

REVERB ACOUSTICS

Noise and Vibration Consultants

Our Ref: 08-1221-L2

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Lake Macquarie Yacht Club Limited
C/- EJE Architecture
412 King Street
NEWCASTLE NSW 2300

Ph. (02) 4929 5353
Fax. (02) 4926 3069

Attention: Mr Peter Johnson

email: pjohnson@eje.com.au

ADDENDUM TO REVERB ACOUSTICS REPORT 08-1221-R1 NEW CLUBHOUSE, MARINA EXTENSIONS AND CARPARK ALTERATIONS LAKE MACQUARIE YACHT CLUB

This letter has been prepared in response to a request for additional information by Department of Planning (DoP), for a new clubhouse, marina extensions and carpark alterations at Lake Macquarie Yacht Club, Ada Street, Belmont. This letter is to be read in conjunction with Reverb Acoustics Report 08-1221-R1 dated June 2009 (referred to as RA-June in this letter). Further information is presented below:

DoP request (Item a): *Provide daily noise monitoring graphs of unattended monitoring in support of the background noise assessment.*

Reverb response: See Appendix A for noise monitoring graphs.

DoP request (Item b): *To support the background noise level assessment provide Tables of Assessment Background Levels determined from the monitoring and explain whether rain or wind speeds of greater than 5m/sec have affected the monitoring. Eliminate data that has been affected by rain and wind speeds greater than 5m/s.*

Reverb response: Table 1 below shows ABL's for monitoring period.

Table 1: Summary of Noise Logger Results, dB(A) – Walter Street

Time Period	Background L90			Ambient Leq		
	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am
21-22 Oct	47.8	45.2	35.4	63.9	60.1	52.7
22-23 Oct	46.1	43.9	38.9	62.0	59.5	55.1
23-24 Oct	44.9	41.7	35.1	62.2	60.3	60.6
24-25 Oct	47.2	43.3	36.1	63.8	56.6	55.6
25-26 Oct	45.5	42.4	35.6	62.1	59.1	52.8
26-27 Oct	45.0	42.0	35.7	61.3	59.1	51.9
27-28 Oct	46.7	45.6	36.4	62.7	58.1	55.1
RBL*	46	43	36	--	--	--
LAeq	--	--	--	63	59	56
RBL*	41 (6pm to midnight)					

Building Acoustics – Council/DECCW Submissions - Modelling - Compliance - Certification

REVERB ACOUSTICS PTY LTD
ABN 90 045 630 639 ACN 142 127 768
PO Box 181 ADAMSTOWN NSW 2289
Telephone: (02) 4950 9222 Facsimile: (02) 4950 9232
email: reverbacoustics@idl.com.au

Table 3.1 of the Industrial Noise Policy (INP) suggests that data should be excluded when wind speed is above 5m/sec or 18km/hr. The only weather data available at this time for the measurement dates are daily averages for Newcastle shown in Table 2 below:

Table 2: Summary of Weather Data

Date	Rain (mm)	Wind Speed (km/hr)	Max Wind Gust (km/hr)	Time Period when Wind Gust above 18km/hr
21-10-2005	8	9	16	-
22-10-2005	0	8	17	-
23-10-2005	0	10	24	14:00-17:00
24-10-2005	8	13	28	22:00-22:30
25-10-2005	0	10	37	14:00-17:00
26-10-2005	0	8	32	13:00-16:00
27-10-2005	0	11	32	07:00-12:00

The above Table demonstrates that wind and rain were below limits specified for data exclusion for the majority of the monitoring period. Also see graphs in Appendix A for excluded data.

Monitoring was also conducted by Reverb acoustics in June 2008 at a nearby location in Belmont. This location is a similar distance from the Pacific Highway, although it is on the east side. Results of this logger are shown below in Table 3:

Table 3: Summary of Noise Logger Results, dB(A) – Railway Parade

Time Period	Background L90			Ambient Leq		
	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am
RBL*	42	43	37	--	--	--
LAeq	--	--	--	55	53	49

DoP request (Item c): Explain whether noise from the existing premises has affected or impacted on the background noise monitoring. The Industrial Noise policy states (in Section 3.1 Determining background noise for Intrusiveness criterion) that the background noise levels to be measured are those that are present at the time of the noise assessment and without the subject development operating.

