

NOISE IMPACT ASSESSMENT FOR DEVELOPMENT APPLICATION

MONA VALE

SURF LIFE SAVING CLUB

JHA

CONSULTING ENGINEERS

DOCUMENT CONTROL SHEET

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CONTENTS

1	INTRODUCTION	4
2	DESCRIPTION OF PROPOSAL	5
2.1	Proposed Development	5
3	EXISTING NOISE ENVIRONMENT	6
3.1	General	6
3.2	Long-term Noise Monitoring	7
3.3	Short-term Noise Monitoring	7
4	RELEVANT NOISE STANDARDS AND GUIDELINES	8
4.1	Northern Beaches Council	8
4.2	Noise Emissions and Intrusive Noise	9
4.3	Traffic Noise generation	11
5	OPERATIONAL NOISE IMPACT ASSESSMENT	12
5.1	Mechanical services noise	12
5.2	Members Lounge/Restaurant/Function	13
5.3	Café Noise	14
5.4	Traffic generation Noise	15
6	SUMMARY AND CONCLUSIONS	16
	APPENDIX A: LONG-TERM MONITORING RESULTS	17

1 INTRODUCTION

JHA Engineers has been engaged by Warren and Mahoney Architects to provide a Noise Impact Assessment in support of the Development Application for the proposed redevelopment of the Mona Vale Surf Life Saving Club (Mona Vale SLSC). The proposed site is located at Surfview Road Mona Vale, NSW.

The following documentation has been prepared considering the following documentation:

- NSW EPA Noise Policy for Industry 2017.
- Pittwater Development Control Plan 2014.
- Traffic Report prepared by TTW dated 30/10/2019
- Architectural drawings prepared by Warren and Mahoney
- Preliminary Services mark-ups prepared by Northrop

This report shall be read in conjunction with the Architectural design drawings and other consultant design reports submitted as part of the application.

The objectives of this acoustic assessment are:

- Identify noise sensitive receivers that will potentially be affected by the operation and construction of the proposed development.
- Determine existing ambient and background noise levels on site.
- Establish the appropriate noise level and vibration criteria in accordance with the relevant standards, guidelines and legislation.
- Determine whether the relevant criteria can be achieved based on the proposed operations and construction methods. Where applicable, provide recommendations for any necessary acoustic control measures that will need to be incorporated into the development or use in order to ensure with the assessment criteria..

This report provides:

- A statement of compliance with the relevant statutory criteria for the proposed use development within the vicinity of the nearest potentially affected receivers.
- Recommendations for noise mitigation measures for the proposed development in order to meet the relevant criteria when compliance is not achieved.

This document and related work has been prepared following JHA Consulting Engineers Quality Management System, which is based on AS/NZS ISO 9001 and ISO 14001 Environmental Management Systems.

2 DESCRIPTION OF PROPOSAL

2.1 PROPOSED DEVELOPMENT

The proposal involves the demolition of the existing Mona Vale Surf Life Saving Club building and the construction of a new club building. The proposed club building will be two storeys: the ground floor will consist of a café, gym, canteen, water closets, offices, and storage facilities; the first floor will include a members lounge, meeting rooms, function room, and restaurant.

The site is bounded by Surfview Road to the north-west, a carpark to the north-east, Mona Vale beach to the south-east, and landscaped area to the south-west. The site is located within an urban environment characterised by normal levels of activities during day-time. Figure 1 shows the site location and the nearest noise sensitive receivers.



Figure 1: Site of the proposed new Mona Vale SLC club building and surrounding nearest noise sensitive receivers.

Based on the proposed architectural layout and the nearest noise sensitive receivers, Table 1 shows a summary of most affected noise receivers surrounding the site along with their respective distances used within the calculations.

<i>Sensitive Receiver</i>	<i>Receiver Type</i>	<i>Distance, m</i>
8 Terrol Crescent	Residential	85
5 Darley Street	Commercial	120

Table 1: The nearest sensitive receivers of each receiver type surrounding the proposed site.

