

**Before an Independent Commissioner of Wellington City Council**

**Under the** Resource Management Act 1991

**In the matter** of a resource consent application for the Future Accomodation Strategy to develop the western portion of the site at 1 Molesworth Street, Wellington

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**EVIDENCE OF JEREMY WILLIAM TREVATHAN ON BEHALF OF THE APPLICANT IN  
SUPPORT OF APPLICATION FOR RESOURCE CONSENT**

**NOISE**

**15 May 2023**

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## **1. INTRODUCTION**

**1.1** My full name is Jeremy William Trevathan. I am the Principal Acoustic Engineer and Managing Director at Acoustic Engineering Services Limited (AES).

**1.2** I am authorised by the Applicant, Parliamentary Service, on behalf of His Majesty the King, to give this statement of evidence on its behalf.

## **2. QUALIFICATIONS AND EXPERIENCE**

**2.1** I hold degrees of Bachelor of Engineering with Honours and Doctor of Philosophy in Mechanical Engineering (Acoustics) from the University of Canterbury. I am an Associate of the New Zealand Planning Institute, and a Member of the Acoustical Society of New Zealand (ASNZ). I am the AES Member Representative for the Association of Australasian Acoustical Consultants (AAAC), a judge for the Association of Consulting Engineers of New Zealand (ACE NZ) Innovate Awards, and a member of the MBIE College of Assessors. I was a member of the ASNZ working group advising the Ministry for the Environment (MfE) regarding the National Planning Standards (2019).

**2.2** I have more than seventeen years' experience in the field of acoustic engineering consultancy and have been involved with a large number of environmental noise assessment projects throughout New Zealand. I have previously presented evidence at Council and Environment Court Hearings, and before Boards of Inquiry. I have provided expert evidence on behalf of applicants, submitters and as a peer reviewer for Councils.

**2.3** I have been involved in a large number of situations where potential noise sources are similar to those anticipated in this case.

### **3. CODE OF CONDUCT**

**3.1** I have read the Code of Conduct for Expert Witnesses outlined in the Environment Court's Practice Note (2023) (**Code**) and have complied with it in preparing this evidence. I also agree to follow the Code when presenting evidence to the Independent Hearing Commissioner. I confirm that the issues addressed in this brief of evidence are within my area of expertise, except where I state that I rely upon the evidence of other expert witnesses. I also confirm that I have not omitted to consider material facts known to me that might alter or detract from my opinions.

### **4. SCOPE OF EVIDENCE**

**4.1** My company has been engaged by Parliamentary Service to provide acoustic advice for the Future Accommodation Strategy development since 2017. Our scope originally related to the acoustic design of the buildings themselves. We also prepared a brief letter which was included with the Resource Consent Application (AES file reference: AC17221 – 03 – R6, dated 5 September 2022) discussing noise from mechanical plant. I reviewed and oversaw the issue of that document, and it was included as Appendix 17 of the Resource Consent Application.

**4.2** My evidence will cover the following matters:

- (a) Construction Noise and Vibration;
- (b) Operational Noise;
- (c) comments on the submissions;
- (d) comments on the Proposed Conditions; and
- (e) conclusions.

## **5. SUMMARY OF EVIDENCE**

- 5.1** I agree with the Council's acoustic advisor, Ms Cocking, that the temporary negative effects of construction can be adequately mitigated through the drafting and implementation of a Construction Noise & Vibration Management Plan (**CNVMP**).
- 5.2** I expect that through the implementation of a CNVMP the majority of the construction activity can be managed to ensure that the recommended noise limits in NZS 6803:1999 are met. However, as with many constrained urban sites, there are some aspects of the construction where it may not be practical to always comply, even when the best practicable options have been identified and applied.
- 5.3** In this case, while the piling methodology has not been finalised, it likely that noise exceeding the guideline levels outlined in NZS6803:1999 will at times be received at the Bowen State Building (including Huxley's restaurant) and the Charles Fergusson Tower during some aspects of piling. However, I expect the effects of this noise can be adequately mitigated through managing the times when this work is undertaken, along with consultation with the receivers, pre-notification and open communication – as is required via the Council's proposed condition 34 process. Much lower noise levels will be received at the more distant residential receivers. I therefore consider construction noise will be adequately managed.
- 5.4** Ms Cocking has recommended a number of conditions to control operational noise from the development. I generally agree with her comments and suggested conditions (subject to some minor amendments), and I expect that the development will be able to comply with the District Plan noise limits, and that this will ensure that effects associated with operational noise are minimal.

