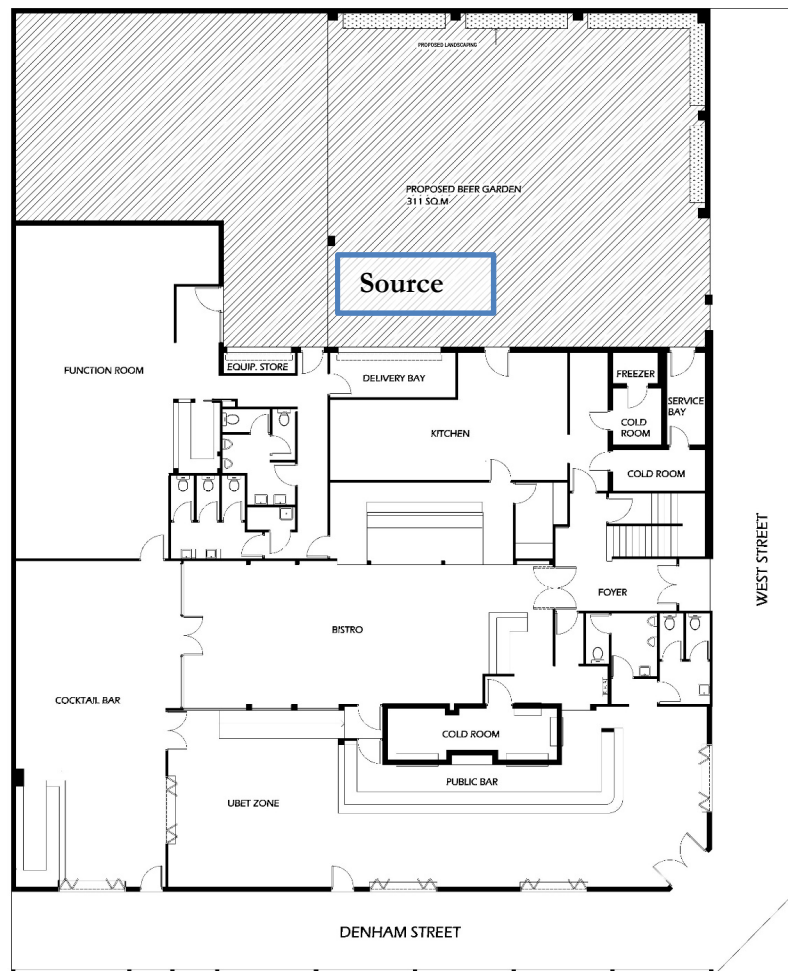
Time of Day	Recommended Noise Limits dB(A)	
	Continuously Operating Plant LA90,T	Time Varying Noise LAeq,adj,T
Daytime and evening (7am to 10pm)	n/a	34+5= 39 dB(A) Leq (Outdoors)
Night-time (10pm to 7am) <sup>1</sup>	n/a	30+5 = 35 dB(A) Leq (outdoors)

*Note 1: A conservative 5 dB(A) inside to outside building façade correction has been applied.*

## 6 NOISE EMISSIONS

The major sources of noise at the proposed beer garden of the Red Lion Hotel could be amplified entertainment music inside the bar area and people noise in the outdoor areas. Figure 6.1 show the site plans including the measurement source.

**Figure 6.1 Site Plan of Red Lion Hotel**



### 6.1 Patron Noise, Amplified Music Noise Emissions

The proposed beer garden operations have been measured (simulated patron, measured amplified music) and assessed to determine the noise impact from the operation of the proposed beer garden. The measurement was taken at 3 metres from the live music speaker. The speakers were played at their maximum output levels for testing purposes as shown in Table 6.1 below.



Table 6.1 SPL of Amplified Music at 3m from Sound Source

ID	Sound Source	Octave Band Frequency (Hz)						L <sub>10</sub> dB(C)	L <sub>10</sub> dB(A)
		63	125	250	500	1k	2k		
1	Proposed Beer Garden	84	91	84	83	72	81	93	85

## 6.2 Normalisation Moderated Outputs

### 6.2.1 Daytime and Evening Assessment

Table 6.2 below shows the noise emissions at the receiver locations during the daytime and evening period with the venue operating. Noise measurements were taken at all eight receiver locations for each of the seven sources. However, to reduce the complexity of the report, the two worst case receivers were selected for each source for doors closed scenarios and one live music source in doors open scenarios.

