Before a Board of Inquiry
Transmission Gully
Notices of Requirement and Consents

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*under:* the Resource Management Act 1991

*in the matter of:* Notices of requirement for designations and resource consent applications by the NZ Transport Agency, Porirua City Council and Transpower New Zealand Limited for the Transmission Gully Proposal

*between:* **NZ Transport Agency**
*Requiring Authority and Applicant*

*and:* **Porirua City Council**
*Local Authority and Applicant*

*and:* **Transpower New Zealand Limited**
*Applicant*

# Second Statement of rebuttal evidence of Dr Vaughan Francis Keesing (freshwater ecology) for the NZ Transport Agency and Porirua City Council

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Dated: 15 February 2012

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**SECOND STATEMENT OF REBUTTAL EVIDENCE OF DR VAUGHAN FRANCIS KEESING FOR THE NZ TRANSPORT AGENCY AND THE PORIRUA CITY COUNCIL**

## INTRODUCTION

1 My full name is **Vaughan Francis Keesing**.

2 I have the qualifications and experience set out at paragraphs 2-8 of my statement of evidence in chief, dated 17 November 2011 (*EIC*).

3 I repeat the confirmation given in my EIC that I have read, and agree to comply with, the Code of Conduct for Expert Witnesses (Consolidated Practice Note 2011).

4 In this statement of supplementary evidence, I respond to the supplementary evidence of:

4.1 **Dr Brett Gilbert Ogilvie** on behalf of the Director General of Conservation; and

4.2 **Ms Paula Warren** on behalf of the Rational Transport Society.

I also respond to the Section 42A report[1] prepared by Mr John Kyle.

5 This supplementary evidence addresses a point raised by Dr Ogilvie in relation to the identification of ephemeral and intermittent-perennial tributaries in the Horokiri and Te Puka systems, and two statements made by Ms Warren.

6 The fact that this statement does not respond to every matter raised in the evidence of submitter witnesses within my area of expertise should not be taken as acceptance of the matters raised. Rather, I rely on my EIC, my previous rebuttal evidence and this statement to set out my opinion on what I consider to be the key freshwater matters for this hearing.

### Dr Brett Ogilvie

7 Dr Ogilvie has some reservations as to the allocation of ephemeral versus intermittent tributaries, having witnessed 3 of the 9 he visited on his field visit flowing (5 days after rain). I assume Dr Ogilvie observed this flow at the lower (confluence) end of the tributaries, which I reputedly recorded as ephemeral.

8 He stated that "*Of this sample of nine culvert locations, I consider that three (T12, T13 and H5) will be located on streams that should*

[1] Section 42A Report – Part 2 (February 2012)

*at the very least be classified as intermittent, and thus should have fish passage provided ...".*[2]

9 However, it appears to me that we are not at odds because I assessed these three tributaries[3] as potentially intermittent and therefore as having a possible need for fish passage. In such cases, which I referred to in my assessment as 'marginal requirements', that classification meant that, as a precaution, fish passage was assumed to be necessary.

10 I stand by my assessment of the classification of these and the other Te Puka and Horokiri tributaries, as I have been visiting these sites since 2009 and have had many more occasions to view these tributaries. I attach as **Annexure 1** my spread sheet showing all of the culverts for the tributaries, which notes those tributaries which I considered require, or may require fish passage.[4] Tributaries T13, T14 and H4 are "marginal" and therefore have a "fish passage" requirement.

11 Dr Ogilvie also raises a concern about the absence of *"value"* attributed to ephemeral streams in my assessment and so to the sufficiency of mitigation. He states: *"In my EIC (paras 45-49) I have stated my concerns in relation to the lack of mitigation being offered for effects on ephemeral streams*". [5]

12 I understand that Dr Ogilvie was not aware at the time he prepared his EIC that the 6000 linear m of ephemeral systems lost (primarily to culverts) was to be off-set by the inclusion of 17000 linear meters of similar ephemeral habitat in the wider mitigation package proposed. He has been made aware of this mitigation through conferencing and I understand (verbally) that he does not now hold the concern he did in that regard.

