RAPT CONSULTING

Mike Bowe C/O Perception Planning

Noise Assessment – 8 Edward Street Morpeth, NSW.

Relationships **A**ttention **P**rofessional **T**rust

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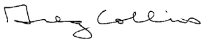
Rev 0	09 February 2021	Gregory Collins	
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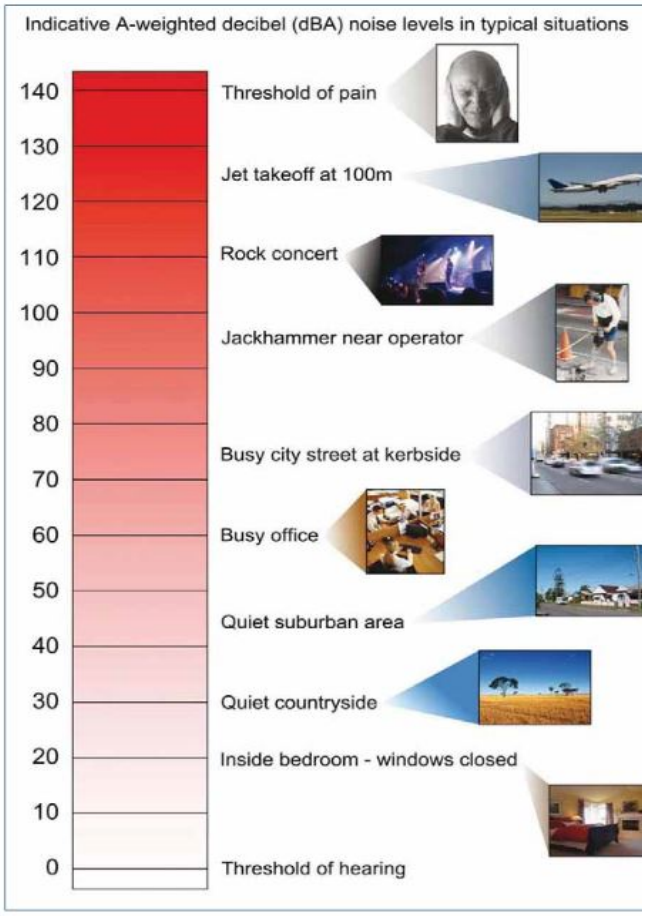
Glossary of Acoustic Terms

Term	Definition
dB	Decibel is the unit used for expressing the sound pressure level (SPL) or power level (SWL) in acoustics. The picture below indicates typical noise levels from common noise sources. 
dB(A)	Frequency weighting filter used to measure 'A-weighted' sound pressure levels, which conforms approximately to the human ear response, as our hearing is less sensitive at very low and very high frequencies.
$L_{Aeq(period)}$	Equivalent sound pressure level: the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
$L_{A10(period)}$	The sound pressure level that is exceeded for 10% of the measurement period.
$L_{A90(period)}$	The sound pressure level that is exceeded for 90% of the measurement period.
L_{Amax}	The maximum sound level recorded during the measurement period.
Noise sensitive receiver	An area or place potentially affected by noise which includes:

	A residential dwelling. An educational institution, library, childcare centre or kindergarten. A hospital, surgery or other medical institution. An active (e.g. sports field, golf course) or passive (e.g. national park) recreational area. Commercial or industrial premises. A place of worship.
Rating Background Level (RBL)	The overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period.
Feasible and Reasonable (Noise Policy for Industry Definition)	**Feasible** mitigation measure is a noise mitigation measure that can be engineered and is practical to build and/or implement, given project constraints such as safety, maintenance and reliability requirements. Selecting **Reasonable** measures from those that are feasible involves judging whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure. To make a judgement, consider the following: Noise impacts Noise mitigation benefits Cost effectiveness of noise mitigation Community views.
Sound power level (SWL)	The sound power level of a noise source is the sound energy emitted by the source. Notated as SWL, sound power levels are typically presented in dB(A).

1. Introduction

Background

RAPT Consulting has been engaged by Mike Bowe C/O Perception Planning to undertake a noise assessment to inform a Development Application (DA) for a proposed temporary use of land function centre to be located at 8 Edward Street Morpeth, NSW using Clause 2.8 of the Maitland LEP 2011.

