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DA Acoustic Assessment for M3 & M4

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1 INTRODUCTION

This Acoustic Assessment report has been prepared by Acoustic Logic (AL) to accompany a development application (DA) for the proposed redevelopment of M3 and M4 buildings at The Maltings, 2 Colo Street, Mittagong, NSW. The proposed development seeks the construction of a 5-storey hotel building above 1 basement level for M4 building, and alterations and additions to M3 to create a 5-storey building comprising gallery, dining, lounge and pool uses for visitors/tourists.

It is noted that the range of uses of the proposed development is similar to the previous approval by Council under 20/1400.

This document addresses noise impacts associated with the following:

- Noise intrusion to the project site from adjacent roadways and rail
- Noise emissions from the terraces of the level 3 dining and level 4 lounge, and
- Noise emissions from mechanical plant to service the project site (in principle).

AL have utilised the following documents and regulations in the noise assessment of the development:

- Wingecarribee Shire Council *Mittagong Township Development Control Plan* (**DCP**) Version 9, 2021.
- Australian Standard AS 2107:2016 *Recommended design sound levels and reverberation times for building interiors*.
- NSW Department of Planning (**DoP**) *Development near Rail Corridors or Busy Roads – Interim Guideline* (**DNRCBR**) 2008.
- Liquor and Gaming NSW (**L&GNSW**).
- NSW Environmental Protection Authority (**EPA**) *Noise Policy for Industry* (**NPI**) 2017.

This assessment has been conducted using the Snohetta architectural drawings (*Project No: 18-17*, dated 20.12.2023).

2 SITE DESCRIPTION

The proposed building M3 redevelopment is a mixed-use commercial development. The development includes:

- Northern gallery at ground floor and L1.
- Southern gallery at L2.
- Dining room and exhibition room on L3.
- Lounge and pool on L4.
- Guest suite on L5.

The building M4 redevelopment is a hotel premises and comprises of:

- Carpark and gym at basement level.
- Studio hotel rooms at L1- L5

The nearest noise receivers around the site include:

- **R1:** Residential Receiver 1 – Residential houses at 23-25 Southey St along the northeast boundary.
- **R2:** Residential Receiver 2 – Residential houses at 26-40 Southey St along the eastern boundary
- **R3:** Residential Receiver 3 – Residential houses at 1-15 Fernbrook Cres to the south.
- **R4:** Residential Receiver 4 – Residential houses to the far west along Railway Cres and Belgrave street.
- **C1:** Commercial Receiver 1 – Multi-storey Fitzroy Inn Historic Guest House to the north.

Site inspection indicates that **R1**, **R2** and **R3** are considered the most affected receivers and have therefore been utilised for assessment.

A site map, measurement locations and surrounding receiver are presented in Figure 1

Figure 1 – Project Site and Noise Measurement (Source from: Six Map NSW)

3 AMBIENT NOISE MONITORING

Monitoring has been undertaken to obtain the following data:

- Background noise levels at the surrounding residential properties.
- Rail/traffic noise levels.

Figure 1 above shows the monitoring locations used.

3.1 NOISE DESCRIPTORS

Ambient noise constantly varies in level from moment to moment, so it is not possible to accurately determine prevailing noise conditions by measuring a single, instantaneous noise level.

To quantify ambient noise, a 15-minute measurement interval is typically utilised. Noise levels are monitored continuously during this period, and then statistical and integrating techniques are used to characterise the noise being measured.

The principal measurement parameters obtained from the data are:

L_{eq} – represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of noise impact as it closely corresponds with how humans perceive the loudness of time-varying noise sources (such as traffic noise).

L_{90} – This is commonly used as a measure of the background noise level as it represents the noise level heard in the typical, quiet periods during the measurement interval. The L_{90} parameter is used to set noise emission criteria for potentially intrusive noise sources since the disturbance caused by a noise source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

L_{10} is used in some guidelines to measure noise produced by an intrusive noise source since it represents the average of the loudest noise levels produced at the source. Typically, this is used to assess noise from licenced venues.

