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Expert report of Renzo Tonin | Construction noise impact

2 December 2015

Bay Simmer investments Pty Ltd

TH720-01F02 Expert Report in Acoustics (r5)

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Contents

List of tables

List of figures

1 Introduction

1. I am the managing director of Renzo Tonin & Associates (NSW) Pty Ltd of Level 1, 418A Elizabeth Street, Surry Hills NSW 2010.

2. I have practiced as a consulting engineer in acoustics for 37 years, 33 years as principal of my firm. I was awarded a B.Sc. (Hons) in 1973 and a PhD in acoustics in 1976. My curriculum vitae is annexed hereto in Appendix 'A'.

3. Bay Simmer Investments Pty Ltd, the **Applicant** in these proceedings, contends that the Minister's Delegate, when granting consent to the Walsh Bay Arts Precinct (**Proposal**) on 21 May 2015, failed to consider the likely noise and vibration impacts arising from construction of the Proposal. The purpose of this report is to provide exert evidence in respect of the noise and vibration impacts on the Applicant's premises. I have not been asked to consider the operational noise impacts of the proposal. A copy of my letter of instructions is annexed hereto in Appendix 'B'.

4. I have read Division 2 of Part 31 of the Uniform Civil Procedure Rules 2005 and the Expert Witness Code of Conduct in Schedule 7 of the Uniform Civil Procedure Rules 2005) and I agree to be bound by the terms of those documents. My evidence in this statement is within my area of expertise, except where I state that I am relying upon the evidence of another person.

5. The following is a list of relevant documents that have been supplied to me:

   i) Simmer on the Bay Consent D/2010/1271 1 Nov 2010

   ii) Set of drawings A02.000[A]-A02.004[A] and A00.000[A]- A00.004[A] prepared by Bates Smart Architects

   iii) EPA comments on the draft Secretary's Environmental Assessment Requirements for the Proposal dated 28 August 2013

   iv) Director-General's Environmental Assessment Requirements 2 Sept 2013

   v) Strata Plan 21 Nov 2013

   vi) SSDA Concept Design Report 1 June 2014

   vii) MBM (Quantity Surveyor's) Report for Walsh Bay Arts Precinct, 10 June 14 (**MBM Report**)

   viii) Heritage Impact Assessment 23 June 2014 (**Heritage Report**)

   ix) WSP Noise & Vibration Report 24 June 2014 (**WSP Report**)

   x) EPA Submission 15 Aug 2014

   xi) Secretary's Environmental Assessment Report 1 May 2015

   xii) Development Consent 21 May 2015

6. I subsequently visited the site on the morning of Thursday 22nd October and on the morning of Thursday 26th November 2015. On the second occasion I took noise readings, the results of which are described in this report.

7. A glossary of acoustic terms used in this statement of evidence is annexed hereto in Appendix 'C'.

2 Description of the Proposal and the Applicant's premises

8. The existing development at Walsh Bay Wharves comprises the following buildings, some of which are shown in Figure 1 below:

   a) Pier One - adapted to contain the Sebel Pier One Sydney Hotel;

   b) Pier 2/3 - an undeveloped finger wharf comprising two storeys (and associated shore sheds) with gabled roof which has approval for cultural uses, temporary arts events and some commercial events.

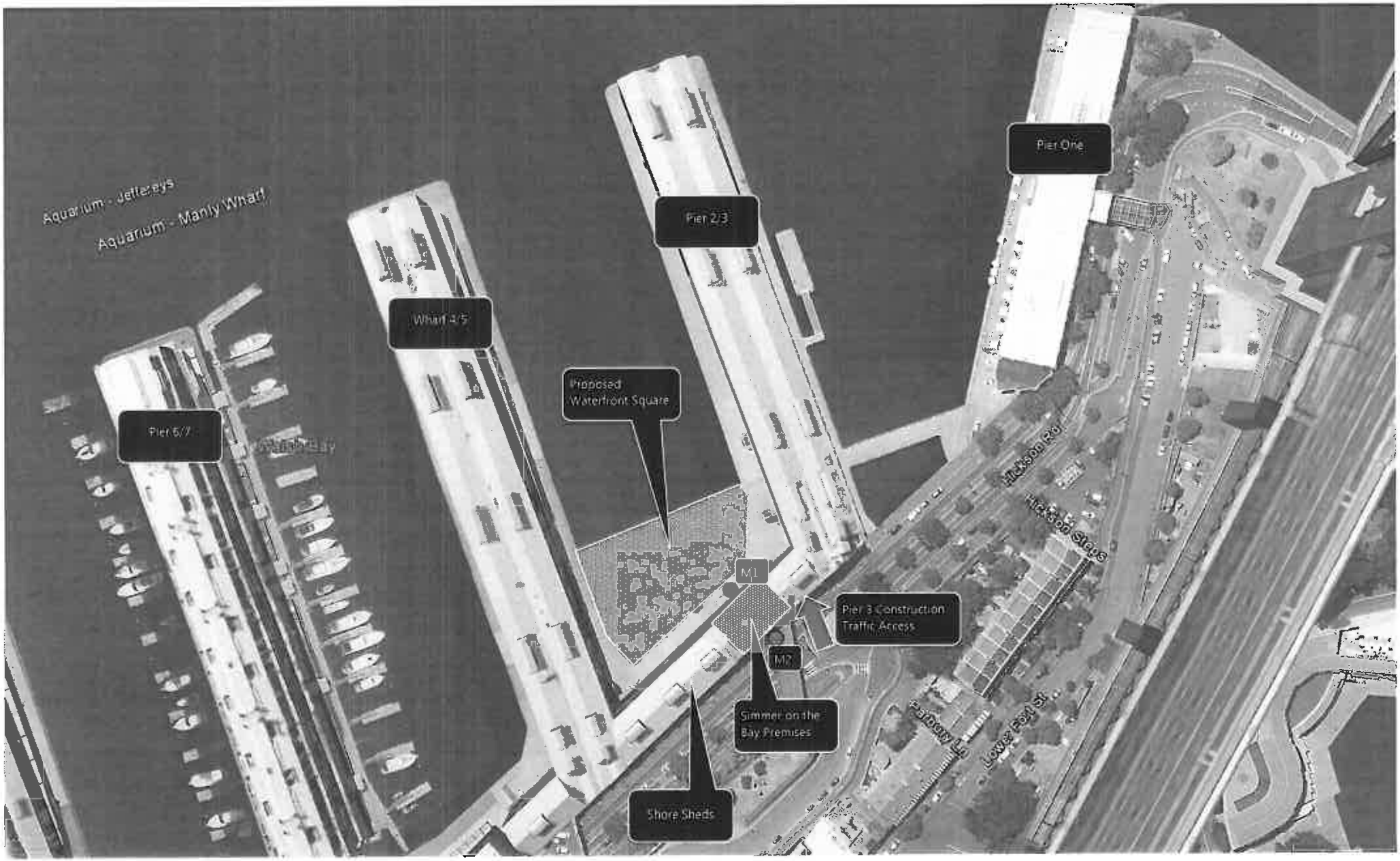
   c) Wharf 4/5 - a four storey timber finger wharf structure used by 10 arts and cultural organisations (such as Australian Theatre for Young People and the Bangarra Dance Theatre) and comprises a range of performance venues, rehearsal, workshop spaces. a recording studio. cafe/restaurants and office accommodation occupied by the Sydney Theatre Company;

   d) Pier 6/7 - redeveloped for residential apartments and associated boat marina;

   e) Pier 8/9 - redeveloped for office uses; and,

   f) Shore Sheds - containing a range of commercial activities, including restaurants. bars, shops and offices.