13 Nevertheless, (as noted in our second caucusing statement[6] ) he recommends that all tributary culverts receive fish passage, which, as noted in the caucusing statement, I consider is not required. In fact I do not believe any of the western Horokiri or Te Puka tributaries **need** any fish passage and it is only through utmost caution that I recommend the passages I do.

14 In any event, Dr Ogilvie and I agreed through caucusing to a condition requiring a more exhaustive fish survey prior to

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2 Ogilvie First Supplementary Statement, paragraph 10.

3 It appears that Dr Ogilvie's reference to H5 may be the tributary I have referred to as H4.

4 The Annexure includes a summary at the start of the requirements for fish passage.

5 Ogilvie First Supplementary Statement, paragraph 8.

6 Dated 31 January 2012.

construction. This will ensure that the tributaries that do actually hold viable fish populations prior to construction can be identified with greater certainty and passage requirements accounted for.

15 I consider that this detailed survey requirement means that the difference in opinion between Dr Ogilvie and I,[7] as to whether the tributaries are ephemeral or intermittent, does not need to be resolved now. The correct classification will be clarified in the detailed survey and fish passage will be required for any tributaries that are even marginal.

**Paula Warren**

16 Ms Warren states that the tributary streams in Te Puka had "*good water quality and good invertebrate fauna*".[8] I am not aware of any rigorous or standard survey method, or analysis being carried out by Ms Warren to reach this conclusion.

17 In any event, from my experience of the site and my sampling, I consider that those tributaries have a standard ephemeral aquatic fauna of no particular note and are more often than not dry in all but perhaps their meeting areas with the main stems.[9]

18 Ms Warren then states[10] that "*All the tributaries [she] examined will be completely destroyed by the road*". This is untrue as in most cases only 50% or less of an ephemeral tributary is changed to a culvert under the foot print.

19 Ms Warren also fails to acknowledge that the 6000m of tributaries lost under culverts is off-set (or mitigated for) by 17000m of protected and managed tributaries under the mitigation proposed.

**Mr Kyle**

20 On page 18, third paragraph of the section 42A Part 2 (February 2012) report Mr Kyle notes that he agrees that there is a need for mitigation monitoring success to be addressed in conditions. He also notes that "Contingency measures if the monitoring indicates an adverse effect should also be identified now and inserted into the conditions in order to provide greater certainty".

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7 I note that Ms Warren raises similar points in her supplementary evidence – refer paragraph 7.

8 Warren Supplementary Statement, paragraph 35.

9 I discuss ephemeral stream values in my Evidence in Chief at paragraphs 230-242.

10 Warren Supplementary Statement, paragraph 36.

21 For the Boards information I note that Ms Rickard has now included (at condition G15M) a condition that sets up the need for mitigation success monitoring and highlights the need for clear options to be formulated to address unsuccessful mitigation elements.

**Vaughan Francis Keesing**

15 February 2012

## Annexure 1 – Culverts and fish passage requirement

| | |
|---|---|
| 35 | = count **Yes,** need fish passage |
| 10 | = count **Marginal,** fish may be present but very marginal habitat, needs passage |
| 79 | = count **No,** fish will not be present |