## 6. CONSTRUCTION NOISE & VIBRATION

- 6.1** Wellington City Council Environmental Noise / Compliance Officer Ms Cocking has prepared a helpful document titled *Technical Advisor Review Noise – 1 Molesworth Street Pipitea Wellington*, dated 24 May 2022. In this document, Ms Cocking has concluded that the temporary negative effects of construction can be avoided through the drafting and implementation of a Construction Noise & Vibration Management Plan (**CNVMP**). Ms Cocking has proposed Conditions to this effect, recommending that a detailed CNVMP is developed to ensure noise and vibration remain reasonable at all times, with the control measures in line with section 16 Best Practicable Option (**BPO**) requirements within the RMA. I agree with this approach, which is in line with current good practice.
- 6.2** Ms Cocking has also recommended a Condition which requires all construction activities to be managed and controlled so that noise levels do not exceed the noise limits outlined in NZS 6803:1999 Acoustics – Construction Noise. For daytime construction activity, the key noise limit is 70 dB LAeq measured at 1 metre from the façade of both commercial buildings, and dwellings.
- 6.3** I expect that through the implementation of a CNVMP the majority of the construction activity can be managed to ensure that the recommended noise limits in NZS 6803:1999 are met. However, as with many constrained urban sites, there are some exceptions where it may not be practical to always comply with these noise limits, even when the best practicable options have been identified and applied. The constrained nature of the site and proximity of sensitive receivers is not unusual in Wellington’s Central Area – for example the Indian High Commission development of Pipitea Street shared a common boundary with residential units.

- 6.4** NZS 6803:1999 recognizes this, and the approach is that discretion is able to be applied to determine whether the noise levels are appropriate if the Best Practicable Option has been employed, even when they exceed the guideline limits. A detailed management strategy is appropriate in these circumstances. This approach is in line with the discussion in Ms Cocking's assessment regarding the importance of an appropriately developed CNVMP, as set out in the Council's proposed condition 34.

### **Piling**

- 6.5** While the piling methodology is not yet finalised, at this stage I understand that in a worst-case situation sheet piling will be required for the Museum Street Building, and secant piling will be required for the Ballantrae Place Building. Sheet piles are vibrated into the ground, and this creates noise and vibration which is typically not practicable to reduce via physical mitigation. The pile casings for secant piling may be inserted using a similar methodology. I understand that Continuous Flight Auger (**CFA**) piling is also being considered as an option. I would expect CFA piling to generate lower levels of noise and vibration than the sheet piling (or the driven casings for secant piling).
- 6.6** While it will depend on the specific equipment used as well as the ground conditions, based on my experience noise levels of above 70 dB LAeq could be experienced within:
- (a) 50 – 100 metres of sheet piling activity and secant piling with driven casings
  - (b) 30 – 50 metres of CFA piling activity

- 6.7** Physical mitigation measures which are sometimes considered for sheet piling include solid screening, or wrapping the piling head / pile. However, typically these measures have limited effectiveness (due, for example, to the height above ground of the source for much of the time as each pile is driven) and slow the progression of the piling work – which many receivers perceive to be a worse overall outcome.
- 6.8** The effect that any periods of noise exceeding 70 dB LAeq may have will depend on a number of factors, including the level of break-in noise experienced inside the receiving building (which will depend on the building structure and design, and if windows are open or closed, for example), the internal layout, the type of activity undertaken within the receiving building, the duration of the noise emissions and at what times it occurs, and the ambient noise levels already experienced in the receiver’s location.
- 6.9** The closest buildings to the piling activity are the Bowen State Building and the Charles Fergusson Tower. Bowen State Building is 16 to 45 metres from the possible sheet piling locations, and 37 to 53 metres from the possible secant piling locations. The Charles Fergusson Tower is 62 to 99 metres from the possible sheet piling locations, and 24 to 82 metres from the possible secant piling locations. Both of these buildings have recently been constructed / redeveloped and have sealed glazed facades with some aluminum spandrels and other features, overlooking the construction activity. It would be conservative to expect these facades to reduce noise levels by 25 dB. Based on this façade reduction, if sheet or secant piling activity was occurring in the locations closest to these buildings, the piling noise would be the dominant noise within the nearest internal spaces. Speech intelligibility would begin to decrease, and occupants may start raising their voices or move closer so that intelligibility can be maintained. If CFA piling is used, the noise will still be the dominant source within the neighbouring buildings, but will be able to be spoken over more