Figure 1 Site location and noise monitoring positions



9. In 2011/12 Arts NSW engaged the NSW Government Architect to prepare a master plan for the precinct. The Proposal comprises the following elements:

   a) Demolition and rebuilding works in Pier 2/3 to accommodate the Australian Chamber Orchestra, Bell Shakespeare and Australian Theatre for Young People with associated foyer and office space on the ground level and a commercial space at the northern end;

   b) The construction of a new Australian Chamber Orchestra auditorium in the north end of Pier 2/3 and secondary auditorium for Australian Theatre for Young People in the south end of Pier 2/3. To accommodate the acoustic needs of the auditorium, a section of roof will be demolished and rebuilt with an increased height;

   c) The demolition and construction of a large "raw" heritage space in Pier 2/3 for events. festivals and functions;

   d) A major upgrade of ground floor facilities at Wharf 4/5 for the Bangarra Dance Theatre (an indigenous performing arts company) including a café/bar at the end of the Wharf on the ground floor and facilities for the Sydney Dance Company (but excluding Sydney Theatre Company which is not a part of the Proposal);

   e) The demolition and construction of creative and commercial activities along the shore sheds included an upgraded choirs office accommodation, rehearsal space and new commercial offices with cafes, restaurants and retail shopping;

   f) The construction of a new north facing Waterfront Square over water between Pier 2/3 and Wharf 4/5 supported with new boardwalks to significantly increase public open space and create a central platform for activity, collaborative outdoor performances, events, festivals, markets and public art. This work will involve the installation of a large number of piles.

10. As shown in Figure 1, the Applicant's premises "Simmer on the Bay" is located within the Pier 2/3 shore shed at 13 Hickson Road, Dawes Point NSW 2000. The premises comprises lots 19,21 and 22 in Strata Plan SP73989 and, with the exception of an office space on the first floor, is a single floor tenancy with high exposed beams supporting the second floor above. There are other tenancies in the four storey shore shed building, those immediately above being used as commercial offices. Abutting the tenancy immediately to the west is a space associated with arts use. Abutting the tenancy immediately to the east is the Pier 3 promenade entrance roadway.

11. The Applicant's premises has a kitchen and café on the eastern portion of the tenancy. The kitchen has one door opening to the Pier 3 promenade entrance roadway and another door opening to the shore shed promenade on the northern façade of the building. The kitchen is not air-conditioned and I am instructed that it is common for those doors to be kept open most of the time except in very cold weather. There are also openable windows on the northern façade which are also kept open most of the time. There is an outdoor area associated with the café with room for approximately 20 patrons.

12. The remainder of the tenancy is used for art gallery/dining room use including an outdoor area. The art gallery/dining room is air-conditioned with 12mm thick glass windows and two 12mm thick double glass doors on the northern façade and large fixed windows and a main entrance incorporating a 12mm thick double glass door on the southern façade.

13. Development consent D/2010/1271 was issued by the City of Sydney to the Applicant on 1st November 2010 for the following use: [1]

Integrated Development Application for the continued use of tenancies 1,2,& 3 as 'Simmer on the Bay', an art gallery, private dining room, cafe and catering service plus the installation of a new fabric awning and two external signs.

14. The approved hours of operation are as follows:

(4) HOURS OF OPERATION

The hours of operation are regulated as follows:

Art gallery

9.00am – 9.00pm 7 days per week

Private dining room

6.00pm – 1.00am (inside areas) Monday to Saturday, maximum 3 times per week

6.00pm – 10.30pm (outside areas) Monday to Saturday, maximum 3 times per week)

6.00pm -- 11.00pm (inside areas) Sundays and public holidays

6.00pm to 10.00pm (outdoor areas) Sundays and public holidays

Catering service

7.00am – 5.00pm Monday to Friday

15. I note the conditions do not place any limitation on the operating hours of the Café and I have been instructed to assume the Café hours are unrestricted.

[1] The consent lapsed on 1 November 2015, however, I am instructed to assume the consent will be extended.

3 Minister's consent and referrals to the EPA

16. Development Application SSD 6069 submitted by Arts NSW to the Minister for Planning was approved on 21 May 2015 for the following:

Staged development (concept proposal) for the Walsh Bay Arts Precinct comprising an integrated performing arts and cultural precinct including:

- *a new waterfront public square between Pier 2/3 and Wharf 4/5, with a stage and shade structure;*
- *the adaptive reuse of Pier 2/3;*
- *the refurbishment of Wharf 4/5; and*
- *the use of the precinct for arts festivals, events and pop-up and associated uses.*

17. There are no conditions contained in SSD 6069 relating to construction noise.

18. In the WSP Report at section 5.4 it states as follows:

5.4 Construction Noise & Vibration

As this is a Concept stage SSDA application. it is not seeking approval for any works to be commenced. As such. Construction Noise & Vibration will be assessed as part of a future Stage 2 SSDA.

19. Similarly, in the Secretary's Environmental Assessment Report at section 5.9, it states as follows:

Construction Impacts

As detailed above, the proposal does not seek approval for any construction works. Furthermore, the applicant has advised that the staging and scope of future applications has not been determined at this stage. This being the case, it is relevant that matters relating to potential construction environmental impacts be fully considered at the future environmental assessment stages of the development. Accordingly, the Department has recommended that the applicant prepare and submit a detailed overarching Construction Framework Environmental Management Plan with the first development application.

20. The issue of whether or not the Minister should have had regard to construction noise impacts in making his decision to grant consent is a matter for this Court and I am not qualified to give evidence in relation to this matter.

21. However, I note that the Director-General's Requirements issued on 2 September 2013 required as follows:

Consultation	*During the preparation of the EIS, you must consult with relevant local, State and Commonwealth authorities, service providers, community groups and affected landowners, particularly the following agencies:* • *Office of Environment and Heritage;* • *Sydney Harbour Foreshore Authority;*

	• City of Sydney Council; • Environment Protection Authority; • Roads and Maritime Services; • Transport for NSW; • Heritage Council of NSW; • Sydney Ports Corporation; • NSW Police; and • Fisheries NSW (Department of Primary Industries). The EIS must describe the consultation process and any issues raised by agencies, and identify where the design of the development has been amended in response to those issues. Provide a short explanation where amendments have not been made to address an issue.

22. In respect of the last paragraph, the EPA was consulted by the Department of Planning and Infrastructure to provide input to the Director General's Requirements for the Proposal whereupon it stated: [2]

3.2 noise and vibration

The EPA considers that the project is likely to generate significant noise and vibration impacts on surrounding residences and other noise sensitive land uses during construction.

Guidance material is available on the EPA web site including downloadable copies of —

- *the Interim Construction Noise Guideline (2009), and*
- *Assessing Vibration: a technical guideline (2006).*

...

Recommendation

EPA recommends that the DGRs require the proponent to closely liaise with non-residential noise sensitive uses, such as theatres and rehearsal facilities, concerning the scheduling of high noise or vibration impact work such as impact piling.