Table 6.2 Daytime and Evening Assessment of Source 1 – Beer Garden

Music and DOSA Patrons									
Assessment Location - ML2 - 148 West Street									
Hz	63	125	250	500	1000	2000	dB lin	dB(C)	dB(A)
Normalisation Moderator	105	109	100	99	96	95	111	111	102
Source L10 (3m from source)	84	91	84	83	72	81	93	93	85
(A-B) (Moderator - Source)	21	18	16	16	24	14			
Intrusive Levels at Worst affected site L10	64	68	58	57	44	45	70	70	57
barrier effect of wall / glazing	7	8	10	12	15	18			
(C+D) (Normalised intrusion level at affected site)	79	78	64	60	53	41	82	81	65
<b>Background at worst affected site L90</b>	45	41	34	31	30	23	47	46	34
(E-F) exceedance of backgrounds)									31
Maximum allowable tolerance above background									5
Exceedance of tolerance									26
max exceedance									26
<b>Recommended Source Level</b>	84 dB(C)								76
Assessment Location - ML3 - 129 West Street									
Hz	63	125	250	500	1000	2000	dB lin	dB(C)	dB(A)
Normalisation Moderator	105	109	100	99	96	95	111	111	102
Source L10 (3m from source)	84	91	84	83	72	81	93	93	85
(A-B) (Moderator - Source)	21	18	16	16	24	14			
Intrusive Levels at Worst affected site L10	62	63	53	51	46	46	66	65	54
barrier effect of wall / glazing	5	5	6	7	8	10			
(C+D) (Normalised intrusion level at affected site)	78	76	63	61	62	51	80	80	66
<b>Background at worst affected site L90</b>	45	41	34	31	30	23	47	46	34
(E-F) exceedance of backgrounds)									32
Maximum allowable tolerance above background									5
Exceedance of tolerance									27
max exceedance									27
<b>Recommended Source Level</b>	83 dB(C)								75

\*Note: The results are based on a under roof absorption and glass louvre windows closed between the north western wall and roof. See Recommendations in Section 7 below.

## 6.2.2 Night Time Assessment

Table 6.3 below shows the noise emissions at the receiver locations for doors closed during the night time assessment period with the venue operating.

**Table 6.3 Night Time Assessment of Source 1 – Beer Garden (Doors Closed)**

		Assessment Location - ML2 - 148 West Street								
Hz	63	125	250	500	1000	2000	dB lln	dB(C)	dB(A)	
Normalisation Moderator	105	109	100	99	96	95	111	111	<b>102</b>	
Source L10 (3m from source)	84	91	84	83	72	81	93	93	<b>85</b>	
(A-B) (Moderator - Source)	21	18	16	16	24	14				
Intrusive Levels at Worst affected site L10	64	68	58	57	44	45	70	70	57	
barrier effect of wall / glazing	7	8	10	12	15	18				
(C+D) (Normalised intrusion level at affected site)	79	78	64	60	53	41	82	81	65	
<b>Background at worst affected site L90</b>	45	41	34	31	30	23	47	46	34	
(E-F) exceedance of backgrounds)									31	
Maximum allowable tolerance									1	
Exceedance of tolerance									30	
max exceedance									30	
<b>Recommended Source Level</b>	<b>80</b>	<b>dB(C)</b>							<b>72</b>	

		Assessment Location - ML3 - 129 West Street								
Hz	63	125	250	500	1000	2000	dB lln	dB(C)	dB(A)	
Normalisation Moderator	105	109	100	99	96	95	111	111	<b>102</b>	
Source L10 (3m from source)	84	91	84	83	72	81	93	93	<b>85</b>	
(A-B) (Moderator - Source)	21	18	16	16	24	14				
Intrusive Levels at Worst affected site L10	62	63	53	51	46	46	66	65	54	
barrier effect of wall / glazing	5	5	6	7	8	10				
(C+D) (Normalised intrusion level at affected site)	78	76	63	61	62	51	80	80	66	
<b>Background at worst affected site L90</b>	45	41	34	31	30	23	47	46	34	
(E-F) exceedance of backgrounds)									32	
Maximum allowable tolerance above background									1	
Exceedance of tolerance									31	
max exceedance									31	
<b>Recommended Source Level</b>	<b>79</b>	<b>dB(C)</b>							<b>71</b>	

