

**ENVIRONMENT COURT OF NEW ZEALAND
WELLINGTON REGISTRY**

**I MUA I TE KOOTI TAIAO O AOTEAROA
TE WHANGANUI-A-TARA**

ENV-2023-WLG-000005

Under the Resource Management Act 1991

In the matter of the direct referral of applications for resource consent and notices of requirement under sections 87G and 198E of the Act for the Ōtaki to North of Levin Project

By Waka Kotahi NZ Transport Agency

**STATEMENT OF REBUTTAL EVIDENCE OF MICHAEL JAMES SMITH ON
BEHALF OF WAKA KOTAHI NZ TRANSPORT AGENCY**

Dated 10 October 2023

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INTRODUCTION

1. My full name is **Michael James Smith**.
2. I prepared a statement of evidence (**Evidence**) regarding noise and vibration effects of the proposed Ōtaki to North of Levin Project (**Ō2NL Project** or **Project**), dated 4 July 2023.
3. My qualifications and experience are set out in my Evidence.
4. In this rebuttal evidence I use the same defined terms as in my Evidence.
5. I repeat the confirmation given in my Evidence that I have read the 'Code of Conduct' for expert witnesses and that my evidence has been prepared in compliance with that Code.
6. This rebuttal evidence responds to points made in evidence by:
 - (a) Mrs Karen Prouse on behalf of herself, the Prouse Trust Partnership, and Mr Stephen Prouse, dated 12 September 2023;
 - (b) Ms Anna Carter, on behalf of Mr Karen and Mr Stephen Prouse, and the Prouse Trust Partnership; and
 - (c) Ms Siiri Wilkening, on behalf of Horowhenua District Council (**HDC**) and Kapiti Coast District Council (**KCDC**), dated 26 September 2023.
7. I attended expert conferencing with Ms Wilkening, Mr Jon Styles (representing Kāinga Ora) and Mr Rhys Hegley (representing James McDonnell Limited) on 27 July 2023.

RESPONSE TO PROUSE EVIDENCE

8. The following issues were raised in the evidence of Mrs Karen Prouse:
 - (a) whether additional mitigation is necessary to achieve an internal noise level of 40 dB $L_{Aeq(24h)}$; and
 - (b) that external noise levels will be high, and why noise walls were not recommended to provide additional noise mitigation to the outside spaces.
9. The evidence of Mrs Prouse includes a report by Jepsen Electronics Ltd (the **Jepsen Report**) that estimates the façade performance.

10. The following issues were raised in the evidence of Ms Anna Carter (Planning):

- (a) modelling queries regarding road geometry and traffic volumes;
- (b) inadequate consideration of the Best Practicable Option for mitigation of road-traffic noise; and
- (c) several recommended amendments to conditions.

Building layout and construction

11. While I have not visited the Prouse property and dwelling, I understand that the bedrooms of Ashleigh are all located on the upper floor. I have identified the master and guest bedrooms on an aerial photograph in Figure 1 and on a photograph of the northern elevation in Figure 2. I understand that there is an additional bedroom on the eastern side of the house, which faces away from the proposed highway.



Figure 1 Aerial photograph with bedroom locations highlighted (north to top)



Figure 2 Northern elevation

12. Based on the Jepsen report¹, I understand:
- (a) the dimensions of each room are approximately 3m wide x 3m long x 2.7m high;
 - (b) the master bedroom has a single casement window facing north glazed with laminated glass and has a small window with louvres in the east facing wall. The outer cladding is weatherboard with no cavity insulation; and
 - (c) the guest bedroom has a single casement window facing north over a small balcony that is glazed with laminated glass, and a small window with glass louvres in the west facing wall. The guest room has cavity insulation in the west wall only.

Building performance – test results

13. The Jepsen Report presents the results of noise measurement taken in “general accordance” with ISO 140-5:1998² (which has been superseded by

¹ Jepsen at Section 1

² International Organisation for Standardisation, *ISO 140-5:1998 Acoustics: Measurement of Sound Insulation in Buildings and of Building Elements. Part 5. Field Measurements of Airborne Sound Insulation of Facade Elements and Facades*, 1998.

ISO 16283-3:2016³) using the “Global Traffic” method. In this test, Mr Jepsen has undertaken simultaneous 15-minute measurements inside and outside the dwelling to infer the performance.