23. I understand from the above the EPA had concerns that the Proposal was likely to generate significant noise and vibration impacts during construction on surrounding residences and other noise sensitive land uses especially in relation to pile driving.

24. According to the Director Generals Requirement stated above in paragraph 21, the EIS *"must describe the consultation process and any issues raised by agencies, and identify where the design of the development has been amended in response to those issues"* and to *"provide a short explanation where amendments have not been made to address an issue"*.

25. On the 15th August 2014 the Environment Protection Authority then submitted its response in relation to the development application whereupon it stated in part as follows:

[2] Correspondence EPA to Department of Planning and Infrastructure dated 28 August 2013

The EPA has identified the following site specific concerns based on the information in the Environmental Impact Statement:

...

(c) construction-related noise and vibration impacts (including recommended standard construction hours and intra-day respite periods for highly intrusive noise generating work such as rock breaking and pile driving);

26. Then in section 2.6 of the attachment to that letter it stated as follows:

2.6 noise and vibration

Appendix 14 Noise and Vibration Assessment (pp. 2 and 23) indicates that the proponent has not undertaken an assessment of construction noise and vibration impacts as the proposal is only at the "... Concept stage ..,"

The EPA considers that during construction the project is likely to generate significant noise and vibration impacts on surrounding residences and other noise sensitive land uses, The EPA provides guidance material available on its web site, including downloadable copies of the following publications -

• the Interim Construction Noise Guideline (2009), and

• Assessing Vibration: a technical guideline (2006).

Recommendation

The proponent be required to undertake a comprehensive noise and vibration impact assessment of construction activities, especially any such activities -

(i) likely to generate noise with annoying or intrusive characteristics,

(ii) likely to cause vibration (human discomfort) impacts on nearby residences and Botanic Gardens research facilities, and

(iii) proposed to be undertaken outside the recommended standard hours discussed in Table 1 to the Interim Construction Noise Guideline.

27. I interpret this to mean that the EPA was still concerned about noise and vibration impacts from the Proposal.

4 Description of proposed construction works

28. The Proposal is described in the architectural drawings prepared by Bates Smart and referenced in paragraph 5 of this report. An explanation of the Proposal is provided in the table below.[3] Works for which approval was sought is indicated in the table below in black type while all other works in blue type are described for information only and not for approval. These are shown on the architectural drawings marked "Not for Approval - For Information Only".

29. However, whilst the approvals might be staged, I have assumed for the purpose of this report that the construction works will not be staged, that all the works will occur concurrently.

Table 1 Proposed construction works

Location	Description
Waterfront Square/ Cultural Hub	New waterfront square between Pier 2/3 and Wharf 4/5 by extending the promenade into the water space between the two wharves.
Pier 2/3 Elevations and immediate apron spaces	New raised pedestrian promenade along the southeast loggia accessing new foyer space. Demolition of existing ramps and stairs on east side (c2003). Zones for three new gantries along the east facade. Northern gantry will have connecting stairs to apron level. Zones for three new balconies along the west facade with connecting stairs to apron level. New openings along the first floor of the west elevation. New openings on the north elevation at ground floor and first floor. Partial or full opening of cargo doors with infill glazing. Reinstated opening to the north side of the ground floor breezeway. Alteration to the existing circa 2003 interpretation mode will be required.
External alterations to Wharf 4/5	Zone for new balcony at the northern end of the east facade with connecting stairs to apron level. Alterations to ground floor openings in the space occupied by the Sydney Dance Company. New openings in the ground floor north elevation to service new cafe/bar adjacent to Bangarra Space.
Pier 2/3 Ground Floor	Southern end partitioned for offices and workshop spaces with new mezzanine levels. Northern end used for "Commercial Events/ Arts Space" retained as relatively untouched "raw" space. New foyer located approximately in the centre of the Wharf, full width and 4 bays long. The space will contain a lift and stair at the north end. Demolition of the existing c2003 stair and lift and replacement with a new stair and lift adjacent. Former dead-house and adjacent bag chute retained.

[3] Section 5. Heritage Impact Assessment 23 June 2014

Location	Description
Pier 2/3 First Floor	New foyer located approximately in the centre of the Wharf with stair and lift connected from ground floor foyer. New auditorium with tiered seating for the ACO at the northern end of the Wharf. The space will be five bays long and set off from the sidewalls. The space will be acoustically and thermally insulated. Four columns will be removed (refer to italic dot-point below) while original associated timber trusses will be retained. Four new rehearsal spaces, and an additional performance space with tiered seating for ATYP. Two columns will be removed (refer to italic dot-point below) while original associated timber trusses will be retained. **Removal of total of six columns on first floor.** New mezzanine spaces accommodating dressing rooms, offices and amenities. New full height ACO function space at the northern end with openings in the north, east and west walls
Pier 2/3 Roof	**Raised roof within the central valley at the northern end of the pier (between roof lanterns) to accommodate ACO auditorium.** **Installation of new solar panels in the central roof valley and outer roof slopes similar to those existing on Wharf 4/5.**
Wharf 4/5 Ground Floor	Refine and better delineate entries to Sydney Dance Company including alteration to existing office and mezzanine spaces. Work will include the removal of one column from studio 5 space. Modifications to Bangarra spaces including main studio space, foyers and offices. Work will include the removal of one column from studio 2 space. **Removal of two columns on ground floor**
Wharf 4/5 First Floor	**Space currently occupied by Sydney Theatre Company. No changes proposed.**
Shore Sheds internal	Re-organization of tenancies including Commercial Retail space. Choir rehearsal and ATYP

NOTE:

ACO – Australian Chamber Orchestra

ATYP- Australian Theatre for Young People

30. A detailed description of construction works can be found in the MBM Report. The table in that report is too voluminous to replicate here, however, I note the following key details:

Table 2 Key project construction details

Location	Description
Pier 2/3 Refurbishment	**Removal of 180 piles to be replaced with new steel jack-up piles.** **ACO Fitout – 1,420sqm of reinforced concrete slabs** **Replace existing roof 336sqm with associated bracing** **Bell Shakespeare Fitout – 573sqm of reinforced concrete slab** ATYP Fitout – 1,405sqm of reinforced concrete slabs
Wharf 4/5 Refurbishment	**Demolish 2,416sqm of ground and first floor areas** Demolish 904sqm of retail space in shore sheds
Waterfront Square	**634sqm of upgrade to eastern approaches to Pier 2/3** **2,175sqm of piling** **1,013sqm of timber decking including framing fixed to piling** **840sqm of unspecified decking to The Wings** **246sqm performance stage** **317sqm of Roof over stage** **157sqm new raised deck area in front of Wharf ¾ Café externally**

Location	Description

NOTE:
ACO – Australian Chamber Orchestra
ATYP- Australian Theatre for Young People

31. The work described above would most likely involve the use of construction equipment such as:

    i) Piling rigs

    ii) Large delivery and dump trucks

    iii) Concrete trucks and concrete pumps with booms

    iv) Front end loaders, cranes and excavators

    v) Welders, nailing guns, hand tools, grinders etc.

32. Whilst a large proportion of the construction works will occur indoors, the construction of the Waterfront Square will occur outdoors immediately in front of the Applicant's premises and I expect that the Pier 3 promenade access road, which is located adjacent to the Applicant's café, is likely to be used by construction traffic.