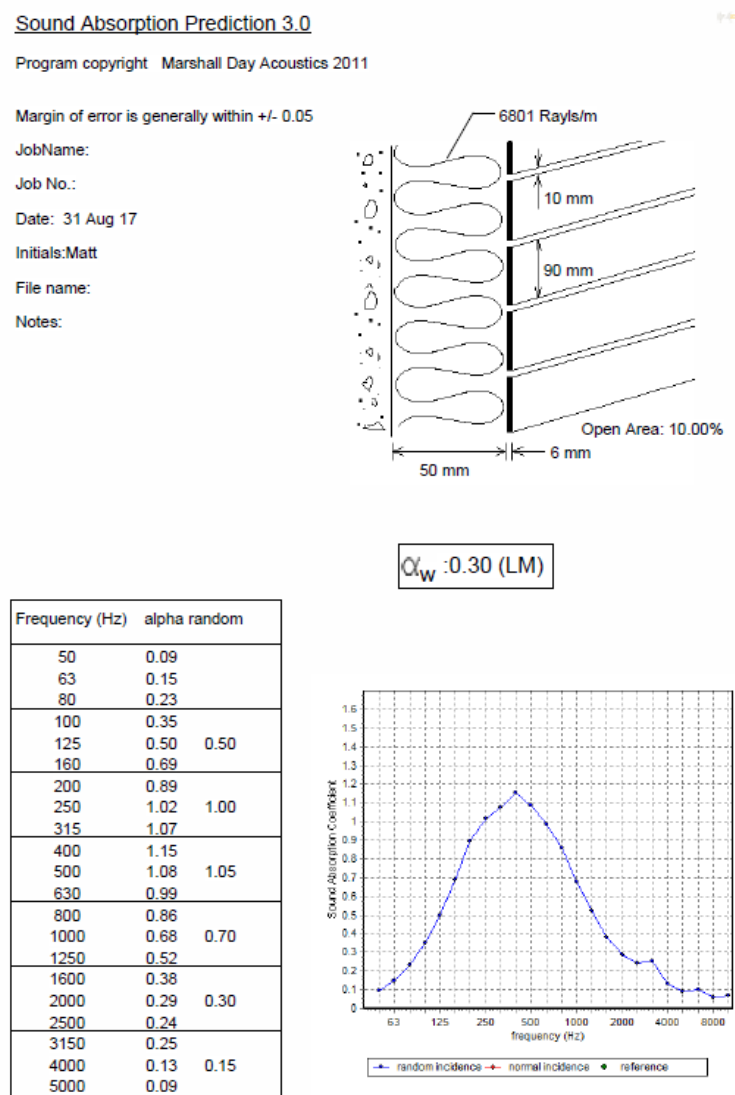
## 7 RECOMMENDATIONS

Noise emissions from the operation of the proposed beer garden, including amplified music and patrons talking are shown to comply with the noise criteria at the nearest residential receivers under the following conditions.

### 7.1 Required Noise Controls

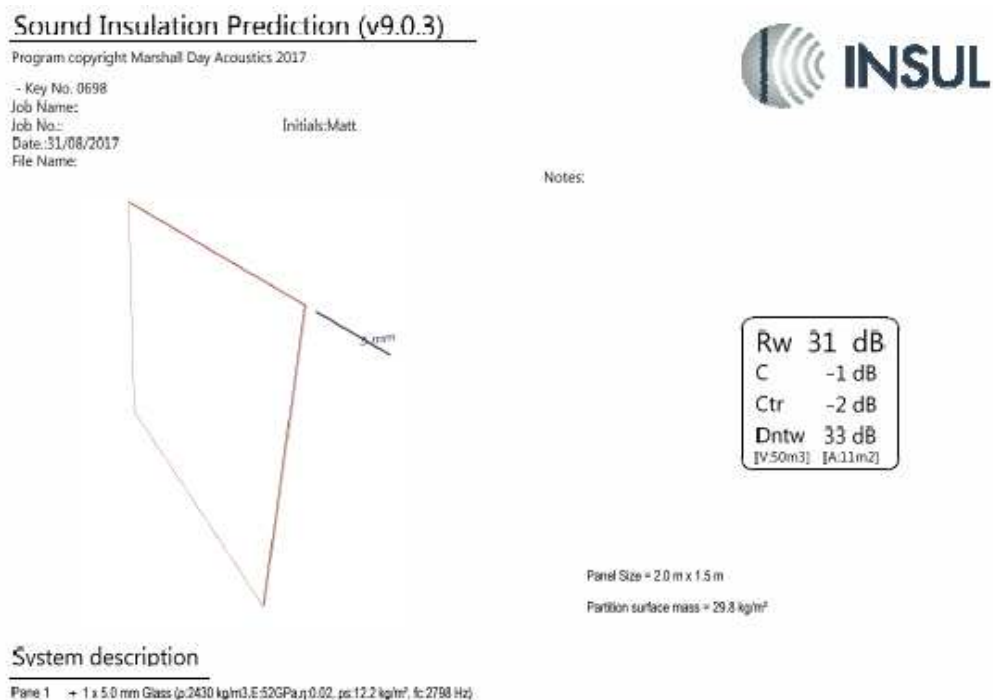
The outdoor Beer Garden is to have the entire under roof treated with acoustic absorption. This can be achieved using an acoustic insulation product with an NRC 0.7 such as 50mm thick, 24kg/m<sup>3</sup> acoustic insulation held in place with a perforated material min 11% open area or using timber slats with open gaps between the timbers (minimum 10mm gap).