14. In my experience, the preferred⁴ method to measure the façade performance is to use a loudspeaker to emit a high noise level at the building. Measurements are then conducted inside the dwelling, as well as at a location 2m from the façade.
15. As this test is undertaken in a controlled environment, only short-term measurements are required, and these do not need to be undertaken at the same time. The test ensures that sufficient energy can be obtained in all relevant frequencies. In addition, a spatial average can be undertaken within the room with the external source unchanged.
16. In this test the measured outdoor sound level includes a reflection from the building façade, and therefore the reduction reported is higher than the level difference one would experience from the traffic noise levels presented in my evidence. This correction also applies when using traffic as a source⁵. It is unclear whether Mr Jepsen has applied this correction, or whether it is appropriate considering the incident sound waves are not normal to the façade.

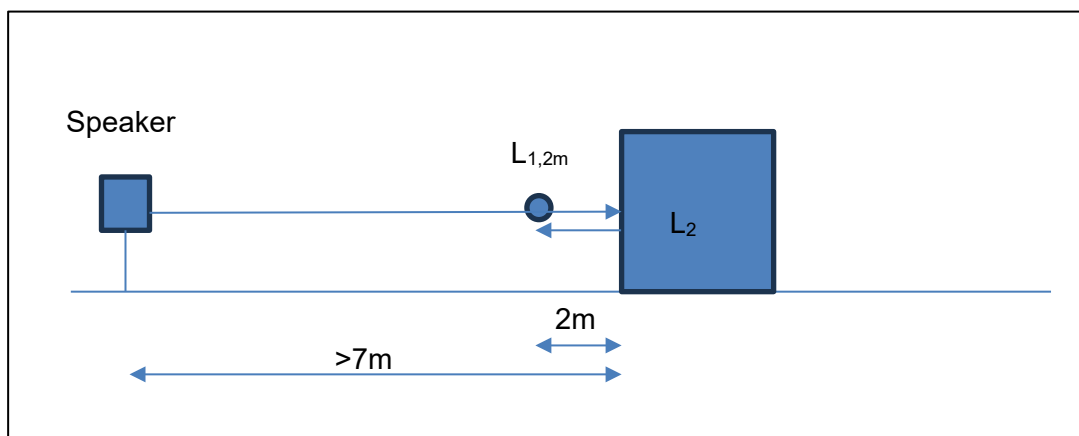


Figure 3 Test layout (global loudspeaker) with reflection shown

17. It is unclear as to the source of noise incident on the test facades in the Jepsen tests, and whether the $L_{1,2m}$ measurements include a reflection. The

³ International Organisation for Standardisation, *ISO 16283-3:2016 Acoustics - Field Measurement of Sound Insulation in Buildings and of Building Elements*, 2016.

⁴ Where the purpose of the test is to evaluate the façade performance for a noise source that is not currently present

⁵ In accordance with the standard, where the traffic source is close to the façade

background (L₉₉) outside noise level as low as 33.5 dB, which indicate that the incident noise levels is variable.

18. When using the global traffic method with individual vehicle movements as the source, a minimum of 50 events should be present in the measurement interval⁶. This number is not reported.
19. Mr Jepsen notes that “Correction background noise (in accordance with) section 5.5.3 was deemed not necessary because of absence of extraneous sound”. Background sound levels should be more than 10 dB below the internal traffic-noise level. In my opinion, it is highly unlikely that the internal noise levels do not include noise from other sources.
20. The Jepsen Report does not include any statement of uncertainties or limitations regarding the conclusions drawn. Mrs Prouse and Ms Carter have interpreted his results as being unequivocal.
21. Where it is not practicable to undertake measurements at an upper floor, it is often possible to use a ground floor room with a similar construction to infer the performance. I am unsure whether this would be appropriate in this case.
22. Given my analysis above, I agree with Ms Wilkening that the results of Mr Jepsen’s tests are inconclusive at best, and likely understate the performance of the façade. Therefore, the Jepsen Report does not alter my conclusions on the likely effects of the Project.

Building performance – expected results

23. In my experience, when a dwelling has a window ajar (100mm) for ventilation, the level reduction is largely independent of the façade performance. This is because the open windows will be the weakest path. Ms Wilkening has a similar opinion⁷.
24. The normal noise level reduction achieved through a façade with windows ajar is typically between approximately 15 to 17 dB. While there may be some variation between dwellings, I consider it unlikely that the level difference is as low as 11-13 dB as reported by Mr Jepsen.