L_{max} is the highest noise level produced during a noise event and is typically used to assess sleep arousal impacts from short term noise events during the night. It is also used to assess internal noise levels resulting from aircraft and railway ground vibration induced noise.

L_1 is sometimes used in place of L_{max} to represent a typical noise level from a number of high-level, short-term noise events.

3.2 ENVIRONMENTAL NOISE SURVEY

3.2.1 Previous Noise Monitoring

Background noise levels have been adopted from a previous application (20/1400) for the site identified in the ARUP report *DA Report - Acoustic* (Job number 272775, AC02, dated 12 May 2020). Monitoring locations are marked up in Figure 1.

The rating background noise levels from the unattended noise monitoring has been reproduced in the following table. RBL for the day, evening and night periods were obtained as defined in the NPI. Furthermore, analysis of background noise levels during the nighttime shoulder period of 10pm-12am have been presented for operational noise criteria (see Section 5).

Table 3-1 – NPI Rating Background Noise Levels

Location	Time	Rating Background Noise Level (dB(A) L_{90})	Average Noise Energy dB(A) L_{eq}
Northern/eastern boundary of the site facing receivers **R1** and **R2** (Location L3 in the ARUP report)	Day	43	52
	Evening	40	51
	Night Shoulder (10pm-12am)	35	47
	Night	30	40
Southern boundary of the site facing receivers **R3** (Location L2 in the ARUP report)	Day	41	52
	Evening	36	52
	Night Shoulder (10pm-12am)	32	41
	Night	30	37
Western boundary facing **R4** (Location L1 in the ARUP report)	Day	47	69
	Evening	41	69
	Night Shoulder (10pm-12am)	37	67
	Night	31	68

3.2.2 Additional Noise Measurements

Additional attended noise measurements were conducted on site to gauge the representative background noise level as presented in Table 3-1. Attended measurement locations are marked up in Figure 1. Attended noise measurement was conducted using a Norsonic N-131 Type 1 sound level meter. Measurements were taken on "A" frequency weighting and fast time response. The sound level meter retains current calibration and was field calibrated at the beginning and the end of the measurement with no significant drift in calibration noted. Attended noise measurements were conducted on Wednesday 24th of January 2024 between 2:00pm and 4:00pm.

Table 3-2 presents the additional attended noise measurement results with comparison of attended measurement results presented in the AURP report.

Table 3-2 – Additional Noise Measurements VS Previous Measurements

2024 Additional Measurement Location & Time	L_{A90} dB	Measurement Location & Time in AURP Report	L_{A90} dB
Facing **R2** 14:45-15:00	51	Logger L3 14:52-15:15	48
Facing **R1** 15:00-15:15	48	Logger L3 14:52-15:15	48
Facing **R3** 15:15-15:30	48	Logger L2 14:02-14:28	48
		Logger L2 14:36-14:45	47
Facing **R4** 15:30-15:45	51	Logger L1 15:52-16:03	50
		Logger L1 16:08-16:20	50

As the additional measured noise levels are comparable with the existing noise monitoring data for the site, the previous monitoring data shall still be utilised for buildings M3 & M4.

3.2.3 Background Noise Spectrum

Table 3-3 below presents the measured background noise spectrum on site normalised to specific RBL's as undertaken by AL to establish spectrum-based noise emission criteria.

Table 3-3 – Adopted Noise Spectrums

Receiver & Time (L_{90} Spectrum)	Octave Band Spectrum dB (Hz)									
	31.5	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**A-wt**
R1 & R2 Day	63	56	46	37	40	39	33	26	24	**43**
R1 & R2 Evening	60	53	43	34	37	36	30	23	21	**40**
R1 & R2 Night Shoulder	55	48	38	29	32	31	25	18	16	**35**
R3 Day	47	45	42	34	36	36	34	32	27	**41**
R3 Evening	42	40	37	29	31	31	29	27	22	**36**
R3 Night Shoulder	38	36	33	25	27	27	25	23	18	**32**
R4 Day	73	59	53	46	43	42	38	31	28	**47**
R4 Evening	67	53	47	40	37	36	32	25	22	**41**
R4 Night Shoulder	63	49	43	36	33	32	28	21	18	**37**

The measured spectrum will be interpolated for respective octave band criteria where applicable.