| SKM Catchment ID | Type of work | Source | Culvert Chainage | Fish passage | Passage type | Catchment Area (ha) | Catchment Area ($m^2$) |
|---|---|---|---|---|---|---|---|
| Wainui_01 | Culvert | CM | 1,500 | Y | Standard | 10 | 96,258 |
| Wainui_02 | Culvert | CM | 1,700 | Y | Standard | 18 | 175,136 |
| Wainui_03 | Culvert | CM | 2,050 | Y | Standard | 264 | 2,643,496 |
| Wainui_04 | Culvert | CM | 2,200 | Y | Standard | 21 | 212,036 |
| TePuka_01 | Bridge | CM | 2,800 | Y | Standard | 314 | 3,144,647 |
| TePuka_02 | Culvert ? | CM | 2,850 | N | | 9 | 85,934 |
| TePuka_03 | Culvert | CM | 3,100 | N | | 9 | 85,085 |
| TePuka_04 | Culvert | CM | 3,300 | N | | 3 | 31,120 |
| TePuka_05 | Culvert | CM | 3,500 | Marginal | Alternative | 10 | 98,305 |
| TePuka_06 | Culvert | CM | 3,700 | N | | 2 | 20,324 |
| TePuka_07 | Culvert | CM | 3,900 | N | | 5 | 49,881 |
| TePuka_08 | Culvert | CM | 4,025 | N | | 8 | 76,128 |
| TePuka_09 | Culvert | CM | 4,300 | N | | 8 | 81,299 |
| TePuka_10 | Culvert | CM | 4,475 | Y | | 15 | 151,535 |
| TePuka_11 | Culvert | CM | 4,800 | N | | 4 | 39,874 |
| TePuka_12 | Culvert | CM | 4,900 | N | | 3 | 34,951 |
| TePuka_13 | Culvert | CM | 5,050 | Marginal | Alternative | 7 | 71,972 |
| TePuka_14 | Culvert | CM | 5,200 | Marginal | Alternative | 7 | 66,241 |
| TePuka_15 | Culvert | CM | 4,600 | N | | 2 | 16,347 |
| Horokiri_01 | Bridge | CM | 8,550 | Y | | 448 | 4,480,966 |
| Horokiri_02 | Culvert | CM | 5,350 | Marginal | Alternative | 9 | 92,313 |
| Horokiri_03 | Culvert | CM | 5,650 | Marginal | Alternative | 10 | 99,529 |
| Horokiri_04 | Culvert | CM | 5,825 | Y | Alternative | 12 | 118,656 |
| Horokiri_05 | Culvert | CM | 5,925 | N | | 4 | 38,960 |
| Horokiri_06A | Culvert | CM | 6,050 | N | | 2 | 17,002 |
| Horokiri_06B | Culvert | CM | 6,150 | N | | 1 | 10,412 |
| Horokiri_07 | Culvert | CM | 6,275 | Y | Standard | 17 | 168,211 |
| Horokiri_08 | Culvert | CM | 6,350 | N | | 1 | 11,494 |
| Horokiri_09 | Culvert | CM | 6,550 | N | | 5 | 50,472 |
| Horokiri_10 | Culvert | CM | 6,625 | N | | 3 | 30,359 |
| Horokiri_11 | Culvert | CM | 6,750 | N | | 4 | 39,234 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Horokiri_12 | Culvert | CM | 6,850 | N | | 6 | 57,758 |
| Horokiri_13 | Culvert | CM | 7,050 | N | | 5 | 53,266 |
| Horokiri_14 | Culvert | CM | 7,225 | N | | 3 | 34,974 |
| Horokiri_15 | Culvert | CM | 7,400 | Y | Alternative | 15 | 151,048 |
| Horokiri_16 | Culvert | CM | 7,650 | Y | Alternative | 15 | 151,183 |
| Horokiri_17 | Culvert | CM | 8,000 | N | | 7 | 73,424 |
| Horokiri_18 | Culvert | CM | 8,150 | Marginal | Alternative | 10 | 96,647 |