comfortably. With either methodology, limiting the duration of exposure to noise at this level is important, along with consultation with the receivers, pre-notification and open communication as the work gets underway to mitigate the adverse effects as far as practicable. These controls will be captured by the CNVMP set out in the Council's proposed condition 34.

- 6.10** The Huxley's restaurant is located on the ground floor of the Bowen State Building, with an outdoor area to the east. This outdoor area is 11 to 39 metres from the proposed Museum Street Building sheet piling activity. The recommended noise levels outlined in NZS 6803:1999 apply at 1 metre from a building façade, to protect spaces within buildings. In this situation, due to the close proximity of the outdoor area to the potential sheet piling for the Museum Street Building, noise levels of greater than 70 dB LAeq are expected for the majority of the sheet piling work.
- 6.11** However, in this context even if noise levels slightly below 70 dB LAeq were achieved through mitigation measures within the Huxley's outdoor area, the noise would still be perceived as loud and dominant and the area is unlikely to be used. Open communication with Huxley's will therefore be key in determining how best to manage these noise effects regardless of the specific noise level – as is required via the Council's proposed condition 34 process. Potentially the times of the day or days of the week when the closest piling work is undertaken could be modified, and/or if Huxley's were agreeable, some temporary solid screening constructed around the outdoor area would reduce noise levels. The addition of seals to external doors or localized temporary façade upgrades could also potentially be used to reduce noise levels within Huxley's. I understand that preliminary discussions have commenced between the parties on these issues.
- 6.12** Sheet piling for the Museum Street Building is expected to generate noise levels of less than 70 dB LAeq at the nearest residential receivers which are



97 to 136 metres from the potential sheet piling location. Depending on the methodology used for the secant piling at the Ballantrae Place building site, there is potential for compliance to be challenging to achieve at the nearest residential locations which are approximately 50 to 110 meters from the potential secant piling locations. Compliance would be more comfortably achieved if CFA piling was used. Whether noise levels are slightly below or above 70 dB LAeq, the construction noise will be an obvious new component of the background noise within the nearest residences, however speech intelligibility will typically not be affected for conversations at a normal voice effort. Day-to-day activities are still likely to be possible with minimal modification or disruption.

- 6.13** In line with the above, I consider proposed condition 34 will adequately address any noise effects from piling. In addition, I understand that the nature of Parliament operations will require further mitigation of construction effects, in addition to those set out in the proposed conditions. Russell Allen discusses these further in his evidence, and notes that while those restrictions are practical rather than having the status of Conditions, they may provide some comfort to submitters and others with interests in the Precinct that all efforts will be made to manage construction noise effects.

### **Construction traffic**

- 6.14** It is expected that heavy vehicles and other vehicles associated with the construction will generate noise on site when arriving and departing, and when idling on site. I consider that the best approach to reducing noise effects from construction vehicles both on and off site would be through operational measures outlined within a CNVMP which include limitations on the arrival and departure times of heavy vehicles, and operational measures such as limiting idling, reversing beepers etc. These measures

should be coordinated with the Construction Traffic Plan (CTP) required under the WCC proposed Conditions 28 to 31.

### **Night-time construction**

- 6.15** While commercial receivers may actually be less noise sensitive at night, NZS6803:1999 recommends significantly lower noise limits at residential receivers during the night-time period. Therefore, if any night-time construction activity is required (such as early morning concrete pours) there is the potential that the NZS6803:1999 noise limits would be exceeded.
- 6.16** Any noisy night-time works should therefore only be undertaken if there is no other practicable option to progress the construction, and should be undertaken in accordance with specific controls developed and outlined within the CNVMP. A key measure is expected to be providing prior notice to residential neighbours of the specific expected timing and duration of any night-time works.

