

Before the Board of Inquiry  
Waterview Connection Project

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*in the matter of:* the Resource Management Act 1991

*and*

*in the matter of:* a Board of Inquiry appointed under s 149J of the Resource Management Act 1991 to decide notices of requirement and resource consent applications by the NZ Transport Agency for the Waterview Connection Project

Second supplementary evidence of **Gavin Fisher (Air Quality)** on behalf of the **NZ Transport Agency**

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Dated: 28 February 2011

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**INDEX**

<b>INTRODUCTION .....</b>	<b>3</b>
<b>PURPOSE OF SUPPLEMENTARY EVIDENCE.....</b>	<b>3</b>
<b>FURTHER EXPERT CAUCUSING.....</b>	<b>4</b>
<b>OFFSETS.....</b>	<b>4</b>
<b>CONSTRUCTION CONDITIONS .....</b>	<b>6</b>
<b>ISSUES NOW FULLY RESOLVED .....</b>	<b>6</b>
<b>ADDITIONAL MATTERS .....</b>	<b>6</b>
<b>SUMMARY .....</b>	<b>9</b>
ANNEXURE A: EXPERT CAUCUSING JOINT REPORT TO THE BOARD, DATED 28 FEBRUARY 2011.....	10

## **SECOND SUPPLEMENTARY EVIDENCE OF GAVIN FISHER ON BEHALF OF THE NZ TRANSPORT AGENCY**

### **INTRODUCTION**

- 1 My full name is **Gavin Westwood Fisher**. I refer the Board of Inquiry to the statement of my qualifications and experience set out in my evidence in chief (*EIC*) (dated 11 November 2010).
- 2 I repeat the confirmation given in that statement that I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court.

### **PURPOSE OF SUPPLEMENTARY EVIDENCE**

- 3 The purpose of this second supplementary evidence is to respond to matters raised in the updated s42A air quality report<sup>1</sup> and the supplementary evidence presented by Ms Janet Petersen (for the Auckland Council) on air quality<sup>2</sup>. Both of these were received after my Supplementary Rebuttal evidence<sup>3</sup>, and both contained substantive new matters that need to be addressed. In particular both have suggested new conditions, not previously proposed, that require a technical response, and I expect a response from the NZTA perspective.
- 4 This evidence will cover the following issues:
  - 4.1 Caucusing outcome;
  - 4.2 Offsets;
  - 4.3 Construction conditions;
  - 4.4 Issues now resolved;
  - 4.5 PM<sub>2.5</sub> effects;
  - 4.6 Assistance to the community; and
  - 4.7 Summary.

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<sup>1</sup> Western Ring Route Waterview Connection. Update to the s42A report for air quality. By Jayne Metcalfe and Racheal Nicholl. 25 February 2011.

<sup>2</sup> Supplementary Rebuttal evidence of Janet Petersen, dated 24<sup>th</sup> February 2011.

<sup>3</sup> Supplementary Rebuttal evidence of Gavin Fisher, dated 17<sup>th</sup> February 2011.

## **FURTHER EXPERT CAUCUSING**

- 5 At the request of the Board Chairman at the hearing start on 28 February, the four air quality caucusing experts reconvened with direction to reduce the number of areas of disagreement.
- 6 This was done, with a considerable degree of success, and the resultant Expert Caucusing Joint Report is attached in **Annexure A**.
- 7 All but two of the outstanding issues have been resolved through the experts' recommendation for the creation of a new technical Peer Review Panel. A new condition OA.8 is recommended in the Caucusing Report. In essence, this Peer Review Panel will have the role of assessing the monitoring data, assessing the effectiveness of the air quality management and compliance process, checking on the outcomes of the NZTA predictions in regard to modelling and effects, and making recommendations for any changes required.
- 8 I am very comfortable with this outcome.
- 9 The two remaining issues that the experts have not agreed are essentially matters of policy, and I here briefly offer some additional perspectives.

## **OFFSETS**

- 10 I reiterate, that from a strict air quality perspective offsets can be valuable and effective tools (and they are in the regulations). But for this project they are (a) unwarranted, (b) unfair (c) difficult to implement, (d) extremely inefficient on a cost benefit basis (my earlier evidence and assessment therein<sup>4</sup> supports this position).
- 11 The updated s42A report has presented some additional arguments in support of mitigation/offset proposals, which I do not agree with.