Reverb response: The logger location was on the west side of Walter Street, approximately 60 metres from the Ada Street intersection. The location was well removed from the existing premises (mechanical plant, carpark, marina, etc) and shielded by residences along Ada Street.

DoP request (Item d): Include more detailed figures showing the location of receivers and logger location. Provide addresses for R1, R2, R3 and the noise logger.

Reverb response: Logger and receiver locations are as follows:

Location	Address	Description
R1	Sail Point Apartments No.41 Walter Street	Multi-storey residential apartments
R2	No. 7 Ada Street	Single-storey residence
R3	Nos. 660 & 662 Pacific Hwy	Double-storey residences
Logger Loc'n	No.47 Walter Street	Positioned on west side of rd
Attended mon Loc'n	Carpark S side Ada Street	Opposite No.7 Ada Street

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Figure 1: Location Plan



DoP request (Item e): Explain why these receiver and logger locations were chosen

Reverb response: Receivers are nearest to proposal and potentially the most affected by activities associated with the clubhouse and marina.

Logger location chosen to utilise existing data and also to ensure activities and plant associated with the existing club did not influence data.

DoP request (Item f): Marinas can generate significant noise 24 hrs per day from slapping and rattling rigs. Include noise from noisy rigging (existing and proposed) in the methodology and analysis.

Reverb response: Reverb Acoustics conducted attended near field measurements of slapping and rattling rigs during relatively rough conditions at the existing marina. The Sound Power Level (Lw) in dB(A) is shown in Table 4.

Table 4: Lw Slapping and Rattling Rigs, dB(A)Leq

Octave Band Centre Frequency, Hz									
dB(A)	31.5	63	125	250	500	1k	2k	4k	8k
68	14	43	52	58	60	63	63	58	52

The nearest marina berth is approximately 150 metres from the nearest residential receiver. Noise from the nearest few boats will produce the most noise at residences. Nonetheless, to produce a worst-case situation, a combined Lw of 86dB(A) has been adopted for existing berths and 89dB(A) for existing plus future berths. Based on the average distance to nearest receivers, noise in the order of 31dB(A) is predicted from slapping and rattling rigs at the nearest receiver and 32dB(A) from existing and future berths. Clearly, noise from slapping and rattling rigs will not raise noise levels at any nearby residence and are expected to be inaudible for the majority of the time.

DoP request (Item g): *Marinas can generate significant noise from use of power tools, on board music stereos and party activities on moored yachts and boats. Include noise from these existing, and likely proposed, marina activities in the methodology, analysis and ameliorative measures.*

Reverb response: As stated in the RA-June Report, other noise sources encountered on the site include repairs and maintenance to individual craft in the wet berths, welders, bench drills, sanders, etc, all of which produce a sound power less than 85dB. Collectively, with up to 3 or 4 sources operating simultaneously on occasion, the sum could be as high as 90dB. This overall sum is at least 10dB below significant sources shown in Table 25, therefore they will not contribute or raise the sound level at nearby receiver.

Obviously, stereos and parties on moored yachts and boats have the potential to exceed the criteria at residential receivers, since the output is unknown and activities could occur outside. The only option available is for club security staff to patrol the marina area and inform offenders to turn down equipment and/or to be quiet. This may be implemented as part of the overall environmental management procedure for the site or included in marina lease agreements. Those at moorings must also comply with local Council management restrictions and rowdy people will also be liable to similar penalties imposed on regular community members.

DoP request (Item h): *Marinas can generate significant noise from use of generators on moored yachts and boats. Include likely generator noise in the methodology, analysis and ameliorative measures.*

Reverb response: We understand all moorings are provided with mains power, removing the need to use generators. Nonetheless, generator use restrictions can be included in marina lease agreements.