### **Construction vibration**

- 6.17** No vibration limits are currently proposed within the WCC Conditions of Consent; however, as outlined in proposed Condition 34, construction vibration is required to be addressed within the CNVMP. This is consistent with the Operative District Plan which does not include any numerical vibration limits. The Proposed District Plan does include vibration limits, referring to the Standard DIN 4150-3:2016 *Structural Vibration – Part 3: Effects of Vibration on Structures*. This is a standard approach in many other Districts.

**6.18** As with noise, the piling activity will generate the highest levels of vibration during the construction. Vibration during the closest portion of sheet piling to Huxley's is likely to just comply with the 5 mm/s residential limit outlined in DIN 4150, and comfortably comply with the 20 mm/s commercial buildings limit. CFA piling would produce lower vibration levels. All other construction activity will comfortably comply with the Proposed District Plan vibration limits at all receivers, including at all residential locations. As an additional layer of assurance with regard to building damage, I recommend a 'pre-condition' survey is however undertaken of the Bowen State Building and Charles Fergusson Tower.

**6.19** I do note that the DIN 4150 limits relate to possible onset of cosmetic damage to buildings, and the vibration during piling will still be readily perceptible to the occupants of the closest buildings (as people perceive vibration at levels down to in the order of 0.1 mm/s). The potential annoyance effect associated with people perceiving this vibration is best managed in tandem with the noise effect, via the CNVMP as described above.

## **7. OPERATIONAL NOISE**

**7.1** Ms Cocking has recommended a number of conditions to control operational noise from the development, and I have commented on the proposed conditions in section 9 of my evidence below. I generally agree with her comments, and I expect that the development will be able to comply with the District Plan noise limits that have been proposed to be included in the consent conditions, and that this will ensure that noise effects are minimal.

**7.2** I have commented in more detail on two key operational noise sources below.

## **Mechanical Plant**

- 7.3** The main external plant associated with the development is to be located on the Ballantrae Place Building rooftop plant deck. My team is currently working through the detailed analysis in regards to the noise emissions from this plant, and this work has suggested that a process will be required to finalize mitigation options and ensure compliance with the District Plan noise limits at the nearest locations. The Applicant is committed to ensuring this outcome.
- 7.4** WCC Proposed Condition 40 requires noise monitoring of the fixed plant prior to occupation. I consider this appropriate to demonstrate that compliance has been achieved.

## **Traffic on Ballantrae Place**

- 7.5** While traffic on roads is not included in the District Plan noise limits, vehicle movements on Ballantrae Place are expected to contribute to operational noise associated with the activity.
- 7.6** With the new development, access to the Parliamentary Precinct will largely be from Ballantrae Place, which will be used for access for parliamentary staff and most servicing and contractor vehicles.
- 7.7** As outlined in the AEE, due to the reduction in parking spaces, trip generation by vehicles parking / visiting the precinct is expected to reduce overall; however, a greater percentage of the remaining vehicle movements are expected to use the Ballantrae Place access point.

**7.8** Ballantrae Place also provides access to other sites, including the service areas for both the Charles Fergusson Tower and the Bowen State Building. The proposal could increase the daily traffic volume from an estimated 1670 vehicles per day to 1872 vehicles per day. This would be expected to increase average daily noise levels in the order of 1 to 2 dB, which is typically not a noticeable noise level change.

**7.9** In order to better understand how vehicle noise may be perceived in this case, my colleague Mr Joshua Luscombe visited the site and carried out ambient noise measurements between 0600 and 0700 hours on a Tuesday morning. I expect this to be representative of one of the quietest times when additional vehicles might travel on Ballantrae Place. During this period, traffic noise from the motorway was the dominant noise source (including a 'click-clack' from the vehicles passing over the expansion joint) and intermittent higher noise levels were recorded from a truck travelling on Ballantrae Place and from aircraft. Average noise levels ranged from 50 – 55 dB LAeq during the measurement period.

**7.10** These measurements confirm that any change in vehicle movements on Ballantrae Place would not lead to an overall perceptible change in the levels and character of vehicle noise currently experienced by residents in the area.

## **8. COMMENTS ON SUBMISSIONS**

**8.1** Five submissions were received on the Application. Of these, two submissions mentioned noise, with specific concerns as follows:

- (a) The owners & operators of Huxley's restaurant are concerned about the noise disturbance for their restaurant during construction.