3.2.4 Rail Noise Levels

Long term noise monitoring data presented in Table 3-1 will be used for rail noise prediction at future façade of building s M3 and M4. Additional attended rail noise has been measured at existing façade of Building M3 with rail pass by.

Table 3-4 – Attended rail Noise Measurements

Location	Time of Day	Noise Level – L_{eq}
1m away from western façade of M3	3:30pm on 24th of January 2024	61 dB(A) L_{eq}

4 EXTERNAL NOISE INTRUSION ASSESSMENT

Site investigation indicates that the major external noise sources around site are from rail movements along the west boundary of the site.

AL notes that a noise intrusion assessment for DA submission is typically not required, however has been conducted with example complying constructions provided for authority approval purposes only. Acoustic treatments for noise intrusion will be subject to further design development in CC Stage for final constructions.

4.1 NOISE INTRUSION CRITERIA

A noise intrusion assessment has been conducted based on the requirements of the following acoustic noise criteria and standards:

- Wingecarribee Shire Council *Mittagong Township Development Control Plan* (**DCP**) Version 9, 2021.
- Australian and New Zealand AS/NZS 2107:2016 *Recommended design sound levels and reverberation times for building interiors.*

4.1.1 Mittagong Township DCP 2021

Part A Section 12 of the DCP relates to objectives and provisions for developments near rail corridors, however no specific noise controls are provided in this section.

AL also notes that the SEPPT&I 2021 also does not provide specific requirements for hotel development (M4) or commercial development (M3). Therefore, internal noise requirements will be assessed with reference to AS/NZS 3671:1989.

4.1.2 Australian and New Zealand AS/NZS 2107:2016 *Recommended design sound levels and reverberation times for building interiors*

Australian Standard AS 2107:2016: *Recommended design sound levels and reverberation times for building interiors* specifies allowable internal noise levels for internal spaces within various building types. AS 2107:2016, gives the following maximum internal noise levels for relevant areas of the proposed building.

Table 4-1 – Recommended Design Sound Level

Space /Activity Type	Recommended Maximum Design Sound Level dB(A) L_{eq}
M4 - Hotel Sleeping Areas (Major Roads)	35-40 dB(A)$L_{eq(10pm-7am)}$
M4 - Hotel Washrooms and Toilets	45-55 dB(A) $L_{eq(anytime)}$
M3 - Bars and Lounges	< 50 dB(A) $L_{eq(anytime)}$
M3 - Kitchen, Laundry and Maintenance Areas	< 55 dB(A) $L_{eq(anytime)}$
M3 - Dining	40-50 dB(A) $L_{eq(anytime)}$
M3 - Gallery	40-45 dB(A) $L_{eq(anytime)}$

4.2 ADOPTED PROJECT SPECIFIC CRITERIA

The internal noise criteria adopted for each internal space is therefore summarised below based on the relevant State, Council and Australian Standard requirements.

Table 4-2 – Adopted Internal Noise Levels

Space /Activity Type	Adopted Internal Sound Level dB(A) L_{eq}
M4 - Hotel Sleeping Areas (Major Roads)	35 dB(A) $L_{eq(10pm-7am)}$
M4 - Hotel Washrooms and Toilets	50 dB(A) $L_{eq(anytime)}$
M3 - Hotel Bars and Lounges	50 dB(A) $L_{eq(anytime)}$
M3 - Kitchen, Laundry and Maintenance Areas	55 dB(A) $L_{eq(anytime)}$
M3 - Dining	50 dB(A) $L_{eq(anytime)}$
M3 - Gallery	45 dB(A) $L_{eq(anytime)}$

4.3 COMPLYING CONSTRUCTIONS

Assessment of façade requirements to achieve required indoor noise levels has been undertaken. Dimensions of spaces, setbacks from roadways, window openings and floor areas have been used.