The characteristics of the proposed development include:

- Is not anticipated to hold more than 120 people at any one time,
- Temporary use of the land / existing building for functions (mainly weddings) in accordance with Clause 2.8 of the MLEP,
- Hours of operation (to provide flexibility for patrons)
    - 9am – 9pm, Mon – Thurs
    - 9am – 12am, Fri + Sat
    - 9am – 5pm, Sun and Public Holidays.
- Built works – amenities building, landscaping, formal gravel parking area and accessible parking spaces only. The shed is existing on-site

An aerial photo of the site and surrounding area is shown in Figure 1.

Figure 1 Site and Surrounding Area

1.1 Limitations

The purpose of this report is to provide an independent acoustic assessment for the proposal.

It is not the intention of the assessment to cover every element of the acoustic environment, but rather to conduct the assessment with consideration to the prescribed work scope.

The findings of the noise assessment represent the findings apparent at the date and time of the assessment undertaken. It is the nature of environmental assessments that all variations in environmental conditions cannot be assessed and all uncertainty concerning the conditions of the ambient environment cannot be eliminated. Professional judgement must be exercised in the investigation and interpretation of observations.

In conducting this assessment and preparing the report, current guidelines for noise were referred to. This work has been conducted in good faith with RAPT Consulting's understanding of the client's brief and the generally accepted consulting practice.

No other warranty, expressed or implied, is made as to the information and professional advice included in this report. It is not intended for other parties or other uses.

2. Existing Environment

Attended measurements to collect background and ambient noise levels were conducted at 8 Edward Street adjacent to the nearest potentially affected residence at 1 Swan Street on 03 February 2021 and 18 October 2021 to quantify the acoustic environment. No activities were occurring at 8 Edward Street and the location selected was considered indicative of the local ambient noise environment. Measurements were conducted using a RION NL-42 Sound Level Meter with Type 2 Precision. 15-minute measurements were undertaken for the Daytime and Evening and Night-Time Periods. The attended noise surveys were conducted with consideration to the procedures described in Australian Standard AS 1055:2018, "Acoustics – Description and Measurement of Environmental Noise" and the NSW Noise Policy for Industry (NPfI). Calibration was checked before and after each measurement and no significant drift occurred. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics – Sound level meters – Specifications.

During site visits it was noted that existing road traffic, distant road traffic, and natural wildlife primarily described the ambient noise environment and is indicative of a sub-urban noise environment.

A photograph of the monitoring location is provided in Figure 2 below.

Figure 2 Noise Monitoring Location

The LA90 descriptor is used to measure the background noise level. This descriptor represents the noise level that is exceeded for 90 per cent of the time over a relevant period of measurement. The LA90 descriptor is used to establish the Rating Background Noise Level (RBL). The RBL has been calculated, according to the procedures described in the EPA's NPfI and by following the procedures and guidelines detailed in Australian Standard

AS1055-1997, "Acoustics - Description and Measurement of Environmental Noise, Part 1 General Procedures" The LAeq is the equivalent continuous noise level which would have the same total acoustic energy over the measurement period as the varying noise actually measured, so it is in effect an energy average.

Logged data was reviewed and filtered to exclude any extraneous data during the monitoring period. The Rating Background Levels (RBL) and ambient L_{Aeq} levels are provided in Table 1 below.

Table 1 Background and Ambient Noise Monitoring Results

Location	Noise Period	Noise Level		Noise Sources
		L_{Aeq}	L_{A90}	
8 Edward Street	03/02/2021 5:40pm – 5:55pm	42	38	road traffic, wildlife noise
8 Edward Street	03/02/2021 6:05pm – 6:20pm	40	36	road traffic, wildlife noise
8 Edward Street	18/10/2021 10:00pm – 10:15pm	36	30	road traffic, wildlife noise

3. Noise Guidelines

3.1 Noise Policy for Industry (NPfI) Operational Noise Criteria

The New South Wales Noise Policy for Industry (NPfI) provides guidance on the assessment of operational noise impacts. The guidelines include both intrusive and amenity criteria that are designed to protect receivers from noise significantly louder than the background level and to limit the total noise level from all sources near a receiver.

Intrusive noise levels set by the NPfI control the relative audibility of operational noise compared to the background level. Amenity criteria limit the total level of extraneous noise. Both sets of criteria are calculated and the lower of the two in each time period normally apply. Intrusive criteria are simply 5 decibels above the measured (or adopted) background level with a minimum of 40 dB(A) for daytime and 35 dB(A) for evening and night-time. In determining project noise trigger levels for a particular development, it is generally recommended that the project intrusiveness noise level for evening be set at no greater than the project intrusiveness noise level for daytime. The project intrusiveness noise level for night-time should be no greater than the project intrusiveness noise level for day or evening.