DoP request (Item i): *The venue will need to be appropriately designed to ensure noise impacts are acceptable from music and indoor entertainment, especially during the evening and night. DECCW requires justification that the sound power levels used for modelling are typical of worst-case analysis.*

Reverb response: Reverb Acoustics has conducted noise impact assessments at over 100 licensed venues. In many instances measurements were conducted for live and recorded music. In our experience Lw's of 116dB(A) for a live band/Disco and 102dB(A) for duo/trio with drum machine accompaniment are well above those typically experienced, thus providing a measure of conservatism. For instance, the Lw for a typical band is more often in the range 106-112dB(A). Note that the types of entertainment adopted for each venue were supplied by our client.

DoP request (Item j): *Also in regard to music and indoor entertainment DECCW questions whether a project specific noise level (PSNL) of 46dB(A) between 10pm and midnight will be appropriate. The proponent needs to review and fully justify this, and other PSNL's. DECCW notes that if a lower level is adopted (as we expect will be needed) then there might be predicted exceedances of the criteria, requiring a reassessment of feasible and reasonable noise mitigation measures that will be needed for the facility.*

Reverb response: Reference to our logger data reveals that the ABL for the Sunday evening (6pm-12am) is 36dB(A), implying a criterion of 41dB(A) for this day. The day, evening and night ABL's for the Sunday are 1dB(A) or less below the adopted RBL, we therefore maintain that for site noise appropriate criteria have been adopted. The exact modified criteria for Sundays are as follows:

Day	50dB(A),Leq 15 minute
Evening	47dB(A),Leq 15 minute
Night	40dB(A),Leq 15 minute
10pm-12am	41dB(A),Leq 15 minute

Reference to Table 20 of the RA-June Report reveals that the highest predicted noise level from entertainment is at residence R1 from entertainment in Function Room 1, i.e. 41dB(A),L10. This predicted noise level is equivalent to the Sunday criteria and therefore compliant. Our client informs us that more than one function room rarely operates at the same time and never on a Sunday. Note that multiple venues are required for different function sizes rather than simultaneous operation.

The cumulative impact during the evening (10pm-12am) may at times exceed the Sunday criterion by 1dB(A), i.e. sum of function room 1, outdoor areas and mechanical plant. However, as previously stated, our adopted Lw for Function Room 1 is above typical club band output.

In the unlikely event that complaints do arise from entertainment, we recommend that an electronic TecSound noise monitor should be installed in the offending venue. These devices have been proven capable of controlling noise emissions and are a cost effective solution for minor noise exceedances. Another option is to install a Panaray MB4 modular Bass Loudspeaker system or JBN Sound Ceiling, incorporated into the house entertainment centre to provide secure settings for controls. These systems have proven successful in reducing noise output from entertainment venues. Note that we do not recommend installing any of the above control systems unless there is complaint. A noise management system similar to that described below should be the first step:

A subjective audibility assessment of noise emissions should be undertaken in the nearby residential area to ensure the amenity of neighbours is maintained. If noise emissions are audible at any residence, then the (appropriately trained) staff member should immediately investigate the source of noise leakage and rectify the problem.

The results and recommendations from all staff noise surveys should be recorded in a log book for future reference. The log book should contain the following:

- Time and date of survey
- Survey location.
- Description of noise sources audible during subjective assessment i.e. traffic, music, patrons. etc.
- In the event of unsatisfactory noise emissions, a description of noise control strategies.
- Signature.