### **PM<sub>2.5</sub> equals PM<sub>10</sub>**

- 12 The first difficulty is the interchangeable use of PM<sub>10</sub> and PM<sub>2.5</sub> through paragraphs 35-41 of that Report.
- 13 The bottom line is that the NES covers PM<sub>10</sub>; there is a standard for PM<sub>10</sub>; and all the regulations for air quality offsets (even the 2011 updates) refer to PM<sub>10</sub>.
- 14 None of these cover PM<sub>2.5</sub>. That is there is no standard for PM<sub>2.5</sub>; it is not covered in any NES regulations; and it is not currently subject to any mitigation/offset requirements. PM<sub>2.5</sub> issues are only covered in discussion sections, and only subject to an Auckland Regional Air Quality Target.

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<sup>4</sup> Supplementary evidence of Gavin Fisher, 17th February 2011, paragraphs 35-38.

- 15 The s42A report authors imply that PM<sub>2.5</sub> be treated exactly as PM<sub>10</sub>, by default, yet an analysis of the merits and appropriate values has not gone through anything like the rigorous process conducted for PM<sub>10</sub>. Which is why, of course, PM<sub>2.5</sub> is still a regional target rather than a national standard.

**Amounts and costs**

- 16 The second difficulty is in the calculation of the amounts to be offset, and the cost/benefit<sup>5</sup>. I find nothing wrong with the numbers used, but an area of uncertainty is this; it has been assumed by the s42A report authors that, if offsets were to be applied, they should applied to the entire volume of vehicle emissions along certain routes, rather than the incremental increases due to the Project.
- 17 This might be fair if NZTA was building a route through greenfields – but it is not. What might be more appropriately assessed are:-
- 17.1 The quantum and costs of emissions in 2006 - today. (These are not insignificant as shown in the s42A report, Appendix 1).
- 17.2 The quantum and costs of emissions in 2016 – do nothing. (These will be larger than they are today).
- 17.3 The quantum and costs of emissions in 2016 – with Project. (These will be very slightly larger again).
- 18 Then the offset could be applied to the increased discharge due to the Project, over what might have happened anyway. This is very much smaller than given in the s42A report – some 0.06% of the numbers according to the traffic assessments<sup>6</sup>. The costs would then be about \$281 per annum (pa) rather than the \$469,000 pa as given in the s42A report.
- 19 I have developed these arguments not to make any specific proposals to the Board, but more to highlight the potentially significant problems of adopting an offset programme prematurely and without very detailed consideration of the relevant issues and options.
- 20 In my opinion, the implications of the Board adopting or imposing an offset requirement on vehicle emissions prematurely are huge. I have participated in resource consents for new supermarkets that are required to show no adverse air effects from the traffic going in and out of their car parks<sup>7</sup>. These supermarkets have been set up in areas where the PM<sub>2.5</sub> target is exceeded<sup>8</sup>. If a precedent is established in this case, Auckland

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<sup>5</sup> Western Ring Route Waterview Connection. Update to the S42A report for air quality. 25 February 2011. Appendix 1.

<sup>6</sup> Evidence in Chief, Andrew Murray, 12 November 2010, paragraph 58.

<sup>7</sup> E.g. Wairau Park Pak'n'Save, 2008, Manukau Hypermarket, 2006.

<sup>8</sup> Council monitoring at Takapuna; Manukau.

Council would surely be duty bound to impose an offset condition covering every single vehicle using those car parks. This would end up being a fairly onerous burden on organisations that really have no control over the discharges of vehicles carrying customers and supplies for their business.

### **CONSTRUCTION CONDITIONS**

- 21 The s42A report presents a further case for adding four “standard” conditions<sup>9</sup> (it was previously just three).
- 22 I can only reiterate my previous position in that these effects are all perfectly well covered in the current proposed conditions<sup>10</sup>. To that extent, to impose more conditions is unnecessary and would simply add more wording. Nor am I convinced by the apparent rationale that because other Auckland construction projects of this size have such conditions, so should Waterview. These conditions, if imposed, would not alter the technical aspects being proposed in the NZTA’s conditions which will avoid, remedy or mitigate adverse effects from air emissions. In my opinion, the NZTA’s proposed conditions are very proactive and better than most.