3 EXISTING NOISE ENVIRONMENT

3.1 GENERAL

Attended and unattended noise surveys around the proposed site were conducted in order to establish the ambient and background noise levels of the site and surrounds.

Long-term noise monitoring was carried out from Wednesday 16th to Wednesday 23rd January 2019 with a Rion NL-52 noise logger (Serial Number: 1054192). The noise logger recorded L_{A1} , L_{A10} , L_{Aeq} and L_{A90} noise parameters at 15-minute intervals during the measurement period. The calibration of the noise logger was checked before and after use and no deviations were recorded. The noise logger microphone was mounted 1.5 metres above the ground and windshield was used to protect the microphone. Weather conditions were generally calm and dry during the unattended noise monitoring.

On Wednesday 23/01/2019 short-term noise measurements were carried out during day-time. Short-term noise measurements were carried out with a NTI XL-2 hand-held Sound Level Meter (Serial Number: A2A-13742-E0). The calibration of the SLM was checked before and after each use and no deviations were recorded.

The SLM microphone was mounted 1.5 metres above the ground and a windshield was used to protect the microphone. Measurements were undertaken in the free field – i.e. more than 3 metres away from any building façade or vertical reflective surface. Weather conditions were calm and dry during the each attended noise monitoring.

JHA Consulting Engineers carried out the surveys, in accordance with the method described in the AS/NZS 1055:1997 – ‘Description and measurement of environmental noise, parts 1 and 2’.

The long-term and short-term noise monitoring locations are shown in Figure 2.

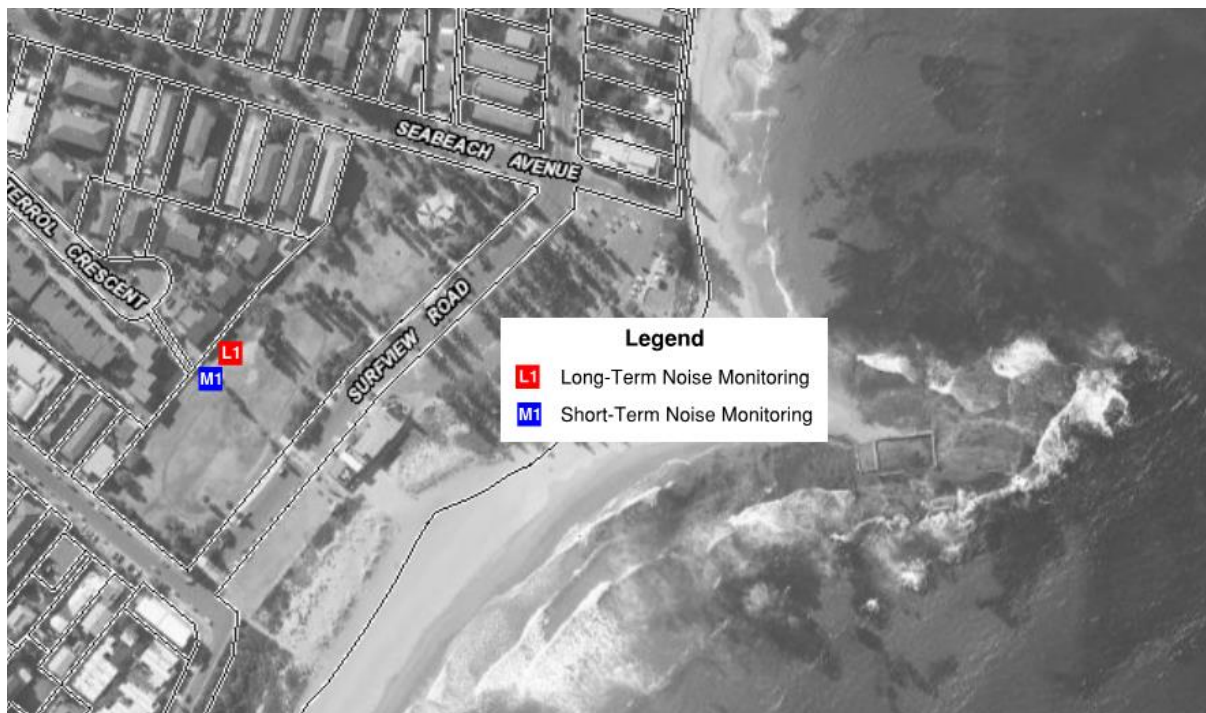


Figure 2: Noise survey locations

3.2 LONG-TERM NOISE MONITORING

The noise logger was located on the boundary of the nearest noise affected receiver. This location was secured and considered to be representative of the typical ambient and background noise levels. The long-term noise monitoring location was chosen as follows:

- Location L1: At the nearest noise affected receiver boundary.