Figure 7.1 Insul Model Output – Absorption Barrier

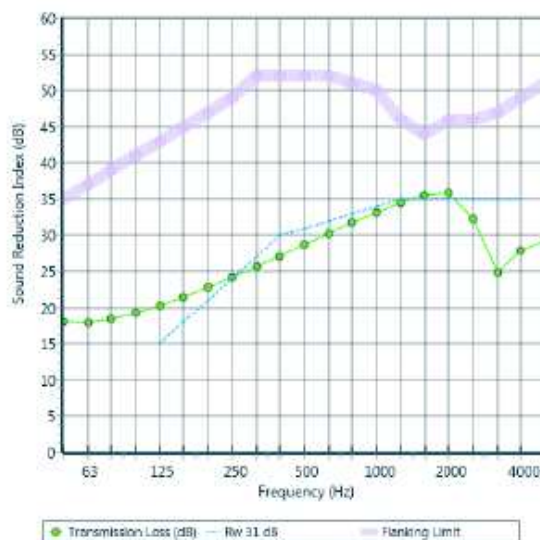


Additionally, 5mm thick glass louvres (min Rw 25) should be installed above the block wall to the roof along the entire boundary between the venue and 148 West Street.

Figure 7.2 Insul Model Output – Acoustic Glazing Design



freq.(Hz)	TL(dB)	TL(dB)
50	18	
63	18	18
80	18	
100	19	
125	20	20
160	21	
200	23	
250	24	24
315	26	
400	27	
500	29	28
630	30	
800	32	
1000	33	33
1250	35	
1600	36	
2000	36	34
2500	32	
3150	25	
4000	28	27
5000	29	



## 7.2 Daytime (10:00am to 10:00pm) Noise Limits

Daytime operation of the venue 10:00am to 10:00pm including in house amplified music should have the following restrictions:

**Table 7.1 Daytime and Evening Noise Limit Summary**

Source ID	Sound Source	Not to Exceed	
		SPL dB(C) Fast Response at 3m from speaker	Doors Open/Closed
1	Proposed Beer Garden	83	-

## 7.3 Night Time (10:00pm to 12:00am) Noise Limits

Night time and evening operation of the venue (10:00pm to 12:00am) including in house amplified music should have the following restrictions:

**Table 7.2 Night Time Noise Limit Summary**

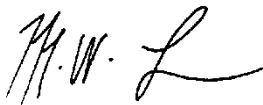
Source ID	Sound Source	Not to Exceed	
		SPL dB(C) Fast Response at 3m from speaker	Doors Open/Closed
1	Proposed Beer Garden	79	-

## 7.4 General Administrative Controls

- Rubbish should be placed into the garbage skip bins (particularly glass bottles) during the daytime hours to minimise any potential noise annoyance during the night.
- All deliveries to the venue should be made during daytime hours to minimise any potential noise annoyance during the night.