| Horokiri_19 | Culvert | CM | 8,350 | Marginal | Alternative | 9 | 91,121 |
| Horokiri_21 | Bridge | CM | 8,600 | Y | | 55 | 545,474 |
| Horokiri_21A | Culvert | CM | 8,850 | Marginal | Alternative | 11 | 113,711 |
| Horokiri_22 | Culvert | CM | 9,000 | N | | 6 | 63,648 |
| Horokiri_23 | Culvert | CM | 9,150 | N | | 3 | 33,432 |
| Horokiri_24 | Culvert | CM | 9,325 | Y | Standard | 106 | 1,056,013 |
| Horokiri_25 | Bridge | CM | 9,750 | Y | | 1,128 | 11,276,325 |
| Horokiri_26 | Culvert | CM | 9,850 | N | | 3 | 29,945 |
| Horokiri_27 | Culvert | CM | 10,200 | N | | 3 | 31,338 |
| Horokiri_29 | Culvert | CM | 10,600 | N | | 3 | 25,858 |
| Horokiri_30 | Culvert | CM | 10,750 | N | | 1 | 6,868 |
| Horokiri_31 | Culvert | CM | 10,900 | N | | 1 | 12,901 |
| Horokiri_32 | Culvert | CM | 11,100 | N | | 1 | 12,572 |
| Horokiri_33 | Culvert | CM | 11,250 | N | | 4 | 40,658 |
| Horokiri_34 | Culvert | CM | 12,050 | N | | 2 | 17,689 |
| Horokiri_35 | Culvert | CM | 12,150 | N | | 5 | 47,437 |
| Horokiri_36 | Culvert | CM | 12,250 | N | | 6 | 58,375 |
| Horokiri_37 | Bridge | CM | 12,400 | N | | 4 | 42,668 |
| Horokiri_38 | Culvert | CM | 12,600 | N | | 3 | 26,887 |
| Ration_01 | Bridge | CM | 12,825 | Y | | 47 | 469,868 |
| Ration_02 | Culvert | CM | 13,000 | N | | 2 | 20,659 |
| Ration_03 | Culvert | CM | 13,100 | Y | Standard | 12 | 124,261 |
| Ration_04 | Culvert | CM | 13,250 | N | | 1 | 8,717 |
| Ration_05 | Culvert | CM | 13,400 | N | | 3 | 25,466 |
| Ration_06 | Culvert | CM | 13,450 | N | | 1 | 12,004 |
| Ration_07 | Culvert | CM | 13,600 | Y | Standard | 149 | 1,493,690 |
| Ration_08 | Culvert | CM | 13,900 | Y | Standard | 29 | 288,520 |
| Ration_09 | Culvert | CM | 14,000 | N | | 5 | 50,392 |
| Ration_10 | Culvert | CM | 14,750 | Y | Standard | 108 | 1,078,770 |
| Ration_10a | Culvert | CM | | | Standard | | |
| Ration_11 | Culvert | CM | 15,050 | N | | 8 | 83,689 |
| Ration_12 | Culvert | CM | 15,350 | N | | 2 | 24,490 |
| Ration_13 | Culvert | CM | 15,600 | Y | Standard | 13 | 127,772 |
| Ration_14 | Culvert | CM | 15,850 | N | | 5 | 50,031 |
| Collins_01 | Culvert | CM | 16,100 | N | | 4 | 43,922 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Pauatahanui_01 | Culvert | CM | 16,625 | Y | | 28 | 284,124 |
| Pauatahanui_02 | Culvert | CM | 16,875 | Y | Standard | 15 | 153,421 |
| Pauatahanui_03 | Culvert | CM | 17,000 | N | | 1 | 14,745 |
| Pauatahanui_04 | Culvert | CM | 17,175 | N | | 1 | 14,460 |
| Pauatahanui_05 | Culvert | CM | 17,300 | N | | 3 | 27,443 |
| Pauatahanui_06 | Culvert | CM | 17,500 | Y | Standard | 11 | 110,683 |
| Pauatahanui_06a | Culvert | CM | 17,500 | N | | | |
| Pauatahanui_07 | Bridge | CM | 17,700 | Y | Standard | 3,909 | 39,085,877 |