33. The extent of the construction works outlined above, the proximity of the works to the Applicant's premises and the potential for Pier 3 promenade access road to be used for construction traffic are factors which I conclude are likely to cause adverse noise and vibration impacts upon the Applicant which require reasonable and feasible means of mitigation.

5 Ambient noise measurements

34. Ambient noise levels were measured inside and outside the "Simmer on the Bay" premises on the morning of Thursday 26th November 2015 from 10:19am to 11:33am.

35. The equipment used for noise measurements was an NTi Audio Type XL2 precision sound level analyser which is a class 1 instrument having accuracy suitable for field and laboratory use. The instrument was calibrated prior and subsequent to measurements using a Bruel & Kjaer Type 4231 calibrator. No significant drift in calibration was observed. All instrumentation complies with IEC 61672 (parts 1-3) '*Electroacoustics - Sound Level Meters*' and IEC 60942 '*Electroacoustics - Sound calibrators*' and carries current NATA certification.

36. Weather conditions were fine with wind gusts less than 5m/sec, temperature 34.4degC, 35%RH and 1/8oct cloud cover.

37. Noise levels were measured in the free field outside the premises on the northern and southern facades (denoted as M1 and M2 in Figure 1). Existing noise sources include traffic, wave noise, helicopters, people chatting in the distance and train passbys on the bridge approach. Noise levels were also measured inside the kitchen and in the gallery/dining space. The following results were obtained:

Table 3 Measured ambient noise levels Thursday 26 November 2015

File	Location	Start Time	Stop Time	Duration	LA10%	LAeq	LA90%
		[hh mm ss]	[hh mm ss]	[mm ss]	[dB]	[dB]	[dB]
SLM_000	M1 - North entrance to Simmer 4m from façade	10:19:44 AM	10:34:46 AM	15:02	60.0	56.7	51.5
SLM_001	M1 - North entrance to Simmer 4m from façade	10:35:18 AM	10:50:36 AM	15:18	61.0	58.1	51.3
SLM_002	M2 - Hickson Road main entrance 3.5m from façade	10:51:48 AM	11:08:12 AM	16:24	71.9	68.7	58.3
SLM_003	Inside kitchen - 3 staff, no airconditioning	11:09:30 AM	11:14:38 AM	05:08	70.0	67.2	60.1
SLM_004	Lower gallery/dining space no airconditioning	11:15:44 AM	11:22:43 AM	06:59	49.3	47.3	43.0
SLM_005	Lower gallery/dining space with airconditioning on	11:26:24 AM	11:32:56 AM	06:32	48.8	46.9	44.9

38. In respect of the gallery/dining space, ambient noise was predominantly due to traffic on Hickson Road transmitted via the main entry door and fixed windows. Whilst the entry door glass is 12mm thick, there are large gaps in the perimeter of the door which allow the transfer of sound. In fact, comparing the outside noise level on Hickson road with the internal noise level, there is only about a 22dB(A) noise reduction in the LAeq noise level. This is relevant because this would be the noise reduction I would also expect from outside to inside from future construction noise transmitted through the northern façade.

6 Applicable noise and vibration criteria

39. As stated in paragraph 26 above, the EPA recommends the following guideline documents for assessing noise and vibration from construction activity:

- Interim Construction Noise Guideline (2009); and
- Assessing Vibration: a technical guideline (2006).

6.1 Applicable noise criteria

40. The NSW EPA *Interim Construction Noise Guideline* (ICNG, 2009) provides guidelines for assessing noise generated during the construction phase of developments. The key components of the guideline relevant to this assessment include:

- Use of LAeq(15min) as the descriptor for measuring and assessing construction noise.
- Application of feasible and reasonable noise mitigation measures.
- A noise mitigation measure is feasible if it is capable of being put into practice, and is practical to build given the project constraints.
- Selecting reasonable mitigation measures from those that are feasible involves making a judgement to determine whether the overall noise benefit outweighs the overall social, economic and environmental effects.

41. The standard hours for construction work recommended in the ING are as follows:

- Monday to Friday 7 am to 6 pm
- Saturday 8 am to 1 pm
- No work on Sundays or public holidays

It is assumed in this report those standard hours will apply to the Proposal.

42. These construction hours do not coincide with the approved dining room use of Simmer on the Bay. However, the art gallery use, the café use and the catering service use (which means use of the kitchen) are potentially affected.

43. Section 4.1.3 of the ICNG sets out the following guideline for commercial premises.

4.1.3 Commercial and industrial premises

Due to the broad range of sensitivities that commercial or industrial land can have to noise from construction, the process of defining management levels is separated into three categories. The external noise levels should be assessed at the most-affected occupied point of the premises:

- *industrial premises: external LAeq (15 min) 75 dB(A)*
- *offices, retail outlets: external LAeq (15 min) 70 dB(A)*

- *other businesses that may be very sensitive to noise, where the noise level is project specific as discussed below.*

Examples of other noise-sensitive businesses are theatres and child care centres. The proponent should undertake a special investigation to determine suitable noise levels on a project-by-project basis; the recommended 'maximum' internal noise levels in AS 2107 Acoustics – Recommended design sound levels and reverberation times for building interiors may assist in determining relevant noise levels (Standards Australia 2000).

The proponent should assess construction noise levels for the project, and consult with occupants of commercial and industrial premises prior to lodging an application where required.

During construction, the proponent should regularly update the occupants of the commercial and industrial premises regarding noise levels and hours of work.

44. As the art gallery use and the catering service use (i.e. use of the kitchen) fall under the category *"other businesses that may be very sensitive to noise"*, I refer to AS2107 for guidance regarding suitable noise criteria. The following table are extracts of recommended design sound levels for different areas of occupancy in buildings from which I have selected the relevant categories being art galleries and kitchens in hotels. I have not made a distinction between the private nature of the art gallery use in the subject building and the public nature of the art gallery category in AS2107.

Table 4: Recommended design sound levels for different areas of occupancy in buildings

Type of occupancy/ activity	Recommended design sound level, L_{Aeq}, dB(A)		Recommended reverberation time (T),s
	Satisfactory	Maximum	
6 PUBLIC BUILDINGS			
Art galleries	40	45	See Note 3
7 RESIDENTIAL BUILDINGS			
Hotels and motels -			
Kitchen, laundry and maintenance areas	45	55	-

NOTES:

* See Appendix A of AS2017:2000

1. The recommended design sound levels are for a fully fitted out and completed building. Attention is drawn to the additive noise effect of many machines within the same area and adjacent areas. Allowance for the total number and type of noise sources should therefore be made in the selection of equipment and in the design of building spaces. A building owner or developer may consider an allowance of 3-5 dB(A) to be appropriate.
2. Recommended reverberation time is 10 percent to 20 percent higher than Curve 1 of Appendix A.
3. Reverberation time should be minimized as far as practicable for noise control
4. Certain teaching spaces, including those intended for students with learning difficulties and students with English as a second language, should have reverberation times at the lower end of the specified range.
5. Specialist advice should be sought for these spaces.
6. A very wide range of noise levels can occur in the occupied state in spaces housing manufacturing processes, and the levels are primarily subject to control as part of a noise management program (see AS/NZS 1269.2). The possibilities for segregating very noisy processes from quieter ones by partitioning vary between particular industries and plants. For reasons such as these, it is difficult to make generalized recommendations for desirable, or even maximum, design levels for the unoccupied state, but one guiding principle may still be observed - when the activity in one area of a manufacturing plant is halted, it is desirable that the local level should if possible drop to 70 dB(A) or lower to permit speech communication without undue effort.
7. In situations where traffic noise levels may vary widely over a 24-hour period, measurements to assess compliance with this Standard should be taken at the relevant time and for an appropriate measurement period according to the area of occupancy or activity in

Type of occupancy/ activity	Recommended design sound level, L_{Aeq}, dB(A)		Recommended reverberation time (T),s
	Satisfactory	Maximum	

the building. Where traffic noise fluctuates rapidly with the passage of individual vehicles, the community reaction may not correlate well with the equivalent continuous noise level as measured.