Amenity noise levels are determined based on the overall acoustic characteristics of the receiver area and the existing level of noise excluding other noises such as traffic and insects. Residential receiver areas are characterised into 'urban', 'suburban', 'rural' or other categories based on land uses, the existing level of noise from industry, commerce, and road traffic. Project amenity noise levels (ANL) are the ANL (Table 2.1 of the NPfI) minus 5 dB(A) and plus 3 dB(A) to convert from a period level to a 15-minute level. The project noise trigger level is the lower value between the intrusive and the amenity noise levels.

The NPfI noise criteria are planning levels and are not mandatory limits required by legislation however the noise criteria assist the regulatory authorities to establish licensing conditions. Where noise criteria are predicted to be exceeded, feasible and reasonable noise mitigation strategies should be considered. In circumstances where noise criteria cannot be achieved negotiation is required to evaluate the economic, social and environmental costs and benefits of the development against the noise impacts. The regulatory authority then sets statutory compliance levels that reflect the achievable and agreed noise limits from the development.

The NPfI is generally intended for large and complex industrial sources and recommends considerable monitoring and assessment measures that may not always be applicable to certain situations. However, the NPfI will be referred to for determining operational noise goals for this project.

Nearest residential receptors are considered sub-urban. Project noise trigger levels are provided for residences and commercial premises in Table 2.

Table 2 Project Noise Trigger Levels

	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10pm to 7am
Rating Background Level $L_{A90(Period)}$	38	36	30
Intrusiveness Noise Level,	43	41	35

	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10pm to 7am
$L_{Aeq(15min)}$			
Amenity Noise Level (Sub-Urban), $L_{Aeq(Period)}$	50	40	35
Project Amenity Noise Level $L_{Aeq(15min)}$	53	43	38
Project Noise Trigger Level Residential	**43 $L_{Aeq(15min)}$**	**41 $L_{Aeq(15 min)}$**	**35 $L_{Aeq(15 min)}$**
Commercial Premises (When in use)	**60**	**60**	**60**

3.2 Liquor and Gaming NSW

Amplified music/patron noise from premises including licensed by Liquor and Gaming NSW additionally have the following noise guidelines which are provided in Figure 4.

Current noise condition

The L_{A10}* noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz–8kHz inclusive) by more than 5dB between 7:00 am and 12:00 midnight at the boundary of any affected residence.

The L_{A10}* noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz–8kHz inclusive) between 12:00 midnight and 7:00 am at the boundary of any affected residence.

Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12:00 midnight and 7:00 am.

* For the purpose of this condition, the L_{A10} can be taken as the average maximum deflection of the noise emission from the licensed premises.

This is a minimum standard. In some instances the Director may specify a time earlier than midnight in respect of the above condition.

Interior noise levels which still exceed safe hearing levels are in no way supported or condoned by the Director.

Figure 3 NSW Liquor and Gaming Noise Requirements

3.3 NSW Road Noise Policy (RNP)

The NSW Road Noise Policy (RNP) recommends various criteria for different road and residential developments and uses. Although it is not mandatory to achieve the noise assessment criteria in the RNP, proponents will need to provide justification if it is not considered feasible or reasonable to achieve them. Based on the definitions in the RNP,

Edward Street, Swan Street and Close Street are considered to be a local roads. Based on this, the following noise goals for residences taken from Table 3 of the RNP are provided in Table 3 Below.

Table 3 NSW Road Noise Policy Noise Goals

Road Category	Day (7am – 10pm)	Night (10pm-7am)
Existing residences affected by additional traffic on existing local roads roads generated by land use development	55 $L_{Aeq(1hr)}$ External	50 $L_{Aeq(1hr)}$ External

4. Assessment of Potential Impacts

4.1 Operational Noise

Assessment approach

Acoustic modelling was undertaken using Bruel and Kjaer's "Predictor" to predict the effects of site noise. Predictor is a computer program for the calculation, assessment and prognosis of noise propagation. Predictor calculates environmental noise propagation according to ISO 9613-2, "Acoustics – Attenuation of sound during propagation outdoors". Terrain topography, ground absorption, atmospheric absorption and relevant shielding objects are taken into account in the calculations.

Modelling results are based on available information provided and should only be used as a guide for comparative purposes. Site layout and building structures were based on information provided at the time of the assessment.