⁶ ISO 16286-3 at 10.5

⁷ Wilkening at [24]

Modelling questions

25. Ms Carter suggests I may have understated noise levels by using a traffic volume based on a 75-percentile growth rate⁸. This is incorrect. As set out in Paragraph 203(a) of Technical Report B and paragraph 90 of my evidence, I have used a 95% population growth traffic volume, as well as a 110 km/h speed limit.
26. Furthermore, as reported in Table B.13 of Technical Report B, I conducted a sensitivity analysis to investigate the difference between a 75% and 95% model. This concluded the difference was 0.2 dB at opening (2029) and 0.4 dB in 2039.
27. Ms Carter also questions whether my modelling considers changes to the alignment between Workshop N4 and Lodgement. I can confirm that the lodgement model which includes the predicted sound levels in Appendix B4 and Plan Set 12 are based on the latest (lodgement) geometrics.

Mitigation evaluation process

28. Ms Carter does not consider that sufficient attention has been given to alternative methods for mitigating road noise in this location⁹ and concludes that the mitigation selected for this site where largely influenced by cost¹⁰. I disagree.
29. I discuss the mitigation evaluation process in paragraphs 178-181 of my evidence. As set out in paragraph 264 of my evidence, there may be scope for property boundary fencing that would further improved noise outcomes for the Prouse Homestead and the curtilage. I understand that Waka Kotahi has offered a 2.0m high boundary fence that would provide some localised benefit.
30. The effectiveness of 1.1m high concrete safety barriers in reducing noise depends on the relationship between the road elevation and that of the surrounding terrain. These have been selected elsewhere on the Project where the road is elevated, and these barriers have provided modest (1-2 dB) reductions. This is not the case with the Prouse property, where the road is essentially level with the surrounding terrain. In response to the evidence of

⁸ Carter at [47]

⁹ Carter at [48]

¹⁰ Carter at [43]

Ms Carter, I have reviewed their performance and can confirm that they are ineffective at this location.

31. It is not uncommon for residents to disagree with the extent of mitigation offered, or to be unhappy with the residual noise effects of the Project. As I have identified in my Evidence, there will be many locations adjacent to the Project that will result in a significant change in environment, and that residents may find this new source of noise intrusive or disruptive. This includes the Prouse property. For a project of this scale, it is not possible to fully internalise the effects unless the road is built in a tunnel.
32. While predicted noise levels at the Prouse property are at the higher end of what is desirable, I do not consider that additional mitigation is required.
33. I consider the mitigation option evaluation process adopted for the Project (guided by both NZS 6806 and the Waka Kotahi guidelines¹¹) to be appropriate and transparent.

Conditions

34. Ms Carter seeks an amendment¹² to DNV4(a)(iii) to reference the removal and replacement of the macrocarpa/pine hedge. It is not clear to me whether this amendment is to reflect concern about noise from such activities, or that they need to occur in response to the concern about the trees falling down from vibration¹³. I consider that that this issue is better addressed through a property agreement with the Prouse family.
35. Ms Carter has recommended that DRN6(b) is amended to essentially treat Ashleigh as a Category B dwelling, regardless of external noise level. As I disagree with the level reduction assumptions of Ms Carter (informed by the Jepsen Report) I do not consider this necessary.
36. Ms Carter has recommended an amendment to DRN(4) Post-construction review, which includes:

For the purpose of achieving condition DRN4(b)(ii) and recognising the heritage values and two-storey design of the PPF at 1024 Queen Street East, actual sound levels at, and within the habitable upstairs rooms shall be undertaken by a suitably qualified and experienced person or persons.”

¹¹ NZ Transport Agency, 'Guide to Assessing Road-Traffic Noise Using NZS 6806 for State Highway Asset Improvement Projects', August 2016.

¹² Carter at [90.2]

¹³ Carter at [86]

37. It is unclear how internal noise levels in bedrooms relate to heritage values. No evidence has been provided to support this position. Nor do I consider that the internal noise levels will be inappropriate.
38. As a general rule, I do not consider measurements within bedrooms to be appropriate to assess road-traffic noise effects.
39. Consistent with most recent roading projects, the proposed conditions do not require “compliance” measurements to be undertaken. The “checks and balances” are provided through a series of inspections that confirm that the road has been constructed consistent with the noise model required by DRN3, and that mitigation has been correctly installed. This is consistent with the recommendations of Research Report 446¹⁴.

