

**Before a Board of Inquiry  
Northern Corridor Improvements Project**

---

Under the Resource Management Act 1991 ('the Act')

In the matter of a Board of Inquiry appointed under section 149J of the Act to consider notices of requirement for designations and resource consent applications by the New Zealand Transport Agency for the Northern Corridor Improvements Project

---

**Summary statement of Siiri Wilkening for the New Zealand Transport Agency (Noise and vibration)**

Dated 28 July 2017

---

---

**KENSINGTON SWAN**

18 Viaduct Harbour Avenue Ph +64 9 379 4196  
Private Bag 92101 Fax +64 9 309 4276  
Auckland 1142 DX CP22001

Solicitor: C M Sheard/N McIndoe  
[christina.sheard@kingtonswan.com](mailto:christina.sheard@kingtonswan.com)/[nicky.mcindoe@kingtonswan.com/](mailto:nicky.mcindoe@kingtonswan.com/)

## **SUMMARY STATEMENT OF SIIRI WILKENING FOR THE NEW ZEALAND TRANSPORT AGENCY**

### **1 Introduction**

- 1.1 This summary statement provides a summary of my evidence in chief ('EIC'), dated 20 April 2017 and my rebuttal evidence, dated 15 June 2017 and includes updates to my evidence as a result of conferencing and as a result of further discussions since the conferencing sessions.

### **2 Summary of evidence in chief**

#### *Construction noise and vibration<sup>1</sup>*

- 2.1 I, and my colleague Peter Ibbotson, have assessed the construction noise and vibration effects from the Project, in accordance with accepted and tested standards and guidelines.
- 2.2 The nature of construction means that noise and vibration levels generated are generally higher than ongoing activities. We have assessed the risk of exceeding relevant criteria. Where buildings are in close proximity (both dwellings and businesses), there is a high risk of exceeding the noise and vibration criteria for limited times during construction.
- 2.3 Therefore, a thorough regime of noise and vibration management will be required which will ensure that effects are mitigated and managed as far as practicable. This will be anchored in the Construction Noise and Vibration Management Plan.
- 2.4 Communication with affected parties is the most important and effective management measure. Frequent information and updates to neighbouring communities will allow dialogue between the construction contractor and residents and businesses potentially affected by the works.
- 2.5 Overall, while the Project construction will likely result in temporary disturbance to nearby residents and businesses, I consider that the Project can be constructed in such a way that any adverse construction

---

<sup>1</sup> EIC (Construction noise and vibration), section 5.

noise and vibration effects are either mitigated or specifically managed to reduce effects as far as practicable.

*Operational noise and vibration<sup>2</sup>*

- 2.6 I have assessed the operational noise and vibration effects from the Project. The assessment focuses on noise sensitive sites only. It excludes industrial and business sites which are generally noise producers in their own right and not considered to be noise sensitive.
- 2.7 Noise level surveys and computer noise modelling provided the baseline of the existing environment. In addition, I modelled several scenarios including future do-nothing, do-minimum and several mitigation options. With team input,<sup>3</sup> we chose the preferred option which in our opinion is the best practicable noise mitigation option.
- 2.8 Mitigation is focused around noise barriers within the designation where practicable and relevant. A number of new dwellings adjacent to SH1 are multi storey and located in a way that structural mitigation in the form of barriers is impracticable. For those dwellings, if external noise levels cannot be sufficiently mitigated, building modification mitigation should be considered on a case by case basis.
- 2.9 The road surface material proposed for the Project is a low noise surface (open graded porous asphalt) for the main alignment. For safety reasons, ramps are proposed to be surfaced with dense asphalt, which still achieves low noise levels.
- 2.10 Overall, I consider that the Project will have a generally neutral effect for the Protected Premises and Facilities ('PPFs') surrounding the Project. The recommended mitigation will reduce noise levels somewhat where practicable, while for some PPFs building modification mitigation will need to be investigated.

---

<sup>2</sup> EIC (Operational noise and vibration), section 5.

<sup>3</sup> The following team members have had input into the selection of the preferred mitigation option: Siiri Wilkening (acoustics), Louise Stroger (planning), Chris Bentley (urban design), John Goodwin (landscape), Dillon Smith (constructability), Matthew Yu (stormwater)

2.11 Traffic vibration is unlikely to cause adverse effects as the road surface will be well maintained. Traffic vibration is generally caused by heavy vehicles driving over dips and bumps in the road, which will not be the case here.