(b) Mr Robertson (who I understand resides at 29 Ballantrae Place) comments on the fact that the residents of Ballantrae Place have been subjected to construction noise for several years (including periods of excessive noise and disruption to residential activities) with the development of the Bowen Campus, and they do not wish to experience this for a further period.

**8.2** I have directly discussed construction noise and vibration when received at Huxley's restaurant in the sections above.

**8.3** I have also included comment on construction noise and vibration on the residents of Ballantrae Place above. I also note that the Bowen Campus is located approximately 12 metres from the Ballantrae Place dwellings, whereas the nearest portion of the Ballantrae Place Building is approximately 45 metres away. I therefore expect that the construction noise effects from the proposed development would be significantly reduced compared to those which were associated with a large-scale building constructed only 12 metres away from a dwelling.

## **9. COMMENTS ON PROPOSED CONDITIONS**

**9.1** I have reviewed the WCC proposed Conditions of Consent. As above, generally I consider these Conditions to be appropriate for managing the potential noise emissions from the site. However, I have the following minor suggestions:

(a) **Condition 30** includes the requirements for the Construction Traffic Plan for the site. As above, I recommend that noise is included as a factor to consider when this is being developed.

- (b) **Condition 33** requires compliance with the recommended noise levels outlined in NZS6803:1999. As discussed above, this is not practical in all circumstances in this case and therefore I recommend that the wording is amended so that construction noise is required to be *'measured, assessment, managed and controlled in accordance with the requirements of NZS 6803:1999 Acoustics – Construction noise'*. This wording is copied from the Wellington City Proposed District Plan and is consistent with Conditions of Consent regularly adopted in other similar situations. Compliance with the noise effects management and mitigation principles outlined in NZS 6803 is required, as opposed to an explicit requirement to comply with the guideline decibel limits outlined in Table 2 and 3 of NZS 6803. A benefit of this approach is that noise emissions will be minimized via the CNVMP process, even where levels would have complied with the NZS 6803 guideline limits (which is for the majority of sources in this case).
- (c) **Conditions 37 and 38** outline the operative District Plan noise limits for all activity on the site apart from fixed plant. I note that the generators which will be installed on site are only to be used in emergencies, and testing will be limited to between 0800 and 1700 hours, so in line with the ODP these more lenient noise limits should also apply to the generators located within the Museum Street Building. I recommend that these Conditions are amended to note *'excluding fixed plant other than generators'* or similar.
- (d) **Condition 41** relates to noise levels from Fixed Speakers. This type of Condition is typically used for an outdoor area of a bar or restaurant where music was played through speakers. I am not

aware of external speakers proposed for this development, and therefore suggest this Condition is deleted.

**9.2** As above, I have also recommended that the Consent Holder undertakes a 'pre-condition' survey of the Bowen State Building and Charles Fergusson Tower, should those parties be agreeable.

**9.3** These amendments have been made in the marked-up copy of the conditions attached to the evidence of Mr Coop.

## **10. CONCLUSIONS**

**10.1** The temporary adverse effects of construction can be adequately mitigated through the drafting and implementation of a Construction Noise & Vibration Management Plan (**CNVMP**).

**10.2** Through the implementation of a CNVMP the majority of the construction activity can be managed to ensure that the recommended noise limits in NZS 6803:1999 are met. However, there are some aspects of the construction where it may not be practical to always comply, even when the best practicable options have been identified and applied. The NZS 6803:1999 approach recognises this, and provides for discretion to be applied in such circumstances. This is captured in the Council's proposed condition 34

**10.3** While the piling methodology has not been finalised, it likely that noise exceeding the guideline levels outlined in NZS6803:1999 will at times be received at the Bowen State Building (including Huxley's restaurant) and the Charles Fergusson Tower during some aspects of piling. I expect the effects of this noise can be adequately mitigated through managing the times when this work is undertaken, along with consultation with the receivers, pre-



notification and open communication. These matters are captured in the CNVMP. Much reduced noise levels will be received at the more distant residential receivers.

**10.4** Noise from construction traffic, and vibration generated by construction activities will also be able to be appropriately managed through the CNVMP process.

**10.5** Operational noise associated with the development will be able to comply with the District Plan noise limits, and that this will ensure that noise effects associated with operational noise are minimal.

**Dr Jeremy William Trevathan**

15 May 2023