8. The overall sound pressure level in dB(A) should conform to the recommended design sound level given in Table 1. In these spaces, a balanced sound pressure level across the full frequency range is essential. These spaces should therefore be evaluated in octave bands across the full frequency spectrum. The recommended maximum sound pressure levels for the individual octave bands corresponding to the overall dB(A) value are given in Appendix C.

9. In spaces in which high quality sound recordings are to be made, the levels set for low frequency octave bands should not be exceeded (see Appendix C). Subsequent replay of the recordings may cause an amplification of the ambient sound resulting in an overemphasis of its low-frequency components. Specialist advice should always be sought when these spaces are being designed. In some circumstances, for purposes of very high quality recording, lower levels than those specified in Table 1 may be required.

45. From Table 3 in the previous section, the noise level in the gallery/dining space of Simmer on the Bay is about 47LAeq which marginally exceeds the maximum level recommended in Table 4 above. I therefore recommend a management construction noise level of (47+5=) 52LAeq for the gallery/dining space on the basis that construction noise should not overly intrude above the existing ambient noise level.

46. The LAeq noise level in the kitchen was influenced by staff talking. AS2107 requires that the noise measurement be taken without human activity noise. As the predominant background noise in the kitchen was the refrigeration equipment, I estimate a level of 62LAeq for the kitchen without staff present. This exceeds the maximum level recommended in Table 4 above and I therefore recommend a management construction noise level of (62+5=) 67LAeq for the kitchen space on the same basis as in the previous paragraph.

47. As the café is an outdoor area, the recommended sound levels in AS2107 would not be applicable as they are intended for indoor spaces only. I therefore adopt the criteria used for residential receivers which is *"RBL+10dB"* for this outdoor space.

48. From Table 4 above, the LA90(15min) (taken to be the RBL) at the northern entrance is 57dB(A) and the appropriate management construction noise level is therefore (57+10=) 67LAeq.

49. The following table therefore summarises the applicable noise management levels for the Simmer on the Bay premises:

Table 5: Construction noise management levels for the premises "Simmer on the Bay"

Assessment Location	Indoors/outdoors	LAeq(15min)
Gallery space	Indoors	52
Kitchen	Indoors	67
Café	Outdoors	67

6.2 Applicable vibration criteria

50. Vibration disturbance from piling operations contemplated for the Proposal is a potential issue.

51. Assessment of disturbance from vibration on human occupants of buildings is made in accordance with the NSW DECC *'Assessing Vibration; a technical guideline'* (DECC, 2006). Sources of vibration are defined as either 'Continuous', 'Impulsive' or 'Intermittent'. In the case of piling operations, these are defined in the guideline as 'Intermittent' and the following vibration criteria apply:

Table 6: Acceptable vibration dose values for intermittent vibration ($m/s^{1.75}$)

Location	Daytime[1]		Night-time[1]	
	Preferred value	Maximum value	Preferred value	Maximum value
Critical areas[2]	0 10	0.20	0 10	0.20
Residences	0.20	0.40	0 13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Notes:
1. Daytime is 7:00am to 10:00pm and night-time is 10:00pm to 7:00am
2. Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous of impulsive criteria for critical areas.

Source: BS 6472-1992

52. By way of explanation, the *"vibration dose values"* or VDV account for both the magnitude of vibration and the number of vibration occurrences.

53. Activities should be designed to meet the preferred values where an area is not already exposed to vibration. Where all feasible and reasonable measures have been applied, values up to the maximum value may be used if they can be justified. For values beyond the maximum value, the operator should negotiate directly with the affected community.

54. As there are no specific categories for art gallery use, café use or catering service use, I shall adopt the third row category in this table *"Offices, schools, educational institutes and places of worship"* as being the most relevant.

7 Predicted construction noise levels and assessment of impact

55. There is no information provided in the Proposal documents as to the type or numbers of construction equipment to be deployed on the subject site and therefore a generic assessment must be made in order to estimate noise levels.

56. I have used the sound levels document in *British Standard BS 5228-1-2009 plus A1-2014 Noise And Vibration Control On Construction Sites* for the purpose of estimating construction noise levels taking into consideration the information provided in the architectural drawings, the Heritage Report, the MBM Report and the noise sources identified in paragraph 31 above.

57. I have assumed three construction scenarios as depicted in the following table – Site Preparation, Piling and Superstructure Works. I have firstly ignored activities which might occur inside the pier and wharf. I have assumed the numbers and type of equipment for each stage depicted in the table based on my understanding of what might be required to construct the Proposal. These assumptions are based on my observations of equipment used on other construction sites. A builder would be better qualified to make an assessment of numbers and type of equipment.

58. Columns 1 and 2 "Table" and "Ref No" are a reference to the data tables in BS 5228. Columns 3-5 describe the equipment. Column 6 is the noise level at 10m. On the assumption that the acoustic centre of the external works (particularly the Waterfront Square) is 30m from the Simmer on the Bay façade then columns 7-8, 9-10 and 11-12 show the numbers of equipment by type and the respective sound levels at the northern façade of Simmer on the Bay.

59. The total cumulative noise level at the northern façade of Simmer on the Bay is shown in the last row.

60. Note that the equipment selection is conceptual. If there is a criticism, for example, that there will be no dozers used on site, then that item of equipment would be indicative of another similar item of equipment.

Table 7 Predicted construction noise levels at Simmer on the Bay

1	2	3	4	5	6	7	8	9	10	11	12
						Site Preparation		Piling		Superstructure Works	
Table	Ref no	Equipment	Power rating, kW	Equipment size, weight (mass), capacity	LAeq,T dB at 10 m	No	LAeq,T Receiver	No	LAeq,T Receiver	No	LAeq,T Receiver
C.2	13	Dozer	82	11t	78	2	71	2	71	2	71
C.2	32	Articulated dump truck	187	23t	74	2	67	2	67	2	67
C.3	2	Hydraulic hammer rig	186	4t hammer	87			1	77		
C.3	28	Tracked mobile crane	184	110t	67	1	57	1	57	1	57
C.3	31	Hand-held welder			73			2	66	1	63
C.3	33	Generator for welding	6	508kg	57			2	50	1	47
C.4	18	Concrete mixer truck (discharing)			75					1	65
C.4	29	Truck mounted concrete pump + boom arm		26t	80					1	70
C.4	43	Wheeled mobile crane	275	35t	70	1	60	1	60	1	60
C.4	67	Mini tracked excavator		5t	74	1	64	1	64	1	64
C.4	73	Hand-held circular saw (cutting paving slabs/tiles)	1.5	7.6kg/235mm diameter	84					4	80
C.4	76	Diesel generator (hand tools, lighting)	6 5		61	4	57			4	57
C.4	93	Angle grinder (grinding steel)	2.3	4.7kg	80					1	70
C.4	95	Handheld cordless nail gun		15 to 50mm nails	73					1	63
					Total Receiver LAeq,T		**74**		**79**		**82**

61. The "Total Receiver LAeq,T" shown in the last row is the external noise level at the northern façade of the Simmer on the Bay premises.