### **3 Summary of rebuttal evidence**

3.1 In my rebuttal evidence, I addressed matters raised in:

- a The evidence of Rhys Hegley, Acoustical expert of the Auckland Council;
- b The report of Jon Styles for the Board of Inquiry; and
- c The evidence of Peter Fogarty.

3.2 Mr Hegley and Mr Styles raise unresolved issues in the areas of construction noise and vibration, and traffic noise. Mr Styles also raises concerns regarding operational vibration effects. I addressed these in my rebuttal evidence.

3.3 Mr Hegley and I had discussions prior to Mr Hegley's preparation of evidence, as noted for instance in his paragraph 3.2(a). My rebuttal provides additional information in responses as agreed during our discussions.

3.4 I concluded that<sup>4</sup> construction noise and vibration can generally be managed to comply with the relevant Standards, through a CNVMP, and that any potential exceedance can be addressed through site specific management plans that incorporate consultation, monitoring, management and mitigation as required.

3.5 Operational noise could be further mitigated through the installation of additional barrier along some parts of the Project, but any such barriers would need to be assessed not only for their acoustic effectiveness but also other disciplines. Based on my modelling, I consider that such barriers in a residential scale will have limited benefit.

---

<sup>4</sup> Rebuttal evidence, paragraphs 7.2 – 7.4.

- 3.6 I remain of the opinion that the Project can be constructed and operated so that resultant noise and vibration levels would be within acceptable levels.

#### **4 Changes to evidence as a result of conferencing**

- 4.1 I took part in the expert conferencing sessions on Noise – Operational, Construction and model on 27 and 28 June and 3, 4, 5 and 6 July 2017, and attended a meeting of the acoustic consultants, planners and lawyers of the Agency, Council and the Board on 27 July 2017.

- 4.2 Through the discussions, I have amended my opinion on a small number of issues as described below. These are reflected in the conditions that have been revised and agreed in the 27 July meeting.

##### 4.3 Construction Vibration

- a While I remain of the view, and Mr Hegley agrees, that the BS5228:2009 limits are appropriate to avoid building damage, I acknowledge that these criteria are not “limits” as such but rather criteria which trigger the application of further measures such as consultation and more detailed site specific assessment. Therefore, during conferencing we agreed that the use of the DIN 4150-3 criteria instead of the BS5228-2 criteria as Category B triggers for unoccupied buildings may be appropriate. In my opinion, the likelihood of these criteria being applied is small, as in most business areas work continues throughout night and weekends, thus not resulting in these buildings being “unoccupied buildings” at any time.

##### 4.4 Traffic Noise

- a The intention of the traffic noise conditions has in my opinion remained unchanged through the discussions, i.e. the recommended structural mitigation options (barriers and road surface) shall be included in the detailed design. During conferencing, we agreed that the barrier from Caribbean Drive to the west (as included in the ULDF plans) should also be extended towards SH1 to cover the entirety of the Barbados Drive dwellings facing Upper Harbour Highway. The barrier will achieve some benefits for adjacent dwellings.

- b Any changes during detailed design, as commonly occur for such large infrastructure projects, should not result in significant additional effects. While this was, in my opinion, already covered by the previous conditions, the amended wording has made that intent clearer.

#### 4.5 Traffic Vibration

- a While I agree that Class C of the Norwegian Standard is an appropriate level of traffic vibration for dwellings, I consider that any potential remediation required should be restricted to the road only, i.e. if a neighbouring site is substandard and the road is of appropriate quality, then no further works should be required. The updated condition OV.1 following the 27 July meeting does, in my opinion, cover this requirement appropriately.
- b Since vibration propagation varies greatly from site to site, and surveys require access to dwellings, any testing should only occur in the event of a complaint being received. This process is similar to that used in other designations, e.g. MacKays to Peka Peka Expressway. I consider that the condition wording from 27 July is pragmatic in its approach and ensures that any traffic vibration issues that cause disturbance to people and caused by defects of the road, will be remedied.

#### 4.6 Colliston Rise

- a From discussion with Mr Hegley, who was engaged in the consenting of Stage 1 of Colliston Rise, I understand that dwelling design was progressed significantly at resource consent stage, to a degree that would normally be expected at building consent stage.

- b For that reason, I agree that Stage 1 of Colliston Rise should be included as PPFs. In addition, I consider that the recommended wording of ON.7 ensures that any dwellings that have been constructed without acoustic treatment required by their consent, do not unduly transfer that requirement for mitigation to the Requiring Authority.



---

**Siiri Wilkening**

**28 July 2017**