Note: Façade constructions are to be reviewed at CC stage based on construction drawings pending final façade design. The below constructions are provided for authority approval purposes only.

4.3.1 Glazed Façade (Windows and Doors)

The following constructions will comply with the project noise objectives. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria. All external windows and doors listed are required to be fitted with Q-lon type acoustic seals. (**Mohair Seals are unacceptable**).

Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable. The recommended external glazing constructions to mitigate potential noise impacts are detailed in Table 4-3.

Table 4-3 – Complying Glazing Construction

Room	Glazing Thickness	Acoustic Seals
All rooms	6.38 mm Laminated	Yes

It is recommended that only window systems having test results indicating compliance with the required ratings obtained in a certified laboratory be used where windows with acoustic seals have been recommended.

In addition to complying with the minimum scheduled glazing thickness, the R_w rating of the glazing fitted into open-able frames and fixed into the building opening should not be lower than the values listed in Table 4-4 for all areas. Where nominated, this will require the use of acoustic seals around the full perimeter of open-able frames and the frame will need to be sealed into the building opening using a flexible sealant.

Table 4-4 – Minimum R_w of Glazing Assembly (with Acoustic Seals)

Glazing Assembly	Minimum R_w of Installed Window
6.38mm Laminated	31

Note: Façade constructions to be reviewed at CC stage based on construction drawings, pending final façade design.

4.3.2 External Wall Construction

External wall construction will be constructed from concrete and masonry elements, therefore; acoustic upgrading is not required. Any lightweight façade construction shall provide a minimum acoustic performance of R_w 50.

There should not be vents on the internal skin of external walls. In the event that any penetrations are required through the external skin, an acoustic sealant should be used to minimise all gaps.

4.3.3 Entry Doors

All doors shall have glazing thicknesses equal to those recommended in Section 4.3.1 and are to have Raven RP10 to the top and sides and Raven RP38 to the underside of a swing door.

Note that mohair seals in windows and doors <u>are not acceptable</u> where acoustic seals are required.

4.3.4 External Roof/Ceiling Construction

External roof construction will be constructed from concrete elements, therefore; acoustic upgrading is not required. In the event that any penetrations are required through the external skin, an acoustic sealant should be used to minimise all gaps.

4.3.5 Ventilation and Air Conditioning

AS2107 rely on the external façade being closed to provide the required noise reduction through the façade. Whilst they do not provide guidance on acceptable tolerances for a 'windows open' level, and noting that this is not strictly required, with respect to natural ventilation of a dwelling, NSW Planning guidelines allow internal noise levels to be up to 10 dB(A) higher than the specified criterion with windows and doors to a dwelling open.

Based on the above, all hotel rooms will be able to natural ventilation while achieving recommended internal noise level.

Any supplementary ventilation system proposed to be installed should be acoustically designed to ensure that the acoustic performance of the acoustic treatments outlined above is not reduced and does not exceed external noise emission criteria to nearby properties. A mechanical engineer is to confirm if supplementary ventilation (to meet Australian Standard AS1668.2 requirements) will be required to these rooms.

5 NOISE EMISSION CRITERIA

The noise emission from the project site shall comply with the requirements of the following documents:

- Wingecarribee Shire Council *Mittagong Township Development Control Plan* (**DCP**) Version 9, 2021.
- Liquor and Gaming NSW (**L&GNSW**), and
- NSW EPA NPI 2017.

5.1 MITTAGONG TOWNSHIP DCP 2021

It is noted that there are no specific numerical criteria relating to noise emissions from licensed venues contained within the Mittagong Township Council DCP 2021, therefore the L&GNSW noise emissions criteria has been adopted for operational noise of Building M3 and the NSW EPA NPI 2017 has been adopted for mechanical noise emissions.