62. The noise level inside the premises can be estimated by adopting a façade noise reduction. In respect of the kitchen with open doors and windows, the façade noise reduction would be approximately 10dB(A) which is a common value used for open windows. In respect of the gallery space, as previously stated, a noise reduction of 22dB(A) was measured for traffic and this may also be adopted in my opinion for construction noise.

63. The predicted external and internal construction noise levels may then be compared with the noise management levels determined in the previous section. The following table shows the predicted noise levels and assessment and compliance with the goals.

Table 8: Assessment of construction noise impact at the premises "Simmer on the Bay"

Assessment Location	Indoors/ outdoors	Outside LAeq(15min)	Façade Noise Reduction dB	Predicted Internal LAeq(15min)	Construction Noise Management Level LAeq(15min)	Exceedence dB
Gallery/dining space	Indoors	74-82	22	52-60	52	0-8
Kitchen	Indoors	74-82	10	64-72	67	0-5
Café	Outdoors	74-82	-	-	67	7-15

64. This table shows there are significant exceedences of the construction noise management level for all assessment locations which require mitigation.

65. In respect of the Kitchen space, the calculation does not take into account any passing construction vehicles in the Pier 3 access road. Those vehicles would be passing within only a few metres of the open door on that facade.

8 Predicted construction vibration levels and assessment of impact

66. Because of the wide variety of pile types and driving methods it is not possible, without further information from the proponent, to estimate with any certainty the vibration levels expected from the proposed piling works.

9 Noise and vibration mitigation measures

67. A reasonable acoustician would have recommended, in the circumstances, a list of work practices to mitigate any predicted construction noise levels in exceedance of the noise management levels based on best practice techniques. This would equally apply to the management of adverse vibration impacts.

68. For example, Section 6 of the ICNG discusses various reasonable and feasible measures including:

    i) reduce the line-of-sight noise transmission using temporary barriers.

    ii) temporary noise barriers can be constructed from hoarding (plywood boards, panels of steel sheeting or compressed fibre cement board) with no gaps between the panels at the site boundary. Stockpiles, shipping containers and site office transportables can be effective barriers. Erect temporary noise barriers before work commences to reduce noise from works as soon as possible.

    iii) provide acoustical treatment for the kitchen, for example, acoustically sealed doors and windows and install air-conditioning to enable the doors and windows to be kept closed.

    iv) using a lower noise and vibration generating form of piling, such as bored or vibratory piling instead of impact piling.

    v) limiting noisy activities – piling and demolishing – to one or two hours in a day to provide respite.

    vi) selecting low noise equipment for the site.

    vii) liaising with stakeholders and informing them when noisy work will occur and what is being done to minimise the noise.

    viii) using smart reversing alarms rather than beeping annoying alternatives.

    ix) use alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric driven units.

    x) locate electrical generators away from noise sensitive receivers and/or use noise barriers.

    xi) examine and specify different types of machines that perform the same function and compare the noise level data.

    xii) select the least noisy machine for the job, for example, rubber wheeled tractors can be less noisy than steel tracked tractors.

    xiii) pneumatic equipment is traditionally a problem – select super-silenced compressors, silenced jackhammers and damped bits where possible.

    xiv) reduce throttle setting and turn off equipment when not being used.

    xv) reducing noise from metal chutes and bins by placing damping material in the bin.

xvi) regularly inspect and maintain equipment to ensure it is in good working order. Also check the condition of mufflers.

xvii) place as much distance as possible between the plant or equipment and sensitive receivers.

xviii) restrict areas in which mobile plant can operate so that it is away from sensitive receivers.

xix) schedule site vehicle entrances away from sensitive land uses.

xx) carry out noisy fabrication work at another site (for example, within enclosed factory premises) and then transport to site.

69. Using the above list of feasible practices, the proponent should be able to identify what work practices are reasonable by comparing the costs of the work practices against the overall project costs and by taking into account the views of the affected sensitive receiver.

10 Conclusion

70. I am briefed to provide an opinion about the likely noise and vibration impacts on the premises used by Bay Simmer Investments Pty Ltd, the **Applicant** in these proceedings due to the construction of a new arts precinct at Walsh Bay involving modifications to Pier 2/3 and Wharf 4/5 and the construction of a new Waterfront Square in close proximity to the Applicant's premises.

71. From the information supplied in the documents supporting the proposal, I am able to prepare a concept plan of construction equipment for the works and to calculate noise levels at the Applicant's premises. However, I am unable to do the same for vibration caused by the proposed piling works because of the wide range of piling equipment and processes that are available. More detailed information would need to be sought from the proponent.

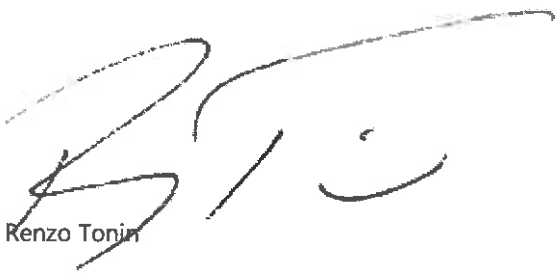
72. From the results of attended noise measurements both inside and outside the Applicant's premises I am able to derive appropriate noise management levels for the construction works and compare these to the predicted noise levels.

73. I conclude on the basis of my assumptions that there are likely to be significant noise impacts at the Applicant's premises which require reasonable and feasible means of mitigation.

74. A reasonable acoustician would have recommended, in the circumstances, a list of work practices to mitigate any predicted construction noise levels in exceedance of the noise management levels based on best practice techniques. This would equally apply to the management of adverse vibration impacts.

75. The EPA in its correspondence to the proponent expressed its concern about high noise and vibration levels which may arise from the proposed construction. I conclude those concerns are well founded.

Signed



Renzo Tonin

Date 2 December 2015

APPENDIX A Curriculum vitae Renzo Tonin

RENZO TONIN & ASSOCIATES
inspired to achieve

Curriculum Vitae

Renzo Tonin

Managing Director

Qualifications

- Ph.D. (Mech Eng), B.Sc (Hons.) University of Adelaide
- Fellow Australian Acoustical Society
- Fellow Engineers Australia
- Member Acoustical Society of America
- NPER, RPEQ
- NATA Accredited Signatory

Appointments

- Senior Honorary Research Associate - Woolcock Institute of Medical Research
- Standards Committee AV-002 Acoustics – Instrumentation and Measurement Techniques.