The detailed results of the long-term noise monitoring are presented graphically in Appendix A. As stated in the NSW NPI, any data likely to be affected by rain, wind or other extraneous noise has been excluded from the calculations (shadowed in the Appendix A graphs).

The background noise levels have been established in general accordance with the methodology described in the NSW NPI, i.e. the 10th percentile background noise level for each period of each day of the ambient noise survey. The median of these levels is then presented as the background noise level for each assessment period.

The octave band noise levels measured for each period for the relevant parameters are shown in

Location	<i>L_{A90} Background Noise Levels, dB(A)</i>			<i>L_{Aeq} Ambient Noise Levels, dB(A)</i>		
	<i>Day 7am-6pm</i>	<i>Evening 6pm-10pm</i>	<i>Night 10pm-7am</i>	<i>Day 7am-6pm</i>	<i>Evening 6pm-10pm</i>	<i>Night 10pm-7am</i>
<i>Location L1</i>	38	39	36	49	50	43

Table 2: Long-term noise levels measured on site.

3.3 SHORT-TERM NOISE MONITORING

Short-term noise monitoring was carried out to obtain representative octave band noise levels of the site plus to confirm long-term monitoring noise levels. Two short-term noise monitoring locations were chosen as representative as follows:

- Location M1: Noise logger location.
- Location M2: O'Connell Street.

From observations during the site visit, it is noted that at locations M1 and M2 ambient and background noise levels are dominated by construction noise during the day from the nearby stadium as well as traffic noise for the Evening and Night-time periods.

A summary of the results of the short-term noise monitoring are shown in Table 3.

Location	Date and Time	Parameter	<i>Sound Pressure Level, dB re 20µPa</i>									
			<i>Overall dB(A)</i>	<i>Octave Band Centre Frequency, Hz</i>								
				<i>31.5</i>	<i>63</i>	<i>125</i>	<i>250</i>	<i>500</i>	<i>1k</i>	<i>2k</i>	<i>4k</i>	<i>8k</i>
M1	23/01/2019	<i>L₉₀,15min</i>	38	52	52	48	39	33	32	28	25	27
		<i>L_{eq},15min</i>	50	58	57	54	50	44	42	41	41	41
		<i>L₁₀,15min</i>	48	60	59	56	50	45	40	37	34	35

Table 3: Short-term noise levels measured on site.

4 RELEVANT NOISE STANDARDS AND GUIDELINES

The following standards and guidelines are considered relevant to the project and have been referenced in developing the project noise level criteria:

- Planning
 - Pittwater Local Environment Plan 2014.
 - Pittwater Development Control Plan 2014.
- Noise Emissions and Intrusive Noise
 - Environmental Planning and Assessment (EP&A) Act 1979.
 - Protection of the Environmental Operations (POEO) Act 1997.
 - NSW EPA Noise Policy for Industry (NPI) 2017.
 - NSW Liquor and Gaming. Noise conditions for licensed premises.
- Traffic Noise
 - NSW DECCW Road Noise Policy (RNP) 2011.

The following sections of this report will review these relevant legislation and guidelines, and if similar criteria, procedures, and/or methodologies are found, then the most stringent will be applied.

4.1 NORTHERN BEACHES COUNCIL

The site is located within The Northern Beaches Council limits and is zoned RE1 Public Recreation. Figure 3 shows the land zoning of the site as per information extracted from the Pittwater Local Environmental Plan (P-LEP 2014) map (6370_COM_LZN_018_010_20140623).