5.2 LIQUOR & GAMING NSW (L&GNSW)

When assessing noise emissions from licensed premises, noise emissions must comply with the acoustic requirements generally imposed by L&GNSW. These guidelines relate to noise generated by patrons and by music. The requirements are set out below:

- *The L_{10} noise level emitted from the premises shall not exceed 5dB above the background L_{90} sound level in any Octave Band Centre Frequency (31.5kHz to 8kHz inclusive) between the hours of 7.00am to 12.00 midnight when assessed at the boundary of the nearest affected residential premises.*
- *L_{10} noise level emitted from the premises shall not exceed the background L_{90} sound level in any Octave Band Centre Frequency (31.5kHz to 8kHz inclusive) after midnight when assessed at the boundary of the nearest affected residential premises.*

After midnight, noise emissions from the Place of Public Entertainment are to be inaudible within any habitable rooms in nearby residential properties.

5.3 NSW EPA NPI 2017

The EPA NPI has two criteria which both are required to be satisfied, namely Intrusiveness and amenity. The NPI sets out acceptable noise levels for various localities. The policy indicates four categories to assess the appropriate noise level at a site. They are rural, suburban, urban and urban/industrial interface. Under the policy the nearest residential receivers would be assessed against the urban criteria.

Noise levels are to be assessed at the property boundary or nearby dwelling, or at the balcony or façade of an apartment.

5.3.1 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

Background noise levels adopted are presented in Table 3-1. Noise emissions from the Site should comply with the noise levels presented below when measured at nearby property boundaries.

5.3.2 Project Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The EPA's NPI sets out acceptable noise levels for various localities. The recommended noise amenity area is based upon the measured background noise levels at the sensitive receiver. Based on the measured background noise levels detailed in Table 3-1, the Noise Policy for Industry suggests the adoption of the 'suburban' categorisation.

The NPI requires project amenity noise levels to be calculated in the following manner:

$L_{Aeq,15min}$ = *Recommended Amenity Noise Level – 5 dB(A) + 3 dB(A)*

The amenity levels appropriate for the receivers surrounding the site are presented in Table 5-1.

Table 5-1 – EPA Amenity Noise Levels

Type of Receiver	Time of day	Project Amenity Noise Level dB(A)$L_{eq(15\ minute)}$
Surrounding Residents (**R1-R4**)	Day	53
	Evening	43
	Night	38
Surrounding Hotel (**C1**)	Day	58
	Evening	48
	Night	43

The NSW EPA Noise Policy for Industry (2017) defines:

- Day as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays.
- Evening as the period from 6pm to 10pm.
- Night as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

5.3.3 Sleep Arousal Criteria

The Noise Policy for Industry recommends the following noise limits to mitigate sleeping disturbance:

Where the subject development / premises night -time noise levels at a residential location exceed:

- *$L_{eq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- *L_{Fmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,*

a detailed maximum noise level even assessment should be undertaken.

Table 5-2 – Sleep Arousal Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A)L_{90}	Emergence Level
Surrounding Residents and Hotels (**R1, R2, R3, C1**)	30 dB(A) L_{90}	40 dB(A)$L_{eq,\ 15min}$; 52 dB(A)L_{Fmax}
Surrounding Residents (**R4**)	31 dB(A) L_{90}	