Awards

- Australian Acoustical Society Award for Excellence in Acoustics 1988 . "New Studios for Radio 2EA"
- Australian Acoustical Society Award for Excellence in Acoustics 1992. "Victoria Barracks 2nd Military District Band Practice Facility

Key Skills and Competencies

Dr Tonin's belief that high technology acoustics and dynamics engineering should form part of every day consulting has found acceptance with many clients. This is reflected in a strong company growth rate from private practice in November 1982 to one of the largest consulting companies specialising in acoustics engineering today.

His sponsored studies encompass such diverse activities as radio and TV studios, commercial buildings, ships, motor vehicles, trains, industrial complexes, power stations, product development, material handling plant, machine health monitoring, coal washeries, public buildings and auditoria.

His special interest is in the use of computer technology to solve problems in the fields of acoustics and dynamics.

He is a contributing author to the book "Environmental Modeling" which is a publication designed to bring together current expertise on modeling of the environment using computer based techniques.

His doctorial thesis addressed the use of laser 3D holography for the study of vibration. A distinguished international journal honored his work in this field by presenting one of his papers as a featured article.

His sponsored studies include the following; Industrial noise, construction noise & vibration, occupational noise, structural vibration, acoustic research & development, architectural acoustics, building mechanical services and expert representation in legal cases.

Relevant Experience

ROADS AND MOTORWAYS

M5 and M5 East EIS, M4 motorway, Silverwater Road Extension, Princes Highway - Oak Flats to Dunmore EIS, Tomerong Bypass EIS, F2 Castlereagh Freeway, Phillip Parkway EIS, Liverpool to Hornsby Highway Strategy Study, Elizabeth Drive Upgrade, Western Sydney Orbital and Badgery's Creek Highway, M2 Motorway Noise Barriers, Albury Wodonga National Highway, M4 Western Motorway Via-Duct, Church Street to James Ruse Drive, Granville.

RAIL INFRASTRUCTURE

Epping to Chatswood Rail Line (ECRL); Very Fast Train (VFT); Perisher SkiTube; Tangara double-deck train acoustics; assessment and design of noise and vibration isolation systems of multiple suburban and inner city residential and commercial developments alongside or above railway lines and railway tunnels.

South-West Rail Link, SWRL Glenfield to Leppington Rail Line, GLRL (D&C);

Southern Sydney Freight Line ONVMP (Peer Review); Epping to Chatswood Rail Line, ECRL (Design Review); Very Fast Train (VFT); Perisher SkiTube;.

RAIL CORRIDOR DEVELOPMENTS

Assessment and design of multiple suburban and inner city residential and commercial developments alongside or above railway lines and railway tunnels

RAIL ROLLING STOCK

Tangara double-deck train acoustics.

PUBLIC HEARINGS AND INQUIRIES

Possum Brush Quarry Inquiry, Mt Arthur South Inquiry, Rix's Creek Inquiry, F2 Castlereagh Freeway Inquiry, Bulga Mine Inquiry, Mt Flora Quarry Hearing, Cleary Bros Sand Mine Hearing.

WIND FARMS

Taralga Wind Farm NSW, Toora Wind Farm VIC, Winchelsea Wind Farm VIC, Glen Innes Wind Farm NSW, Gullen Range Wind Farm NSW, Cullerin Range Wind Farm NSW, Capital Wind Farm NSW, Woodlawn Wind Farm NSW, Crudine Ridge Wind Farm NSW.

GOVERNMENT BUILDINGS

Sydney Entertainment Centre sound reinforcement system, the Glebe Remand Centre floating floor project, Applied Arts & Sciences Stage II expansion, Geological & Mining Museum, the Mint and Barracks building refurbishment, Sydney Football Stadium and the Darling Harbour Development.

HOTELS

Observatory Hotel, Sydney Hilton, Sydney Regent, Ritz/Carlton, Sheraton Hyde park, Country Comfort Central, World Square, Hyde Park Plaza, Sheraton Hobart, Campbell St Hotel, Novotel Darling Harbour, Bullecourt place, La Galleria Kings Cross, Bayswater Hotel, Park Hyatt, Parramatta Hotel, Sheraton Airport Central, Chatswood Connection.

COMMERCIAL TOWERS

QV1 development Perth, Robt Jones Tower Auckland NZ, 135 King St, Australia Square refurbishment, Landmark, 545 Kent St, Metroplaza North Sydney, Airport Central Commercial, Chatswood Connection, Chatswood Interchange, 45 Clarence St.

APARTMENT/RESIDENTIAL

Raleigh Park, Quay West, Frenchs Forest, Port Jackson Tower, HighGate Kent St, Northborne Ave Canberra, Crown Street Apartments, Crown Gardens, Villa Development, 19-21 George St North Strathfield, Mark Foys Warehouse Apartments, Frenchs Forest Medium Density, Linda St Hornsby, Camden Retirement Village, The Elan, 37 Glen St Milsons Point, Hawthornden Estate, Rockwall Apartments, Pavilion On The Harbour.

SOUND SYSTEM DESIGN

Sydney Entertainment Centre, Darling Harbour Convention Centre and Exhibition Halls, Darling Harbour Park Sound System, Baulkham Hills Entertainment Centre, Sydney Sports Stadium, Hailstrom Park Sports Complex, Homebush Sports Centre, NSW.

ROTATING MACHINERY VIBRATION

Electricity Commission of NSW - Liddell Generating Station: Unit 2 multi-plane balance, Electricity Generating Authority - Investigation of high vibration levels of both Boiler Feed Pump and Turbine, Electricity Generating Authority - Investigation of cause of shaft bow and severe bearing damage in vertical cooling water pumps ,ICI Olefines Plant – Sydney, APCL - Kandos NSW, CIG, Shell Clyde Refinery, Alcan Kurri Kurri, Water Board.

STRUCTURAL DYNAMICS

Munmorah Power Station – High density modal analysis of generator casing to locate source of excessive high frequency casing vibration, Hail Creek Coal Preparation Plant – FEA analysis of structural vibration in 7 storey industrial structure with respect to human vibration exposure and structural damage criteria, Vales Point Generating Station: Unit 3 fatigue investigation, Snowy Mountains Hydro-Electric Authority - Murray 2 Power Station - Pipeline vibration investigation, Electricity Generating Authority – Condenser tube vibration analysis, Electricity Generating Authority – Boiler feed pump booster low frequency vibration analysis, Gas Supply Authority – Pipework vibration analysis

Professional History

- 1982 - Director and Principal, Renzo Tonin & Associates Pty Ltd
- 1979-1982 - Associate Director and Sydney Office Manager, Vipac & Partners Pty Ltd
- 1976-1978 - Post graduate studies, University of Adelaide Mechanical Engineering Department

Books

- Environmental Modeling - Vol 1. Chapter 7. Environmental Noise Modeling. P Zannetti ed. Computational Mechanics Publications. 1993.

Publications

- Time-Averaged Holography For The Study of Three-Dimensional Vibrations. Journal of Sound and Vibration (1977) 52 (3), 315-323.
- General Theory of Time-Averaged Holography for the Study of Three- Dimensional Vibrations at a Single Frequency. Journal of the Optical Society of America (1978) 68 (7), 924-931.
- Analysis of 3-D Vibrations from Time-Averaged Holograms. Applied Optics (1978) 17 (23), 3713-3721. (Featured Article).
- Free Vibration of Circular Cylinders of Variable Thickness. Journal of Sound and Vibration (1979) 62 (2), 165-180.
- Determination of Ambient Noise Levels in the Presence of a Disturbing Noise Source Using a Directional Microphone. 10th International Congress on Acoustics (1980).