## 8 NOISE IMPACT STATEMENT

Measurements and calculations show that, noise emissions from the operation of proposed beer garden at the Red Lion Hotel, located at 138 Denham St, Allenstown, Rockhampton QLD 4700, will comply with the set noise criteria outlined in this report for the time of operation **provided the recommendations in Section 7 of this report are implemented in full.**



**MATTHEW FISHBURN** BE(Mech) Hons, MAAS, MIEAust, CPEng, RPEQ [14356]

Principal Consulting Acoustical Engineer

## ALPHA ACOUSTICS

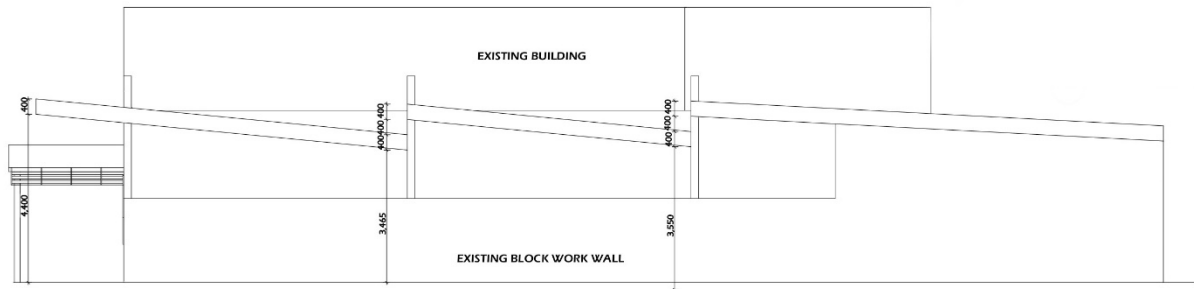
(Member firm of the Association of Australian Acoustical Consultants)

P: 07 3885 2380  
M: 0420 935 874  
E: [info@alphaacoustics.com.au](mailto:info@alphaacoustics.com.au)



## 9 APPENDIX A – VENUE PLANS

### Side Elevation



### Architectural Design – Front Elevation



Architectural Design – from intersection of Denham and West Street



Architectural Design – from Denham Street





## 10 APPENDIX B – GLOSSARY OF ACOUSTIC TERMS

The following is a brief description of the technical terms used to describe traffic noise to assist in understanding the technical issues presented in this document.

### *Event maximum sound pressure level ( $L_{A\%,adj,T}$ ), L01*

The L01 level is calculated as the noise level equalled and exceeded for 1% of the measurement time, for example 9 seconds in any 15-minute interval. L01 is an appropriate level to characterise single events, such as from impulsive or distinctive pass-by noise. In this Report, the measured L01 levels for day/evening/night are not averaged but are arranged from low to high in the relevant day/evening/night interval and the value that is found at the 90th percentile (L10 of L01 sample) in the interval is recorded as its “L01” level. The level can be adjusted for tonality or impulsiveness.

### *Average maximum sound pressure level ( $L_{A\%,adj,T}$ ), L10*

The “L10” level is an indicator of “steady-state” noise or intrusive noise conditions from traffic, music and other relatively non-impulsive noise sources. The L10 level is calculated as the noise level equalled and exceeded for 10% the measurement time, for example 90 seconds in any 15-minute interval. The measured L10 time-intervals for day/evening/night are arithmetically averaged to present the “average maximum” levels of the environment for day/evening/night. The level can be adjusted for tonality or impulsiveness.

### *Background sound pressure level ( $L_{A90,T}$ ), L90*

Commonly called the "L90" or "background" level and is an indicator of the quietest times of day, evening or night. The L90 level is calculated as the noise level equalled and exceeded for 90% the measurement time. The measured L90 time-intervals are arithmetically averaged to present the “average background” levels of the environment for day/evening/night. The level is recorded in the absence of any noise under investigation. The level is not adjusted for tonality or impulsiveness.

### *Equivalent Continuous or time average sound pressure level ( $L_{Aeq,T}$ ), Leq*

Commonly called the "Leq" level it is the logarithmic average noise level from all sources far and near. The maximum 1-hour levels within the day/evening/night time intervals are referenced for building design. The level can be adjusted for tonality.

### *Façade-adjusted level*

A sound level that is measured at a distance of 1.0 metre from a wall or facade. The level is nominally 2.5 dB higher than the free-field level.

### *Free-field level*

A sound level that is measured at a distance of more than 3.5 metres from a wall or facade.

### *Weighted Sound Reduction Index, $R_w$*

A single number value used to compare the sound reduction index of building elements. Similar to the Sound Transmission Class (STC) rating that is still in common use.  $R_w$  and STC are not identical though may be considered, for most applications, as being interchangeable. A high  $R_w$  indicates high sound reduction.