5.4 SUMMARISED OPERATIONAL NOISE EMISSIONS CRITERIA

Table 5-3 – Operational Noise Emission Objectives

Receiver	Time of Day	Criteria	Octave Band Noise Criteria, dB L_{10} (Hz)									A-wt
			31.5	63	125	250	500	1k	2k	4k	8k	
R1 & R2	Day (7am – 6pm)	BG + 5dB L_{10} (external)	68	61	51	42	45	44	38	31	29	**48**
	Evening (6pm-10pm)		65	58	48	39	42	41	35	28	26	**45**
	Night shoulder (10pm-12am)		60	53	43	34	37	36	30	23	21	**40**
R3	Day (7am – 6pm)		52	50	47	39	41	41	39	37	32	**46**
	Evening (6pm-10pm)		47	45	42	34	36	36	34	32	27	**41**
	Night shoulder (10pm-12am)		43	41	38	30	32	32	30	28	23	**37**
R4	Day (7am – 6pm)		78	64	58	51	48	47	43	36	33	**52**
	Evening (6pm-10pm)		72	58	52	45	42	41	37	30	27	**46**
	Night shoulder (10pm-12am)		68	54	48	41	38	37	33	26	23	**42**

5.5 SUMMARISED MECHANICAL NOISE EMISSIONS CRITERIA

Table 5-4 – EPA NPI Noise Emission Criteria

Receiver	Time Period	Assessment Background Noise Level dB(A)L_{90}	Intrusiveness Criteria $L_{eq(15min)}$	Project Amenity Criteria dB(A) L_{eq}	NPI Criteria for Sleep Disturbance
R1 & R2	Day	43	**48**	53	N/A
	Evening	40	**45**	43	N/A
	Night	30	**35**	38	40 dB(A)$L_{eq,\ 15min}$; 52 dB(A)L_{Fmax}
R3	Day	41	**46**	53	N/A
	Evening	36	**41**	43	N/A
	Night	30	**35**	38	40 dB(A)$L_{eq,\ 15min}$; 52 dB(A)L_{Fmax}
R4	Day	47	**52**	53	N/A
	Evening	41	**46**	43	N/A
	Night	31	**36**	38	40 dB(A)$L_{eq,\ 15min}$; 52 dB(A)L_{Fmax}
C1	Day	43	**48**	58	N/A
	Evening	40	**45**	48	N/A
	Night	30	**35**	43	40 dB(A)$L_{eq,\ 15min}$; 52 dB(A)L_{Fmax}

The project noise trigger levels are indicated by the bolded values in the table above.

6 NOISE EMISSIONS ASSESSMENT

6.1 NOISE FROM MECHANICAL PLANT WITHIN PROPOSED SITE GENERALLY

Detailed plant selection and location has not been undertaken at this stage. Satisfactory levels will be achievable through appropriate plant selection, location and if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures. Noise emissions from all mechanical services to the closest residential and commercial receivers should comply with the requirements of Section 5.4.

Detailed acoustic review should be undertaken at CC stage to determine acoustic treatments to control noise emissions to satisfactory levels. Indicative treatments to be reviewed and/ or iterated at CC stage are shown below.

6.1.1 Preliminary Mechanical Treatment Advice

- Condenser plant equipment: No indicative location of condenser plant is currently shown. Night time operational speeds shall be restricted with a night mode card (Daikin RXYMQ or similar).

- Major fans (typically with a sound power over 80dB(A) such as kitchen exhaust, major toilet exhaust and major carpark exhaust/supply/ relief air fans) may require acoustic treatment if located externally near sensitive receivers. It is recommended that axial (as opposed to roof mounted fans) are to be used as this will enable acoustic treatment to be incorporated within ductwork running to atmosphere and with attenuators if necessary. Indicatively a 1d unpodded attenuator with 2m of 50mm internally lined ductwork.

- Cumulative assessment of both plant noise with other noise sources is recommended when conducting acoustic design of plant items.

Compliance with EPA acoustic criteria (as set out in Section 5.4) will be achievable provided that detailed acoustic review of plant items is undertaken once plant is selected, and acoustic treatments similar to those outlined above are adopted.

6.2 NOISE FROM OUTDOOR TERRACES AND POOL

A detailed assessment of the Building M3 Level 3 dining room terrace, Level 4 lounge terrace, pool and landscape terrace have been conducted in this section.

Noise from the use of terrace will primarily be from the patron and amplified background music noise.