### **ISSUES NOW FULLY RESOLVED**

- 23 The following issues that were addressed in previous evidence and in the updated s42A report are now fully resolved, if the proposed new condition for a Peer Review Panel is adopted (OA.8 – refer Caucusing Report in Annexure A for detail):
- 23.1 Air quality monitoring;
- 23.2 New tunnel monitoring;
- 23.3 Portal monitoring (for fan control);
- 23.4 Separation distances; and
- 23.5 Monitoring review.

### **ADDITIONAL MATTERS**

- 24 There are two additional matters included in this evidence, resulting from questions asked of other witnesses by the Board.

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<sup>9</sup> Western Ring Route Waterview Connection. Update to the S42A report for air quality. 25 February 2011. Paragraph 28.

<sup>10</sup> Proposed Conditions AQ.1 to AQ.19.

### Board questions on PM<sub>2.5</sub>

- 25 I noted in the hearing transcript the Board's questions of Dr Black in regard to health effects of PM<sub>2.5</sub><sup>11</sup>. This is an area that I have researched in some depth, and can perhaps add some relevant information in respect of these questions.
- 26 During the very large HAPiNZ study, published in 2008, deciding how to handle PM<sub>2.5</sub> effects was a key issue<sup>12</sup>. We knew very well that all fine particulates have health effects, but we do not even today have detailed knowledge about precise effects from say, PM<sub>10</sub> vs. PM<sub>2.5</sub> vs. ultrafines, or from vehicle particulates vs. industrial particulates vs. woodburner emissions vs. dust. In many cases this is due to the fact that we simply do not have sufficiently detailed monitoring and exposure data for all these types of particulates. However we still have extremely powerful information from the large epidemiological studies that were carried out to show the health effects of particulates. These are documented in substantial detail in the 200 page HAPiNZ report<sup>13</sup>.
- 27 In essence, the PM<sub>10</sub> effects include all the fine particulate effects. That is PM<sub>2.5</sub> effects are a subset of the PM<sub>10</sub> effects. This relies on an assumption that the ratio of PM<sub>2.5</sub> to PM<sub>10</sub> is similar across large urban areas – that is Auckland is broadly similar in terms of its airborne particulate to those cities where the large studies were carried out (mostly in the US and Europe). There is no reason not to believe this is a reasonably sensible approximation – we all have the same sorts of sources (vehicles, industry, domestic and natural emissions), and the analysis of monitoring results generally confirms this. Typically the PM<sub>2.5</sub>/PM<sub>10</sub> ratio is around 50% (+/- 10%) in urban areas. This shows up in the monitoring data around Waterview, in other parts of Auckland (and in Australia).
- 28 What this means, in my view, is that broad scale health effects associated with particulate emissions are perfectly well covered by monitoring and analysing PM<sub>10</sub>. In recent years there has been more of a trend to monitor PM<sub>2.5</sub> preferentially, since it is probably a more reliable direct indicator of health effects than PM<sub>10</sub>. One of the reasons for this is that these finer particles are known to penetrate more deeply into the lungs.
- 29 So, the fact that a PM<sub>2.5</sub> target is being exceeded has less to do with any defined additional health effect of this, and more to do with the way the target has been set. The PM<sub>10</sub> 24-hour standard is very well defined and justified at 50 µg m<sup>-3</sup>. The PM<sub>2.5</sub> target has been set at 25 µg m<sup>-3</sup> – or half the PM<sub>10</sub> value. The reasons why this value was chosen by the Auckland Regional Council are not clear – it was possibly on the basis that the

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<sup>11</sup> Transcript at page 418.

<sup>12</sup> Fisher, G.W; Kjellstrom, T.; Kingham, S.; Hales, S.; O'Fallon, C.; Shrestha, R.; Sherman M. (2007). Health and air pollution in New Zealand. Final Report to the Health Research Council, Ministry for the Environment and Ministry of Transport. June. 156 p. Available for download at hapinz.org.nz.

