

IN THE MATTER OF

The Resource Management Act 1991

AND

IN THE MATTER OF

Notices of requirement for designations under section 168 of the Act, in relation to Te Ahu a Turanga; Manawatū Tararua Highway Project

BY

NEW ZEALAND TRANSPORT AGENCY
Requiring Authority

**STATEMENT OF EVIDENCE OF KIERAN TROY MILLER (FRESHWATER
ECOLOGY) ON BEHALF OF THE NEW ZEALAND TRANSPORT AGENCY**

8 March 2019

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INTRODUCTION

1. My full name is **Kieran Troy Miller**.
2. I am a consultant ecologist employed by Boffa Miskell Limited ("**BML**").
3. I prepared the "*Te Ahu a Turanga; Manawatū Tararua Highway Project: Freshwater – Ecological Impact Assessment*" ("**Freshwater Ecology Report**"). The Freshwater Ecology Report is an appendix to the overview "Technical Assessment #6: Terrestrial Ecology" ("**Technical Assessment 6**"), which was prepared by **Dr Adam Forbes**.
4. Technical Assessment 6, and the Freshwater Ecology Report, are in Volume 3 of the Assessment of Environmental Effects ("**AEE**") which accompanied the Notices of Requirement ("**NoRs**") lodged in respect of Te Ahu a Turanga; Manawatū Tararua Highway Project ("**the Project**").

Qualifications and experience

5. I have the following qualifications and experience relevant to the evidence I shall give:
 - (a) I hold the qualification of Bachelor of Science (Biological Sciences) and Master of Science (1st class honours) (Biological Sciences) from the University of Waikato;
 - (b) I am an Associate Principal and Senior Ecologist with BML specialising in freshwater ecology and working primarily in the Bay of Plenty region. I have worked at BML since July 2015 (three years and seven months);
 - (c) I have previously worked as an ecologist for Tonkin + Taylor Ltd from March 2011 to June 2015 (four years and four months);
 - (d) I am a Certified Environmental Practitioner with the Environmental Institute of Australia and New Zealand and I am bound by the Institute's code of ethics; and
 - (e) some of my relevant recent project experience in freshwater ecology includes:
 - (i) Whangarei to Te Hana indicative and detailed business cases, 2017-2018. Carried out indicative and detailed business case multi-criteria assessment for Whangarei to Te Hana roading project options for freshwater ecology (instream habitats and fauna species);

- (ii) Three Creeks subdivision in Ohauti, Tauranga (2015 to present). I assessed ecological values over a 20ha block of land proposed for subdivision. The ecological assessment included multiple streams and addressed the likely affects from the proposed development; and
- (iii) Tauriko west urban growth area (2017 to present). I assessed ecological values within the proposed urban growth area and I am part of the technical advisory group tasked with guiding the extensive proposed development.

Code of Conduct

- 6. I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2014. My evidence has been prepared in compliance with that Code, as if it were evidence being given in Environment Court proceedings. In particular, unless I state otherwise, this evidence is within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Assumptions and exclusions in my assessment and my evidence

- 7. The assumptions and exclusions I applied in preparing the Freshwater Ecology Report are set out in that assessment. The intent of the Freshwater Ecology Report was to assess the values present across the proposed road alignment and provide an indicative assessment of the potential effects. Construction aspects were not included within the assessment due to limited information available and high likelihood of changes to construction methods. A complete freshwater ecological impact assessment will be prepared for the regional consenting process.

Purpose and scope of evidence

- 8. My evidence does not repeat in detail the technical matters set out in the Freshwater Ecology Report, or the detailed summary set out in Technical Assessment 6. Rather, in this evidence I:
 - (a) comment on questions raised by the Hearing Panel; and
 - (b) comment on Council Section 42A Reports.

COMMENTS ON QUESTIONS RAISED BY THE HEARING PANEL

9. I provide responses to questions from the Hearing Panel below.

In your view, how can the QEII streams be best protected against the effects of the proposed road alignment? Would there be significant ecological benefit in realigning further to the north?

10. The best way to avoid effects of the proposed road alignment on QEII streams would be to move the alignment north to avoid direct modification of perennial / intermittent waterways. Other options would also include the use of bridges instead of culverts.

Please explain what the 'SEV value' means and the relevance of the SEV values of streams being higher or lower than the reference sites in data provided by Horizons Regional Council.

11. The Stream Ecological Valuation ("SEV") is a method used to assess stream function, and is one of a variety of assessment tools that can be used to describe the overall stream condition. SEV assesses a range of parameters that fall under four main attributes (hydraulic, biogeochemical, habitat and biodiversity provisions). The data is used to provide an overall (indices) score of stream function between 0 and 1. SEV scores close to 1 are fully functional and are likely to be near pristine, while sites which score close to 0 are dis-functional and likely to be highly impacted / modified. The SEV is an averaged value of the separate sub-totals of several variables under those 4 main attributes

12. Regional reference site SEV's are used to provide context within the region and show what an upper functional score can be expected to be for the "best" remaining streams under particular circumstances (i.e. rural, protected forest, urban). SEV assessment scores that are similar to reference sites indicate that the assessed site is likely to be in as good a state as can be expected. Sites below the reference scores indicate restorative gains and functional enhancements could be made.