RESPONSE TO MS WILKENING (HDC AND KCDC)

Construction noise

40. The sole remaining issue in Ms Wilkening’s evidence is the management of the effects of activities that cannot achieve the noise or vibration criteria from DNV1 or DNV2.
41. Condition DNV4¹⁵ refers to the preparation of *Site Specific Noise and Vibration Mitigation Plans*. These are the same documents I have referred to in Technical Report B and my Evidence as *Schedules to the CNVMP*.
42. *Schedule* is the terminology used by Waka Kotahi in its Construction Noise and Vibration Management Guide¹⁶ and Specification¹⁷. I consider this to be the industry standard and is the preferred terminology by all acoustics experts involved in this Project¹⁸.
43. I understand the reasons for not adopting the recommended *Schedule* terminology are:
 - (a) As the CNVMP is subject the Outline Plan requirements (DGA.6), it is unclear whether a Schedule to the CNVMP also be subject to this

¹⁴ VK Dravitzki, RJ Jackett, and CWB Wood, ‘The Variability of Road Traffic Noise and Implications for Compliance with the Noise Conditions of Roading Designations (NZ Transport Agency Research Report 446)’, 2011.

¹⁵ Conditions attached to the planning JWS.

¹⁶ Waka Kotahi, ‘State Highway Construction and Maintenance Noise and Vibration Guide’, August 2019, <https://www.nzta.govt.nz/resources/sh-construction-maintenance-noise/>.

¹⁷ Waka Kotahi, Specification PXX *Noise and vibration management during works. 2021 Draft for comment* (unpublished)

¹⁸ Noise and Vibration JWS

requirement. In my opinion this clearly would not be workable, and would require clarification that this is not required.

(b) The conditions themselves include schedules, which set out the requirements of management plans.

44. The rationale for conditions is set out in the evidence of Ms McLeod.

45. In terms of the authorship of such Schedules/SSCNVMPs, Ms Wilkening states¹⁹:

I do not consider it sufficient to hand the full responsibility of preparation of plans to manage the noise and vibration effects of the activities predicted to cause the highest effects to a potential non-expert without consistent expert oversight and assistance.

46. I agree that the person preparing these plans need to be suitably qualified and experienced for the task at hand. As I discussed in paragraph 246 of my Evidence, the process for preparation, approval, and review of Schedules will be documented within the CNVMP. As such, the councils will be able to comment on the proposed process as part of the Outline Plan process.

47. In my Evidence, I placed emphasis on auditing and monitoring the implementation of construction noise management. This includes both the preparation of Schedules/SSCNVMPs as well as the onsite implementation. In my view the auditing should be undertaken by an acoustics specialist. This will likely involve the initial set of Schedules being reviewed by the acoustics specialist until they are comfortable that the processes are being followed and desired outcomes achieved.

48. I agree with Ms Wilkening that in the case of predicting, measuring, and designing mitigation for vibration, that this needs to be undertaken by an acoustics specialist.

49. It is my expectation that the Project team will be undertaking the necessary reviews of these documents as well as auditing their implementation. If the Council has concerns with the implementation of construction noise management, I consider it should trigger a review of the CNVMP rather than providing extensive comments on individual Schedules.

¹⁹ Wilkening at [15]

50. The Conditions require Schedules/SSCNVMPs, prepared in accordance with the CNVMP, to be issued to the Councils prior to implementation. This is for transparency, and not for certification. The Councils can make comment on matters of substance, which the Project team must consider.

Conditions

51. The Noise JWS recommended that the term PPF was limited to road-traffic noise, and an alternative definition used for identifying construction receivers. This has not occurred. Ms Wilkening has identified that at the very least the last bullet point (playgrounds that are part of educational facilities that are within 20m of buildings used for teaching spaces) should at least be deleted²⁰. I concur.
52. I agree with Ms Wilkening at paragraph 37 that construction noise should not apply at unoccupied commercial buildings.
53. Ms Wilkening's opinion is that DNV4 should contain both the contents of the Schedule as well as the matters of consideration. I consider that this is a drafting matter best addressed by Ms McLeod. Ultimately the CNVMP will set out the process for preparing Schedules.
54. Ms Wilkening remains of the opinion that the low-noise surface should be installed within 12 months of the road opening (if it cannot be installed prior to opening). I agree that this is desirable, however as discussed by Mr Dalzell in his Rebuttal Evidence, this may not be practicable in a limited set of circumstances. Ms Wilkening has proposed an amendment to DRN1(a) to require the low-noise surface to be installed within 12 months unless it is not reasonably practicable to do so. I am unsure whether such a condition will change outcomes as the Project team is motivated to install the final surface as soon as possible to minimise effects on the community.

²⁰ Wilkening at [35]

55. Ms Wilkening highlights²¹ that DRN3 does not establish how the Best Practicable Option is determined or documented, should mitigation need to be re-evaluated. As the BPO will involve input from multiple specialists (acoustics, landscape/visual, engineering etc), I agree that a brief evaluation should be appended to the design report required by DRN3 as Ms Wilkening proposes.

Michael James Smith

10 October 2023

²¹ Wilkening at [41]