The Pittwater DCP states in sections C2.10 and C5.17 on Pollution Control for Business and Other Developments respectively that the development and operations must comply with the *Protection of the Environment Act 1997* and the *NSW Environmental Protection Authority Industrial Noise Policy (INP) [January 2000]*. It should be noted that the INP 2000 is now superseded by the NSW EPA noise policy for Industry 2017.

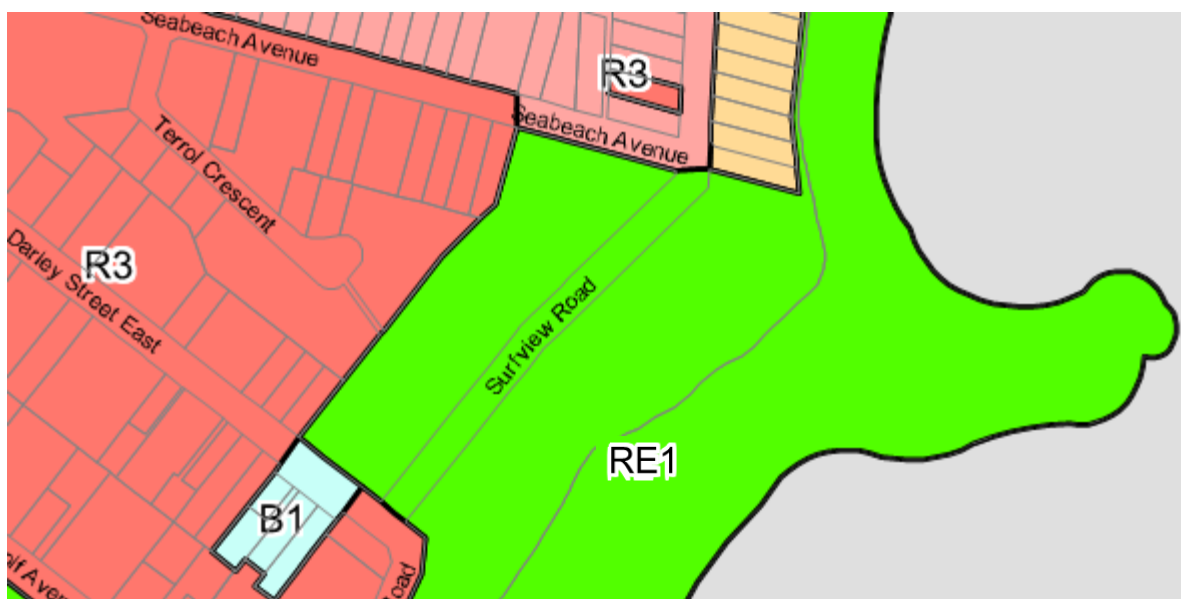


Figure 3: P-LEP 2014 Land Zoning Map of the site and surroundings.

4.2 NOISE EMISSIONS AND INTRUSIVE NOISE

4.2.1 NSW EPA NOISE POLICY FOR INDUSTRY

The NSW EPA Noise Policy for Industry 2017 (NPI) assesses noise from industrial noise sources - scheduled under the POEO. Mechanical noise from the development shall be addressed following the recommendations in the NSW NPI.

NSW NPI noise assessment methodology is generally used by relevant guidelines and legislation to establish background and ambient noise levels. The assessment is generally carried out based on the existing ambient and background noise levels addressing the following:

- Intrusiveness Criteria, to control intrusive noise into nearby sensitive receivers.
- Amenity Criteria, to maintain the noise level amenity for particular land uses.

These criteria are established for each assessment period (day, evening and night) and the more stringent assessment result sets the Project Noise Trigger Level (PNTL's).

4.2.1.1 Intrusiveness Criteria

The NSW NPI defines the intrusiveness criteria as follows:

"The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15 minute period, does not exceed the background noise level by more than 5 dB(A) when beyond a minimum threshold."

Indicative Noise Amenity Area	Period	Measured Rating Background Noise Level (L_{A90}), dB(A)	Intrusiveness Criterion, dB(A)
Suburban Residential (R2 & R3)	Day	38	43
	Evening	39	44
	Night	36	41
Commercial	When in use		65

Table 4: Determination of the intrusiveness noise level criteria for noise sensitive receivers.