Primary onsite environmental noise sources will be in the form of patrons conversing primarily indoors and potentially outside. There is also the potential for live or background music which is understood to be indoors.

Live Music

Typically, live music in comes in the form of a singer and a live amplifier which produces a variety of noise sources including, bass, drums, guitar, backing vocals and keyboards. RAPT Consulting has undertaken numerous measurements of these situations. L_{A10} sound power noise levels from these activities are provided in Table 4.

Table 4 L_{A10} SWL of Live Music

	L_{A10} SWL dB(A) Octave Band Centre Frequency, Hz									
	31.5	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**	**dB(A)**
Live Music $L_{A(10)}$	58	71	84	86	87	89	86	77	65	**94**

The music has been modelled as an indoor source playing in the south eastern area of the facility.

Other Noise Sources

Patron noise in the form of human raised voice has been sourced from RAPT Consulting's database. The sound level of normal conversation is generally between 50 and 65 dB(A) at 1 metre. A sound level of 60 dB(A) for patron noise has been assumed to be operating from the indoor area in the form of 60 persons conversing respectively as it is not expected every patron would be conversing at one time.

We have assumed one kitchen exhaust fan will be required, typically vertical fans with the outlet located 1 metre above roof level over the kitchen. Refrigeration and air conditioning plant will also be required. A sound power level of 70 SWL dB(A) for these sources has conservatively been assumed with data sourced from RAPT Consulting's database.

Onsite vehicles entering and exiting noise modelling assumptions include 5 cars in 15 minutes within the 10 car carpark with a 20km/hr sound power level of 85dB(A), one bus traveling at 20 km/hr with a sound power level of 93 dB(A) and a sound power level of a car door opening and closing of 78dB(A) which has been sourced from RAPT consultings' internal sound level database.

Building Materials

The shed walls and roof are constructed of metal sheeting with windows.

Based on this provided reduction indexes (Rw) of building elements are provided in Table 5.

Table 5 Building Material Information

	63	125	250	500	1K	2K	4K	8K
Glass 8mm	18	18	25	31	32	28	36	39
Metal Sheeting	3	8	14	20	23	27	27	35

To simulate a worst-case scenario, received noise produced by anticipated activities of outdoor patrons, live music, mechanical plant and vehicular movements have been simulated.

Additionally for atmospheric conditions, a 2 m/s source to receiver windspeed coupled with a F class temperature inversion has been modelled.

Figure 4 shows the results of the modelling.

Figure 4 Cumulative Noise Modelling Results Leq(15min) dB(A)

The results of the modelling indicate compliance is expected at all residential and commercial receptors during daytime and evening even in the event a worst-case scenario with all items operating. However there is the potential for exceedances during night-time particularly at R1 and R2.

These are worst case scenarios with all people conversing, mechanical plant and music playing with no attenuation measures in place other than buildings and other environmental factors. In reality, it is highly unlikely for this scenario to occur where all of these items are operating simultaneously at their sound power levels. Actual noise levels received can be expected to be significantly lower.

While noise trigger levels are expected to be met for the proposal during daytime and evening situations ,it is recommended in the establishments' plan of management, implement a plan particularly to have music playing at the most south eastern point within the structure as far as practicable and to deal with the unlikely occurrence of excessive patron noise and vehicles entering and leaving the facility. Additionally, all doors are recommended to be shut while music is playing. Other recommendations include:

- Speaker set up should be to the south east (directed away from nearest residences)
- Where possible the bass noise component of the entertainment (125Hz and below) should be kept at low levels. This generally means that the bass guitar and drum

noise should be kept down. It is, typically, the low frequency noise which is the cause of most complaints in relation to noise from entertainment venues.

- During night-time situations, it is recommended the sound level of music playing be reduced to 80 dB(A) at 1 metre from speakers.

- The walls and ceilings of the facility should be lined with acoustically absorbent material

Road Noise

While the road network is consists of local roads, to increase noise levels by 2dB(A) one would have to increase the cumulative traffic volume by 60%. The amount of vehicles resulting from the proposal on the road network is negligible and will not increase overall traffic noise levels by more than 2 dB(A) on the surrounding road network. Therefore, compliance is expected.

5. Conclusion

This noise assessment has been undertaken for Mike Bowe C/O Perception Planning to inform a Development Application (DA) for a proposed temporary use of land, function centre to be located at 8 Edward Street Morpeth, NSW.

Recommendations have been made for noise control within the function centre. Provided those recommendations are in place it is expected risk pertaining to the noise amenity of the area can be minimised.