<sup>13</sup> Loc cit.

monitoring ratio was about half, or maybe that the Australians have adopted this as a reporting measure. But the 2006 USEPA revised value is  $35 \mu\text{g m}^{-3}$  (down from  $65 \mu\text{g m}^{-3}$ ). The Auckland Regional Council could well have set this value at something else, perhaps 30 or  $35 \mu\text{g m}^{-3}$  based on the  $\text{PM}_{2.5}/\text{PM}_{10}$  monitoring ratio in the city which is more like 60% rather than 50% (as shown in the Waterview monitoring results)<sup>14</sup>. Perhaps they could have made it 15 or  $20 \mu\text{g m}^{-3}$ , in order to accelerate improvements in Auckland's air quality. Nevertheless, Councils and Ministries charged with environmental protection will tend to set progressively tighter standards, and that is obviously a factor here. But because of the complications I have noted above, there is no compliance standard for  $\text{PM}_{2.5}$ , and in my view the particulate health effects assessments done on the basis of  $\text{PM}_{10}$  are justified in terms of our current epidemiological knowledge. And there are no exceedences of the  $\text{PM}_{10}$  standard due to the Project.

- 30 So my conclusions here in relation to  $\text{PM}_{2.5}$  are:-
- 30.1 The existing exceedences are unfortunate and since they exceed a Council target the Council is certainly mandated to seek a reduction.
  - 30.2 However, outside of Council plans and policies, there are no national legislative tools to require mitigation of  $\text{PM}_{2.5}$  (as there are for  $\text{PM}_{10}$ ).
  - 30.3 There is no significant known implication of these exceedences on health effects beyond those already assessed.

#### **Assistance to the community**

- 31 In noting questions asked of Dr Black by the Board in relation to general community concerns about discharges from the vents<sup>15</sup>, I can perhaps offer some relief. I fully sympathise with concerns that have been expressed many times – especially from schools and kindergartens about the perception which says *“That’s a big vent, it must have a big discharge, I think I’ll stay away and won’t let my children go to that school”*. I also recognise that many of these people have difficulties appreciating the issues and contexts, which can be very technical and very specialised.
- 32 I here re-iterate a verbal offer that I have made previously in consultation meetings to assist community groups, especially the schools, communicate with their stakeholders on the issues of air quality perception. I have found this may not be the complete solution, but can go some appreciable way to mitigating the negative perceptions of the community.
- 33 Subject to defining the scope of this, I am confident that NZTA will fund some involvement by me should these community groups wish to take this up. I would imagine 15-20 hours or so over the coming year could help

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<sup>14</sup> E.g. NZTA. Alan Wood Reserve. Particulate Matter & Meteorological Monitoring Monthly Report, August 2010. Watercare Service Ltd. 10 September 2010.

<sup>15</sup> Hearing Transcript at pages 419-420.



with preparing brochures, information for parents, attendance at meetings, and the like.

### **SUMMARY**

- 34 In summary, the experts have now agreed on all but two issues.
- 35 As noted in the updated s42A report, these essentially boil down to matters of policy and preference, rather than technical matters<sup>16</sup>. Which is why this group of technical experts has been unable to fully close up agreement on these last two matters – offsets and construction conditions.



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**Gavin Fisher**

**28 February 2011**

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<sup>16</sup> Western Ring Route Waterview Connection. Update to the S42A report for air quality. 25 February 2011. Paragraph 2.

**ANNEXURE A: EXPERT CAUCUSING JOINT REPORT TO THE BOARD,  
DATED 28 FEBRUARY 2011**

Before the Board of Inquiry  
Waterview Connection Project

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*in the matter of:* the Resource Management Act 1991

*and*

*in the matter of:* a Board of Inquiry appointed under s 149J of the Resource Management Act 1991 to decide notices of requirement and resource consent applications by the NZ Transport Agency for the Waterview Connection Project

Expert Caucusing Joint Report to the Board of Inquiry – Topic Air Quality

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Dated: 28 February 2011

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## **EXPERT CAUCUSING JOINT REPORT TO THE BOARD OF INQUIRY**

### **INTRODUCTION**

- 1 This joint signed report is written in response to a request from the Board Chairman in opening session on 28 February 2011. It has been requested in light of additional supplementary evidence presented since the last caucusing report, and in light of a second S42A report requested by the Board on 21 February 2011, and received on 25 February. The instructions are that this caucusing report should:
  1. Be succinct.
  2. Attempt to get clear agreement on any remaining technical issues.
  3. Describe issues that are not resolved, and why.
- 2 This report relates to the caucusing topic of **Air Quality**.
- 3 The caucusing meeting was held on **28 February 2011**.
- 4 Attendees at the meeting were:

1. Gavin Fisher (Air Quality, for the NZTA)
2. Janet Petersen (Air Quality, Auckland Council & Transport)
3. Jayne Metcalfe and Rachael Nicoll (Air Quality, appointed by the Board of Inquiry, and authors of the Board s42a report).