4.2.1.2 Amenity Criteria

The NSW NPI states the following to define the amenity criteria:

"To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance."

<i>Indicative Noise Amenity Area</i>	<i>Period</i>	<i>Recommended Amenity Noise Level (L_{Aeq}), dB(A)</i>	<i>Amenity Criterion, dB(A)</i>
Suburban Residential (R2 & R3)	Day	55	53 $L_{Aeq,15min}$ (55-5+3)
	Evening	45	43 $L_{Aeq,15min}$ (45-5+3)
	Night	40	38 $L_{Aeq,15min}$ (40-5+3)
Commercial	When in use	65	63 $L_{Aeq,15min}$ (65-5+3)

Table 5: Determination of the amenity noise level criteria for noise sensitive receivers.

4.2.1.3 Project Noise Trigger Levels

The PNTL's are shown in Table 6 and have been obtained in accordance with the requirements of the NSW NPI. These shall be assessed to the most affected point on or within the noise sensitive receiver boundary

<i>Indicative Noise Amenity Area</i>	<i>Period</i>	<i>Project Noise Trigger Levels</i>
Suburban Residential (R2 & R3)	Day	43
	Evening	43
	Night	38
Commercial	Noisiest 1-hour period when in use	63

Table 6: Determination of PNTL's for the proposed development.

4.2.2 NSW LIQUOR AND GAMING

The current noise conditions for licensed premises by the NSW Liquor and Gaming Authority are shown below.

- The L_{A10}^* noise level emitted from the licensed premises shall not exceed the background noise level (L_{A90}) 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 (L_{A90}) 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.

The adapted NSW Liquor and Gaming Authority criteria for patron noise emissions are detailed in Table 7. As the proposed licensed premises will not operate beyond 10pm, the relevant noise criterion has been established for the 7:00 am to 12 midnight period.

Location	Period	Descriptor	Sound Pressure Level, dB re 20μPa									
			Overall dB(A)	Octave Band Centre Frequency, Hz								
				31.5	63	125	250	500	1k	2k	4k	8k
M1	7:00am to midnight	L _{A90,15min}	39	52	52	48	40	34	33	29	26	28
		L _{A90,15min} +5	44	57	57	53	45	39	38	34	31	33

Table 7: NSW Liquor and Gaming Authority noise criteria at nearest residential receivers

4.3 TRAFFIC NOISE GENERATION

Road traffic noise impact is assessed in accordance with the introduced NSW Road Noise Policy (Office of Environment and Heritage July 2011) which supersedes the *NSW Environmental Criteria for Road Traffic Noise* (ECRTN, Department of Environment Climate Change and Water 1999). The criterion (Table 3 – Road Traffic Noise Assessment Criteria for Residential Land Uses) divides land use developments into different categories and lists the respective criteria for each case. The category that is relevant to the proposed use of the site is shown below:

Road Category	Type of project/land use	Assessment Criteria	
		Day (7am – 10pm)	Night (10pm – 7am)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq,1\ hour}$ 55 (external)	$L_{Aeq,1\ hour}$ 50 (external)

Table 8: Traffic Generation Noise Criteria

In the event that the traffic noise at the site is already in excess of the criteria noted above, the NSW RNP states that the primary objective is to reduce the existing level through feasible and reasonable measures to meet the criteria above.

If this is not achievable, Section 3.4.1 Process for applying the criteria – Step 4 states that for existing residences affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise should be limited to 2 dB above that of the corresponding ‘no build option’.

5 OPERATIONAL NOISE IMPACT ASSESSMENT

Noise break-out from the proposed development has the potential to impact on future noise sensitive receivers. For the purpose of this noise impact assessment, the noise sources are assumed as follows:

- Noise emissions from mechanical plant from the development to the surrounding receivers.
- Noise emissions from patrons and background music from the Function/Restaurant/Members areas
- Noise emissions from patrons in the Cafe
- Noise emissions from traffic generated by the proposed development.