An assessment for predicted noise levels emitted from the noise sources above has been predicted to nearby sensitive receivers. The analysis presented in this section of the report has been based on the internal dimensions of the space, building construction, openings in the façade and spatial layouts including awnings.

Noise emissions will be assessed with reference to the relevant criteria outlined in Section 5.4.

6.2.1 Acoustic Data

Noise emissions from the operation of the venue will be predicted to the closest residential receivers based on the following assumed noise levels.

- A sound pressure level per patron of 66dB(A) @ 1m L_{eq} for male raised voice consistent with a dense retail food and beverage environment with the following spectrum per the AAAC *Licensed Premises Noise Assessment Technical Guideline* V2 2020 (Cushing et al). The 31.5Hz has been amended from noise data collected by this office. The L_{10} levels have been determined based on the addition of exceedances per Table B3 of the guideline.

Table 6-1 – Patron Noise Spectrum (Sound Power Level) dB

SWL	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
L_{10}	61	68	68	74	77	68	60	55	47	76

- A spatially averaged L_{10} noise level for music (background and/or live music) within the venue has been based on noise data collected by this office for typical usage settings. The spectrums can be adjusted for different dB limits depending on specific usage scenarios. The below octave bands can also be individually tuned and managed via an RMS noise limiter.

Table 6-2 – Internal Music Noise Spectrum (Sound Pressure Level) dB

SPL	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
L_{10}	71	71	77	73	72	71	66	57	59	75

It is noted that AL has been advised that background music will be played at a low volume to allow for customer service and not be a dominant noise source.

6.2.2 Operational Assumptions

Dining room and lounge terrace operation has been assessed to the most time sensitive period of operation, that being the day period (7am – 6pm), evening period (6pm – 10pm) and the night time shoulder period (10pm – 12am). Assessment has been based on the following assumptions:

- L3 Dining room Terraces:
    - 32 patrons located within the dining terrace, with 1 in 2 patrons talking at any one time, and
    - Music within the terrace limited to 75 dB(A) L_{10} sound pressure level. This is a spatially averaged sound pressure level typical of background music.
- L4 Lounge Terraces & Pool:
    - Day & Evening:
        - 50 patrons located within the lounge terrace, accessible landscape terrace and pool, with 1 in 2 patrons talking at any one time.
        - Music within the three areas limited to 75 dB(A) L_{10} sound pressure level. This is a spatially averaged sound pressure level typical of background music.
    - Nighttime shoulder period:
        - 30 patrons located within the lounge terrace, accessible landscape terrace and pool, with 1 in 2 patrons talking at any one time, and
        - No music to be played externally after 10pm
- Operating hours of all external terraces and the pool from 7:00am-12:00am for Mondays to Saturdays, and 8:00am-12:00am for Sundays and Public Holidays.

The above assumptions have been calculated to assume a worst-case scenario with standing patrons. The purpose of this assessment is to provide confidence that predicted noise levels are within operational noise emissions requirements.

6.2.3 Predicted Noise Levels

The predicted noise levels from venue operation are presented in the following table. Predicted noise levels are based on the dimensions of the building, factor in losses due to distance attenuation and barrier effects (where applicable). Predicted noise emissions have been calculated on the assumption that the complying controls in Section 6.2.4 are implemented.

Predicted noise levels at receivers shall not be taken as noise limits.