#### **AREAS THAT HAVE BEEN RESOLVED**

- 5 The parties have agreed that all technical air quality matters have been resolved and are no longer disputed. To summarise:

##### **1. Monitoring**

- (a) Separation Distances. – Ambient monitoring will be undertaken at an agreed location which is representative of the minimum separation distance between the edge of SH20 and residential properties.
- (b) There will be 3 monitoring sites. One ambient site as per (a) above, one ambient site near the existing Cowley St site and one tunnel portal site.
- (c) A Peer Review Panel will oversee all monitoring including traffic monitoring, ambient monitoring and portal emission monitoring. The Peer Review Panel will review all monitoring and recommend whether monitoring should cease.
- (d) Conditions relating to the monitoring and Peer Review Panel (Appended to the report) have been agreed by all the parties as suitable to resolve all technical monitoring and portal emission issues.

#### **AREAS THAT ARE NOT RESOLVED**

- 6 The parties have not agreed on the following policy matters:

##### **1. Construction Effects**

- (a) Conditions relating to construction effects. The positions are as follows:
  - (i) Janet Petersen (Auckland Council) and Jayne Metcalfe and Rachael Nicoll (Emission Impossible) consider that consent conditions relating to odour, dust and visible emissions (as outlined in para. 28 of the s42A Update report 25 February 2011) should be included.
  - (ii) Gavin Fisher (NZTA) has no technical disagreement with these requirements but does

not consider these conditions are necessary to prevent adverse effects.

## 2. Offsets

- (a) The parties agreed that offsets are a good air quality management tool, however the parties do not agree whether they should be required for this project.

Date: 28 February 2011



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**Gavin Fisher (Air Quality)**



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**Janet Petersen (Air Quality)**



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**Jayne Metcalfe (Air Quality)**



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**Rachael Nicoll (Air Quality)**

## APPENDIX 1

### Amended Conditions

- 1 Add a new condition OA.8 to incorporate a Peer Review Panel

A Peer Review Panel shall be appointed by NZTA with the agreement of Auckland Council for the purpose of reviewing the ambient air quality monitoring programme and results. The Peer Review Panel shall consist of two independent experts in air quality with experience in ambient air quality monitoring and emissions from motor vehicles. The Peer Review Panel shall review all ambient monitoring, relevant traffic data and tunnel emissions and provide a summary report including any interpretation and recommendations to NZTA, Auckland Council and the Public Information Liaison Group within 6 months of the tunnels becoming operational and annually thereafter.

- 2 Amend Condition OA.2

Prior to the tunnels becoming operational, ~~the Requiring Authority~~ NZTA shall establish two ambient air quality monitoring stations ~~and one portal air quality monitoring station~~. The location ~~and type~~ of these monitoring stations shall be selected by NZTA in consultation determined and agreed with the Auckland Council ~~and Peer Review Panel (Condition OA.8)~~. Ambient air quality shall be monitored continuously in real time, to monitor potential effects associated with the operation of the ventilation system from the tunnels. ~~Ambient M~~ Monitoring shall include fine particulates (PM<sub>10</sub> and PM<sub>2.5</sub>) and nitrogen dioxide. Portal monitoring shall include nitrogen dioxide. Results shall be compared with the relevant National Standards for air quality and Auckland Regional Air Quality Targets. ~~Monitoring shall be undertaken for at least 24 months once the tunnels are operational unless it has been agreed with the Auckland Council that monitoring is no longer required. Monitoring shall be undertaken at each site until the Peer Review Panel recommends that monitoring is no longer necessary.~~ The locations, operation and maintenance schedules of the continuous monitors shall, as far as practicable, comply with the requirements of AS/NZ 3580.1.1:2007 Method for Sampling and Analysis of Ambient Air – Guide to Siting Air Monitoring Equipment, and with methods specified in the National Environmental Standards.

- 3 Agreed Condition OA.7

The tunnel ventilation system shall be designed and operated to ensure that any air emitted from the tunnel portals does not cause the concentration of nitrogen dioxide (NO<sub>2</sub>) in ambient air to exceed 200 micrograms per cubic metre, expressed as a rolling 1 hour average, at any point beyond the designation boundary that borders an air pollution sensitive land use.