Each of these noise sources has been considered in the operational noise impact assessment. The noise impact assessments assume the following:

- Noise levels are continuous over assessment time period to provide the worst-case scenario.
- Distance attenuation, building reflections and directivity.
- Lowest measure background noise levels at the nearest noise sensitive receiver have been used to provide a worst-case scenario.

5.1 MECHANICAL SERVICES NOISE

Noise from proposed mechanical plant should be controlled to ensure external noise emissions are not intrusive and do not impact on the amenity of the nearest noise sensitive receivers.

At this stage, final mechanical plant selections have not been made; therefore, it is not possible to undertake a detailed assessment of the mechanical plant noise emissions. However, a preliminary assessment has been carried out for the mechanical plant rooms from which the following is noted:

- Based on the plant room locations, the most restrictive noise level criterion during night-time is 38dB(A) at residential receivers.
- Considering the distance from the proposed mechanical plant to the nearest noise sensitive receivers, at this stage, maximum allowable noise emissions have been predicted to be limited to a cumulative Sound Power Level of 85 dB(A)

Noise controls will need to be incorporated with the design of the mechanical services plant to ensure that the cumulative noise output from plant at the nearest noise sensitive receivers is within the allowable limits. Usual design noise controls that may need to be implemented will typically include, but are not limited to:

- Strategic location and selection of plant to ensure the cumulative noise levels at the receiver boundaries is met.
- Selection of appropriate quiet plant.
- Acoustic noise control measures to be put in place to minimise noise impacts such as:
 - In-duct attenuation
 - Noise enclosures as required
 - Sound absorptive panels
 - Acoustic louvres as required
 - Noise barriers as required

Acoustic assessment of all mechanical plant shall continue during the detailed design phase of the project in order to confirm any noise control measures..

5.2 MEMBERS LOUNGE/RESTAURANT/FUNCTION

The members lounge, function room and restaurant located on Level 1 have been assessed as operating concurrently. It is anticipated that amplified music will be the key noise source for events, which however will be contained by the internal partitions and building fabric. The noise assessment assumes the following:

- Restaurant: 90ppl capacity
- Function room: 90ppl capacity with music as per Table 9
- Members lounge: 60ppl capacity
- Members room, Function Room & Restaurant proposed to operate between 7am to 10pm
- External doors to balcony from members room shut
- 50ppl located on the Western Balcony at any one time (~1.5m² per person)
- The vocal effort of patrons communicating with “normal” speech to provide a worst case scenario.
- For every two patrons only one person will be speaking at any given time.
- Façade of Restaurant/Function/Members lounge with a minimum Sound Insulation performance of R_w35

The Sound Power Levels used within the assessment are summarised below in Table 9.

Noise Source	Sound Power Level, dB re 1pW									
	Overall dB(A)	Octave Band Centre Frequency, Hz								
		31.5	63	125	250	500	1k	2k	4k	8k
L ₁₀ live band (located indoors)	105	97	99	100	102	99	101	98	92	85
L ₁₀ 50 Patrons (outdoors)	94	79	81	83	84	91	89	85	78	74

Table 9: Sound power levels for assumed noise sources

Based on the previously noted assumptions, the predicted noise levels are shown below in Table 10

Parameter	Sound Power Level, dB re 1pW									
	Overall dB(A)	Octave Band Centre Frequency, Hz								
		31.5	63	125	250	500	1k	2k	4k	8k
Noise from Patrons	94	79	81	83	84	91	89	85	78	74
Correction for number of Patrons Talking		-4.5	-4.5	-4.5	-4.5	-4.5	-4.5	-4.5	-4.5	-4.5
Distance attenuation (45 m)		-49	-49	-49	-49	-49	-49	-49	-49	-49
Resulting level at residential boundary	41	27	29	31	32	39	37	33	26	22
NSW Liquor and Gaming Criteria (7am to midnight)	44	57	57	53	45	39	38	34	31	33
Complies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 10: Predicted Noise Levels for Members lounge/Function/Restaurant Areas

5.3 CAFÉ NOISE

Noise emissions from the proposed café has been assessed at the nearest noise sensitive receivers. The noise assessment has considered the following assumptions

- Café proposed to operate between 7am-5pm
- Capacity of 70 people
- No service of alcohol
- The vocal effort of patrons communicating are “normal” speech to provide a worst case scenario.
- Every two patrons, only one person will be speaking at any given time.