In your view, would there be benefit in bridging across all streams that would otherwise be subject to high ecological effects of culverting? If not, why not?

13. Yes, bridging all stream crossings (where bridging meant no impacts to the bed) that would otherwise be subject to a high ecological effect would be beneficial as bridges in general have less adverse ecological impacts than culverts.

COMMENTS ON COUNCIL SECTION 42A REPORTS

Freshwater Ecology (Logan Brown)

Sediment discharge

14. Mr Brown (paragraph 18) has concerns about the temporary nature of construction discharged sediment. He states that such effects may continue for a period after the works are completed, and that discharged sediment does not disappear from the system after the next high flow event. In response, I note that discharged sediment becomes more and more diluted and diffuse over time and with events, and its discernible presence diminishes to background levels fairly quickly. Its measurable effects on natural character, or habitat quality are, after earthworks are complete and surfaces healed, temporary. This is not a permanent effect.

Scope of the Freshwater Ecology Report

15. Mr Brown (paragraph 48) refers to the scope of the Freshwater Ecology Report, which is to “*provide preliminary recommendations for appropriate avoidance, remediation and/or mitigation of adverse effects...*”. Mr Brown states that the scope does not align with another caveat in the Report, which provides that adverse effects on freshwater ecological values (and associated measures to address effects) will be addressed during the resource consenting phase.
16. It is true that the freshwater information provided and the array of mitigation aspects discussed is not sufficient for, or focused on, a regional resource consent process. The preliminary recommendations and comments on measures for addressing adverse effects were made because doing so at this early stage was considered helpful to the overall design process. These measures will need to be further explored and developed during the consenting phase (as options and construction methods solidify). The intention of the Freshwater Ecology Report under the current NoR process was to provide an indication of the likely effects in light of the preliminary design and early values assessments, and the types of enhancement / restoration activities which may be required to address such effects.

Data that informed the Freshwater Ecology Report

17. Mr Brown notes (paragraph 49) that collection of data informing the Freshwater Ecology Report has involved one-off sampling points and does not necessarily capture all of the ecological values at a site (which can vary depending on the season).

18. This is partially correct. Many of the attributes that have been used to assess the values of streams are unlikely to change significantly (if at all) between seasons (i.e. sediment contaminants, SEV scores and fish survey); and standard protocols do not require repeated measurements.
19. I acknowledge that macroinvertebrate populations will change, and associated indices, but the magnitude of such changes are unlikely to result in the alteration of the values assessment.
20. I also acknowledge that multiple site visits are required to assist in identifying the classification of streams (i.e. perennial, intermittent, ephemeral)¹. In that respect, the site visit that informed the Freshwater Ecology Report was conducted during winter (July), when it could be anticipated that perennial reaches are at the greatest extent (i.e. streams which may be intermittent could have been classed as perennial). This means that a conservative approach has been applied to the extent of perennial streams. However, further investigations will likely be conducted during the design phase to supplement the initial assessment.
21. Further, baseline monitoring is currently being conducted within selected stream reaches across the Project corridor. The data collected will contribute to the freshwater ecological impact assessment that will be prepared for the application for regional resource consents.

Assessment of permanent loss of waterways

22. Mr Brown also questions (paragraph 52) whether the assessment of stream length that is lost includes permanent loss of waterways. Particularly, headwater ephemeral streams as a result of cut and fill works, and areas that will be required for sediment and erosion control devices.
23. Ephemeral waterways lost as part of cut and fill works have not been included as part of the assessment as yet. The possible loss of perennial, intermittent and ephemeral waterways, associated with sediment and erosion control devices, has also not been included yet. Those aspects are yet to be fully developed. Erosion and sediment control devices are subject to change (including location and size) and the placement (and associated direct and indirect effects) will be taken into consideration for the freshwater ecological impact assessment prepared as part of the application for regional resource consents.

¹ Please see definitions of these terms in the Freshwater Ecology Report.

Method for assessing magnitude of effects

24. Mr Brown raises concern (paragraphs 53 to 55) over the approach used to assess the magnitude of effects.² Specifically, Mr Brown is concerned that the approach used has watered down the effects, and does not take into consideration any localised or cumulative effects within a sub-catchment.
25. There are different methods with which to assess the magnitude of effect on freshwater ecology values. The difference relates, in essence, to spatial scale - from each individual stream reach to the wider (Manawatū) catchment. The magnitude of effect relates to the changes at the local habitat, and a sub-catchment approach is a good middle ground between too fine a focus (the stream) and too large (the wider catchment).
26. The approach I have used takes into account the habitat and resource availability at the sub-catchment level and is, in my opinion, the appropriate spatial scale for the landscape and systems of the Project. It takes into account the range of habitat availability within sub-catchments across the alignment. I note that of the eight sub-catchments assessed, one sub-catchment consists of over 35km of linear waterway, while another sub-catchment consists of just under 10km of linear waterway, and the remaining six sub-catchments are relatively smaller in scale (less than 5km).