| Pauatahanui_08 | Culvert | CM | 17,800 | N | | 3 | 29,067 |
| Pauatahanui_09 | Culvert | CM | | | | | |
| Duck_01 | Culvert | CM | 19,975 | N | | 1 | 13,986 |
| Duck_02 | Culvert | CM | 20,100 | N | | 2 | 20,550 |
| Duck_03 | Culvert | CM | 20,200 | N | | 2 | 23,587 |
| Duck_04 | Culvert | CM | 20,350 | N | | 1 | 10,460 |
| Duck_05 | Culvert | CM | 20,550 | N | | 2 | 22,801 |
| Duck_06 | Culvert | CM | 20,600 | N | | 3 | 29,311 |
| Duck_07 | Culvert | CM | 20,650 | Y | Standard | 39 | 393,191 |
| Duck_08 | Culvert | CM | 21,050 | Marginal | Alternative | 13 | 128,216 |
| Duck_09 | Culvert | CM | 21,225 | Y | Alternative | 18 | 179,127 |
| Duck_10 | Culvert | CM | 21,400 | N | | 9 | 89,193 |
| Duck_11 | Bridge | CM | 21,600 | Y | | 183 | 1,829,355 |
| Duck_12 | Bridge | CM | 22,000 | Y | | 84 | 844,740 |
| Duck_13 | Culvert | CM | 22,450 | N | | 2 | 17,839 |
| Duck_14 | Culvert | CM | 22,650 | Y | Standard | 21 | 207,124 |
| Duck_15 | Bridge | CM | 22,850 | Y | | 39 | 390,698 |
| Duck_16 | Culvert | CM | 23,050 | N | | 1 | 6,329 |
| Duck_17 | Culvert | CM | 19,550 | N | | 1 | 7,454 |
| Duck_18 | Bridge | CM | 20,000 | Y | | 572 | 5,721,062 |
| Duck_19 | Culvert | CM | | N | | 2 | 15,148 |
| Duck_20 | Culvert | CM | | N | | 3 | 25,795 |
| Duck_21 | Culvert | CM | | N | | 1 | 14,637 |
| Duck_22 | Culvert | CM | | N | | 2 | 21,305 |
| Duck_23 | Culvert | CM | | N | | 9 | 94,464 |
| Duck_24 | Culvert | CM | | N | | 5 | 48,893 |
| Duck_25 | Culvert | CM | | N | | 3 | 33,176 |
| Duck_26 | Culvert | CM | | N | | 3 | 34,492 |
| Kenepuru_01 | Bridge | CM | 23,600 | Y | | 149 | 1,491,405 |
| Kenepuru_02 | Culvert | CM | 24,400 | N | | 2 | 24,464 |
| Kenepuru_03 | Culvert | CM | 24,600 | N | | 3 | 28,988 |
| Kenepuru_04 | Culvert | CM | 24,700 | N | | 3 | 32,649 |
| Kenepuru_05 | Culvert | CM | 24,850 | N | | 6 | 61,946 |
| Kenepuru_06 | Culvert | CM | 24,900 | N | | 1 | 7,771 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Kenepuru_07 | Culvert | CM | 25,100 | N | | 9 | 88,854 |
| Kenepuru_08 | Culvert | CM | 25,200 | N | | 2 | 18,294 |
| Kenepuru_09 | Culvert | CM | 25,425 | Y | Alternative | 16 | 155,828 |
| Kenepuru_10 | Bridge | CM | 25,800 | N | | 4 | 36,586 |
| Porirua_01 | Bridge | CM | 26,000 | Y | | 39 | 386,455 |
| Porirua_02 | Culvert | CM | 26,150 | N | | 2 | 15,149 |
| Porirua_03 | Culvert | CM | 26,300 | N | | 5 | 49,230 |
| Porirua_04 | Culvert | CM | 26,450 | N | | 10 | 98,047 |
| Porirua_05 | Culvert | CM | 26,675 | Marginal | standard | 24 | 237,875 |
| Porirua_06 | Culvert | CM | 27,000 | N | | 13 | 134,343 |
| Porirua_07 | Bridge | CM | 27,500 | Y | | 83 | 831,217 |