The noise assessment has been based on the sound power levels derived as per Hayne et al technical paper¹. The Sound Power Levels used within the assessment are summarised below in Table 11.

Noise Source	Sound Power Level, dB re 1pW									
	Overall dB(A)	Octave Band Centre Frequency, Hz								
		31.5	63	125	250	500	1k	2k	4k	8k
L _{eq} one person “normal” vocal effort	64	50	52	54	55	62	60	56	49	45
L _{eq} 70 patrons “normal” vocal effort	94	78	80	82	83	90	88	84	77	73

Table 11: Sound power levels for people talking with “normal” vocal effort.

Based on the previously noted assumptions, the predicted noise levels are shown below in Table 12.

Calculation	Overall A-weighted noise level, in dB(A)
L _{eq} 70 patrons “normal”	94
Correction for number of Patrons Talking	-4.5
Distance (85 m) attenuation, dB	-49
Building attenuation / reflections / directivity, dB	0
L _{Aeq} resulting at active recreational receiver	41
NPI Criteria / Complies?	43 / Yes

Table 12: External Noise Assessment of Café

Based on the predicted results shown above in Table 12, the operations of the café are expected to meet the aforementioned noise criteria.

¹ Prediction of noise from small to medium sized crowds. M.J. Hayne et al. Proceedings of AAS 2011.

5.4 TRAFFIC GENERATION NOISE

Proposed primary access for the traffic generated by the development will be via Surfview Road. A noise impact assessment of the traffic has been assessed based on the trip generation information as provided TTW. As noted in NSW NRP (Section 4.3), when considering land use redevelopment and the impact on sensitive land uses (residential / schools / hospitals / recreational), the NSW RNP states that an increase up to 2 dB in relation to existing noise levels is anticipated to be insignificant.

Based on the information provided in the traffic report prepared by TTW, the proposed development is not expected to result in any changes to traffic generation. Therefore, it can be stated that the traffic increase will not result in any noticeable change in traffic noise levels and is expected to meet the NSW Road Noise Policy recommendations.

6 SUMMARY AND CONCLUSIONS

A noise and vibration assessment has been carried out for the proposed Mona Vale SLSC club redevelopment. This report forms part of the documentation package to be submitted to the Northern Beaches council.

Ambient and background noise surveys have been undertaken at the existing site in order to establish the appropriate noise criteria in accordance with the relevant guidelines.

The noise assessment has adopted methodology from relevant guidelines, standards and legislation to assess noise impact. The noise impacts have been predicted at the nearest noise sensitive receiver boundaries.

At this stage, mechanical plant selections have not been made. Therefore, a detailed assessment has not been able to be carried out. A preliminary review has been carried out for the plant rooms, and based on their location, distance to noise sensitive receivers and noise level criteria, noise emissions from the mechanical services plant shall be limited to a Sound Power Level of 85dB(A). Recommendations have been provided to minimise the impact of external noise emissions associated with the mechanical plant of the proposed development to the nearest sensitive receivers.

External noise emissions associated with the operations of the members lounge, function room and restaurant have been assessed in accordance with the NSW Liquor and Gaming Authority criteria. The predicted noise levels demonstrate that the operations of these areas are expected to meet the noise criteria.

In addition, the external noise emissions associated with the operations of the proposed café have been assessed. Based on the assessment, the expected noise level at the nearest residential receiver will meet the noise level criteria.

The traffic generation noise has also been assessed based on the rates provided in the noted traffic report. Based on the assessment, the noise levels as a result of the additional traffic is anticipated to be insignificant.

Based on the information presented within this report, relevant objectives will be satisfied and therefore approval is recommended to be granted.

APPENDIX A: LONG-TERM MONITORING RESULTS

L_{Amax} – The L_{Amax} level is the maximum noise level during the sample period.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