Methods for avoiding, remedying or mitigating adverse effects

27. Mr Brown states that the Freshwater Ecology Report is “silent” on how the adverse effects will either be avoided, remedied or mitigated.
28. As discussed above, the Freshwater Ecology Report was produced to provide an indication on the condition and values of the habitats present and the potential habitat loss / modification associated with the proposed alignment (as well as to assist in the natural character assessment). The intention of the Report was not to provide a comprehensive package that would recommend avoidance, remediation and / or mitigation actions or otherwise address the likely effects. The detailed design phase will almost certainly alter how much waterway length will be affected and thus the extent of measures necessary to address those effects.
29. Mr Brown (paragraph 60) states that the AEE suggests that there will be a high level of ecological effect on streams. The Freshwater Ecology Report warns of the possibility of such an outcome but, as I have noted above, that

² The detail of the approach used is provided under section 4.1.1 of the Freshwater Ecology Report with a brief description provided in paragraph 27.

initial Report is not the ecological impact assessment, which reflects the developed construction and alignment design. There are potential design opportunities that can reduce impacts on freshwater ecology values which will need to be further explored. This detail, along with proposed measures to address effects, will be provided within the freshwater ecological impact assessment with the application for regional resource consents.

Planning (Phillip Percy and Anita Coplestone)

30. Mr Percy and Ms Coplestone provide an overview of the submissions that are relevant to freshwater ecology (paragraphs 399 to 400). They refer to the following submission points:
- (a) impacts on freshwater values as a result of run-off from roads and construction activities (i.e. sedimentation) and subsequent downstream contamination;
 - (b) Forest & Bird contend little consideration has been given to the ecological importance or threat status of the macroinvertebrate species identified;
 - (c) Forest & Bird also raised concerns about the long-term impacts on downstream waterways, particularly in terms of sedimentation (Transmission Gully is raised as an example);
 - (d) concerns were also raised around the quantity of riparian planting that will be required to address effects, and the potential that there might not be adequate areas (sub-catchments) available to accommodate the necessary planting.
31. Mr Percy and Ms Coplestone raise a concern (paragraph 460) about how the proposed condition relating to the maximum stream length able to be affected (draft Condition 5), were determined.
32. I respond briefly to these points in turn below.

Freshwater macroinvertebrates

33. Freshwater macroinvertebrate communities will be dealt with in detail in the regional resource consenting process. Freshwater macroinvertebrate results have contributed to assessing the freshwater values of the waterways. Macroinvertebrate indices (and a taxonomic resolution standardised to these indices) have been used (along with other measures)

as a surrogate for the “health” of the waterways. This is a common assessment method.

34. Whilst the conservation status of the macroinvertebrates has not been considered in the current assessment, the outcomes of determining their conservation status is unlikely to change the overall assessed values of the waterways, nor any proposed measures to address effects. This is because *Threatened* and *At risk* macroinvertebrates are more likely to be found in less modified and more intact instream habitats (such as Watercourse network 6 and Watercourse 7A), and these waterways have already been categorised as having “high” ecological value.

Sedimentation

35. Erosion and sediment control and stormwater treatment plans, as well as other protocols (covering works near watercourses, vegetation clearance, etc) will be developed and implemented to the relevant standards as part of the resource consent process. At this stage, there is no reason to assume proposed plans and protocols will not be robust, or adequate to limit direct impacts on freshwater ecological values.
36. Regarding the Transmission Gully experience raised, it is the case that erosion and sedimentation events have been monitored over the construction period and have involved numerous sediment discharge issues over that time. The long-term macroinvertebrate and condition monitoring does not however, reflect substantive community damage. That is, monitoring results from the Transmission Gully project indicate that instream communities and assemblages, while periodically affected to differing degrees, have largely remained similar to the pre-roading / farming landuse background state. What changes have been recorded are all, so far, short term temporary changes.

Riparian planting quantities

37. Initial indications of stream habitat loss would suggest that the quantum of mitigation required (riparian planting / stream enhancement) is likely to be larger than what can be undertaken within the designation. **Dr Forbes** and **Mr Dalzell** discuss opportunities and processes for identifying and securing land beyond the designation corridor for ecological restoration processes.

Condition on maximum affected stream lengths

38. The maximum stream lengths able to be affected were guided using the scaled approach (identified in Table 6.C.8) that is described in the Freshwater Ecology Report in section 4.1.1.
39. The intention is to set an effects envelope, to provide a bottom-line level of certainty and protection. I agree that this should not dissuade the Transport Agency from seeking to minimise the extent of freshwater habitat modifications (and that is not the intention).

Kieran Miller

8 March 2019