- Acoustic Requirements to Curb Rain Noise from Metal Deck Roofs. Bulletin Acoustics Australia (1985) 13 (1), 16.
- Estimating Noise Levels from Petrochemical Plants, Mines and Industrial Complexes. Acoustics Australia (1985) 13 (2), 59-67.
- Application of Modelling Techniques to Resolving a Dynamics Problem in a Building Structure. The First Australasian MSC Users Conference, June 1987.
- Vibration Isolation of Impacts in High-Rise Structures. The Second Australasian MSC Users Conference, Nov 1988.
- Future Noise and Vibration Control Methods for Building Services. 2nd CIBSE Australian Conference, Nov 26-28, 1991.
- Acoustic and Vibration Insulation in Buildings. Building Science Forum of Australia Seminar. 'Insulation, Thermal, Acoustic'. Aug 25, 1993.
- ENM Windows - Environmental Noise Model. Euro-noise '95 Software for Noise Control Conference. Lyon, France 21-23 March 1995.
- Modelling Virtual Noise for the Real Environment. Noise & Vibration Worldwide. June 1995. pp 10-12.
- A Method of Strategic Traffic Noise Impact Analysis. Proceedings of Internoise 96, August 1996, Liverpool UK, pp 2395-2400.
- ENM Windows – Environmental Noise Model. Air & Waste Management Association's 90th Annual Meeting & Exhibition, Toronto, Ontario, Canada, 1997.
- Validation of Environmental Noise Model (ENM Windows). Acoustics Australia Vol 25 (1997) No 2 pp 75-79.
- Acoustical Research in Australia. Acoustics Australia Vol 25 (1997) No 2 pp 49-63 (contributing editor).
- Heavy Vehicle Noise Reduction Study. Fifth International Congress on Sound and Vibration, Adelaide, South Australia, Dec, 1997, P Karantonis, N Ishac and R Tonin.
- Comparison of Occupational Noise Exposure Results Acquired from an In-Ear Probe Tube and an Artificial Ear, for Users of Tele-Communication Headsets. Seventh International Congress on Noise as Public Health Problem, 'Noise Effects '98', Sydney, NSW, November 1998, P Karantonis and R Tonin.
- Occupational Noise Management - Educating the Workforce. Australian Acoustical Society Conference Nov 1999. Pages 71-88. N Koolik, D Eager, R Tonin
- Sensitivity of Frequency Response to Type of Tubing, 11 AWES Workshop, Darwin 2004, A.W.Rofail, R.Tonin and D.Hanafi
- The BCA 2004 – A Plan For The Future. (Invited Paper) Australian Acoustical Society, Acoustics 2004 Proceedings, November 2004.
- What is offensive noise? A case study in NSW. Acoustics Australia 38(1) 2010
- Offensive Noise in Planning & Enforcement: Is there a Difference? Environmental Law News (55) 2010
- Sources of Wind Turbine Noise and Sound Propagation. Acoustics Australia 40(1) 2012
- RONDA - CPX Trailer Initial Test Results. R Tonin, A Szabo. Inter-noise 2014 Melbourne Australia
- Response to Simulated Wind Farm Infrasound Including Effect of Expectation. Wind Industry Forum 2015. Renzo Tonin and James Brett.
- Response to Simulated Wind Farm Infrasound Including Effect of Expectation. Sixth International Meeting on Wind Turbine Noise Glasgow, Scotland, 20th – 23rd April 2015. Renzo Tonin and James Brett.
- RONDA open frame CPX trailer - results of first trials. R Tonin, M Chung, M Gange. Inter-noise 2015 San Francisco US

APPENDIX B Letter of instructions

CLINCH
LONG
LETHERBARROW
LAWYERS

Our Ref: PRC:PJL:131924

2 October 2015

Dr Renzo Tonin
Renzo Tonin & Associates
Level 1
418A Elizabeth Street
SURRY HILLS NSW 2010

BY COURIER

Dear Dr Tonin

BAY SIMMER INVESTMENTS PTY LTD V ARTS NSW & ORS

We act for Bay Simmer Investments Pty Ltd (**the applicant**) which, which is challenging the approval of the Walsh Bay Arts Precinct (**the proposal**) in judicial review proceedings in the Land and Environment Court. The proponent is Arts NSW, a division of the NSW Department of Justice.

The applicant's sole ground of challenge is that the delegate of the Minister for Planning, when approving the proposal, failed to take into consideration the likely impact of noise and vibration, dust and traffic arising from the construction (as distinct from the operation) of the proposal.

The Department of Planning maintained throughout the assessment process that because the applicant was only seeking concept approval, it was either not possible or not appropriate to take into account the impacts of construction. The applicant will contend that this view was legally incorrect.

We are writing to inquire whether you would be able to provide expert evidence to support the applicant's case in those proceedings.

We have not yet approached the Court for directions for the filing of evidence. Our decision to do so will depend on your preliminary views on the feasibility of providing such evidence.

Accordingly, we seek your preliminary views on the following questions:

1. Is it possible to estimate the construction noise and vibration impacts likely to be caused by the Proposal, based on the information contained in the development application documents listed below?

2. If the answer to Question 1 is "no", what further information would be required to enable estimate to be made of the construction noise and vibration impacts likely to be caused by the Proposal?

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3. If the answer to Question 2 is "yes", what are the construction noise and vibration impacts likely to be caused by the Proposal on:

   (a) The function venue operated by the Applicant at Shore 2/3 Walsh Bay; and

   (b) Other sensitive noise receivers in the area?

In responding to the above questions, please include consideration of the noise of any pile driving required for construction of the proposed Waterfront Square over Sydney Harbor.

We **attach** the following documents which may be required to enable you to form a preliminary view:

1. The Class 4 Summons in the Land and Environment Court.
2. A plan showing the location of the applicant's premises relative to the proposal.
3. Confidential submission made by Brigid Kennedy, the owner of Simmer on the Bay, 15 August 2015.
4. Submission by the Environmental Protection Authority.
5. Environmental Impact Statement - Walsh Bay Arts Precinct – June 2014, including the following appendices:

Appendix 1	Director-General's Requirements
Appendix 2	Concept Design Report - For Information
Appendix 4	Concept Design Drawings - For Approval
Appendix 8	BCA Assessment Report
Appendix 12	Heritage Impact Assessment
Appendix 14	Noise and Vibration Assessment.

6. Further submission by Brigid Kennedy, 2 March 2015.
7. The Secretary's Environmental Assessment Report, May 2015.
8. Development Consent, 21 May 2014.
9. The Expert Witness Code of Conduct in Schedule 7 of the Uniform Civil Procedure Rules 2005.

Please contact the writer to discuss your fees prior to commencing work.

The applicant is seeking your preliminary view by the **first week of November**, in order to decide whether or not to make an application for directions for expert evidence in this matter.

Yours faithfully
CLINCH LONG LETHERBARROW

Executive Lawyer: Peter Clinch
Email: pclinch@cll.net.au

APPENDIX C Glossary of terminology

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

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dBThe sound of a rock band 115dBLimit of sound permitted in industry 120dBDeafening
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.

L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.