Receiver	Time of Day	Octave Band Noise Criteria, dB L_{10} (Hz)									A-wt
		31.5	63	125	250	500	1k	2k	4k	8k	
R1 & R2	**Predicted Day & Evening**	**24**	**24**	**28**	**32**	**36**	**37**	**30**	**9**	**0**	**39**
	Evening Criteria (6pm-10pm)	65	58	48	39	42	41	35	28	26	45
	Predicted Night shoulder	**21**	**21**	**23**	**29**	**34**	**35**	**29**	**6**	**0**	**37**
	Night shoulder Criteria (10pm-12am)	60	53	43	34	37	36	30	23	21	40
R3	**Predicted Day & Evening**	**27**	**27**	**30**	**31**	**35**	**35**	**29**	**8**	**0**	**38**
	Evening Criteria (6pm-10pm)	47	45	42	34	36	36	34	32	27	41
	Predicted Night shoulder	**23**	**23**	**25**	**28**	**32**	**32**	**27**	**5**	**0**	**35**
	Night shoulder Criteria (10pm-12am)	43	41	38	30	32	32	30	28	23	37
R4	**Predicted Day & Evening**	**22**	**22**	**26**	**22**	**26**	**28**	**21**	**0**	**0**	**30**
	Evening Criteria (6pm-10pm)	72	58	52	45	42	41	37	30	27	46
	Predicted Night shoulder	**22**	**22**	**25**	**22**	**26**	**28**	**21**	**0**	**0**	**30**
	Night shoulder Criteria (10pm-12am)	68	54	48	41	38	37	33	26	23	42

6.2.4 Complying Controls

The findings in this report show that compliance with the noise criteria set out in Section 5.4 can be achieved. Predicted noise levels indicate that this venue has a low acoustic impact on the surrounding receivers. However, to ensure ongoing compliance with these noise criteria, the following complying controls can be implemented:

- The operational parameters assumed in Section 6.2.2 are not to be exceeded. If allowances above and beyond the assumptions are requested, a separate acoustic assessment is recommended.
- Barrier/balustrade to the terraces/pool shall be minimum 1.2m above the floor level.
- Speakers are to be vibration isolated by Embelton NRD/RDSHS mounts or equal.
- Signs are to be displayed at the entry/ exit of the venue reminding patrons to minimise noise when departing the premises, especially after 10:00pm.
- Doors to the terraces can remain open for the duration of trading hours.
- To protect the amenity of residents located around the development, where possible – garbage collection, deliveries and disposal of bottle/waste should be completed between the hours of 7:00am and 6:00pm. In particular, glass bottles and similar should not be disposed of after 10:00pm. They should instead be stored within the premises and disposed of the following day.
- All external terrace and pool operation is to cease by 12:00am every day. Internal areas can continue to operate subject to a closed façade (exact construction to be determined in Design Stage).

7 CONCLUSION

This report presents an acoustic assessment of noise impacts associated for the proposed M3 and M4 buildings redevelopment located at The Maltings, 2 Colo Street, Mittagong, NSW. The proposed development seeks the construction of a hotel for M4 and commercial building for M3. It is noted the proposed development is similar in terms of the range of uses as previously approved by Council under 20/1400. Provided that the complying constructions presented in Sections 4.3 are adopted, the development will comply with the acoustic requirements of the following documents:

- Wingecarribee Shire Council *Mittagong Township Development Control Plan* (**DCP**) Version 9, 2021.
- Australian and New Zealand AS/NZS 2107:2016 *Recommended design sound levels and reverberation times for building interiors*.

The development will also comply with the vibration requirements of the NSW Department of Planning (**DoP**) *Development near Rail Corridors or Busy Roads – Interim Guideline* (**DNRCBR**) 2008

External noise emissions criteria have been established in this report. Provided that the complying controls presented in Sections 4.3 and 6.2.4 are adopted, the development will comply with the acoustic requirements of the following documents:

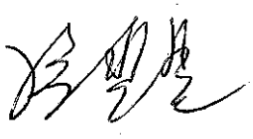
- Wingecarribee Shire Council *Mittagong Township Development Control Plan* (**DCP**) Version 9, 2021.
- Liquor and Gaming NSW (**L&GNSW**).
- NSW Environmental Protection Authority (**EPA**) *Noise Policy for Industry* (**NPI**) 2017.

A detailed acoustic review of mechanical plant will be undertaken during CC Stage, however preliminary calculations have been undertaken and general complying controls have been documented.

Overall, the proposal will not result in any adverse noise or vibration impacts subject to the implementation of the complying constructions and controls set out in this report.

Please contact us should you have any further queries.

Yours faithfully,



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