DoP request (Item k): *Include a Table with recommended project specific noise limits at sensitive receivers during the day and night time periods, based on a cumulative assessment, compared against the predicted project specific noise at the receivers.*

Reverb Response:

Table 5: Cumulative Noise Impact - Propagated to Nearest Residences

Rec/Item	Clubhouse Ent	Club Terraces	Carpark Activities	Marina	Mech Plant	Sum
DAY				Criteria = 50dB(A), Leq 15 minute		
R1 North east	41#	36	<25	47	31	48
R2 east	39#	<25	46	51	35	52
R3 South east	39#	34	<25	49	32	50
Night				10pm-12am = 50dB(A), Leq 15 minute		
R1 North east	41#	36	<20	-	31	42
R2 east	39#	25	40	-	35	43
R3 South east	39#	34	<20	-	32	41

Only 1 Function Room operating.

Noise impact from individual activities associated with operation of the site will be compliant with the criteria at nearest residential receivers during all time periods, subject to our recommendations. However, Table 5 indicates that the cumulative noise impact from all activities associated with the site may exceed the criteria at residences east of the site (R2) during the day by 2dB(A) and 1-2dB(A) at receivers R1 and R2 at night. The following points will demonstrate that compliance during all time periods is in fact achieved:

1. When the carpark is operating at full capacity during the day, say when a regatta is being held, activities/equipment associated with the marina will be idle, i.e. workshop, etc. Therefore compliance is expected.
2. Entertainment in the clubhouse will cease by midnight. The criteria up until midnight is 46dB(A) and after this time reduces to 41dB(A). Therefore, providing all entertainment ceases by midnight, overall compliance with the night criterion will be achieved.

In the unlikely event that complaints should arise from operation of the site, noise management strategies are available and discussed in previous sections of this addendum.

DoP request (Item l): *DECCW notes that pile driving is proposed. This activity can be particularly intrusive. The Environmental Assessment needs to consider this and other construction noise in accordance with the Department's Interim Construction Noise Guideline (2009) and in particular give consideration to respite periods and other appropriate measures where noise goals cannot be met.*

DoP request (Item m): *Demonstrate compliance with DECCW's Interim Construction Noise Guidelines.*

Reverb response to Items l and m: The RA-June Report has a comprehensive section dealing with construction noise and vibration impacts. The assessment was completed in June 2009 and was therefore carried out in accordance with the requirements of the DECCW's Draft NSW Construction Noise Guideline, since their Interim Guideline was not released until June 2009.

For all intents and purposes, the criteria and procedure in the Draft and Interim Guidelines is the same. We consider the RA-June Report to be valid, with perhaps the exception that respite periods have not been proposed. Note that the DECCW's criteria of 75dB(A), signifying a highly effected receiver, is only exceeded by earth moving equipment and piling driving at receivers closer than 100 metres.

Table 33 of the RA-June Report, reproduced below in Table 6, is presented as a guide for the construction team to consider and follow. When the nominated activity occurs within the safe working distance, attended vibration monitoring should be conducted at the relevant receiver type. We have recommended that attended noise monitoring should be carried out in conjunction with vibration monitoring, as activities that produce high vibration amplitudes also regularly produce high levels of noise.

**Table 6: Vibration Monitoring Program
 Minimum Distance when Monitoring is Required**

Activity/Process	Receiver Type	Distance to Receiver (m)
Piling	Residential	150
	Heritage structure	200
	Commercial building	120
Ripping (Dozer)	Residential	80
	Heritage structure	100
	Commercial building	60
Earthworks (track machine)	Residential	80
	Heritage structure	100
	Commercial building	50
Vibrating roller	Residential	60
	Heritage structure	80
	Commercial building	50
Smooth drum roller	Residential	20
	Heritage structure	30
	Commercial building	10
Truck movements	Residential	20
	Heritage structure	30
	Commercial building	10

Table 34 of the RA-June Report also gives alternate construction techniques for consideration for activities that produce high levels of noise. The complaints handling procedure and monitoring program will in the majority of cases provide management for activities that produce high noise levels. In saying this, respite periods are shown below for piling, if this process is carried out:

Piling Periods:

Monday to Friday 9am-11am and 1pm-4pm
 Saturday 9am-12pm
 Sunday/Public Holidays No piling.

APPENDIX A

Noise Monitoring Graphs







