BEFORE THE TARANAKI REGIONAL COUNCIL AND NEW PLYMOUTH DISTRICT COUNCIL

MT MESSENGER BYPASS PROJECT

In the matter	of the Resource Management Act 1991
and	
In the matter	of applications for resource consents, and a notice of requirement by the NZ Transport Agency for an alteration to the State Highway 3 designation in the New Plymouth District Plan, to carry out the Mt Messenger Bypass Project

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STATEMENT OF REBUTTAL EVIDENCE OF MARTIN WILLIAM NEALE (FRESHWATER ECOLOGY) ON BEHALF OF THE NZ TRANSPORT AGENCY

30 July 2018

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TABLE OF CONTENTS

INTRODUCTION

1. My name is Martin William Neale.

2. This rebuttal evidence is given in relation to applications for resource consents, and a notice of requirement by the NZ Transport Agency ("the **Transport Agency**") for an alteration to the State Highway 3 designation in the New Plymouth District Plan, to carry out the Mt Messenger Bypass Project ("**the Project**"). It is my second statement of evidence for the Project, following my evidence in chief ("**EIC**") dated 17 July 2018.

3. I have the qualifications and experience set out in my EIC.

4. I repeat the confirmation given in my EIC that I have read the 'Code of Conduct' for expert witnesses and that my evidence has been prepared in compliance with that Code.

5. In this evidence I use the same defined terms as in my EIC.

6. This evidence responds to the freshwater evidence of Dr Thomas Drinan on behalf of DOC.

STREAM VALUES AND PROPOSED MITIGATION

7. I agree with Mr Hamill and Dr Drinan that the freshwater resources in the project area are generally of high value. However, Dr Drinan's use of the FENZ resource (Freshwater Ecosystems of New Zealand (Leathwick et al, 2010)) raises some issues.

8. First, FENZ is a desktop-based modelling tool that is primarily based on environmental characteristics that themselves are predicted from other models. The use of environmental classifications of this type is based on an assumption that biological properties of aquatic systems can be inferred from environmental conditions (Hawkins & Norris, 2000). However, numerous studies have shown the power of environmental classifications to infer biological properties to be low (Neale & Rippey, 2008 and references therein).

9. Second, if we were to accept that the two affected catchments have 'significant conservation value' based on FENZ (Dr Drinan paragraph 60) and that this should be factored into the assessment of the potential impacts, then the same concept could equally be applied to the benefits of the mitigation package. That is, the proposed package seeks to restore over 8km of stream system in a catchment of significant conservation value according to FENZ.

10. I agree with Dr Drinan that there is increasing evidence that stream restoration efforts are frequently not as effective as expected (Dr Drinan paragraph 105(e)). However, a particular strength of the current proposal is the large-scale restoration of stream reaches that are contiguous with high value stream reaches upstream (i.e. forested headwaters), and contiguous with downstream

reaches with minimal fish passage issues. In combination, these factors provide me with greater certainty that the proposed restoration will be successful. Dr Drinan is of course correct that this restoration activity is subject to landowner agreements (Dr Drinan paragraph 104). Mr MacGibbon addresses this point on behalf of the Transport Agency.

11. Dr Drinan has compared Environmental Compensation Ratios (ECR) for this project with those from Transmission Gully and an Auckland average (Dr Drinan Para 16 & 120). At a high level, I am very cautious about comparing ECRs from different projects because they are dependent on numerous site-specific factors (including the quality and potential of the impact sites, and the quality and potential of restoration sites).

12. Nevertheless, Mr Hamill has addressed the comparison to Transmission Gully in his rebuttal evidence (Hamill rebuttal Para 19) and I comment on the Auckland average here. I calculated the Auckland average ECR to which Dr Drinan refers in 2009, based on a small number of projects that had been completed in Auckland during the first two years after SEV was published in 2006. This was calculated to provide context to the participants in the SEV training course that I ran from 2008 to 2016 for Auckland Council. It was not intended to be used as a 'benchmark' for ECRs. A more recent review of far more applications (i.e. hundreds) of the SEV and ECR tools has found an average ECR of around 2.4 (publication in prep).

13. Dr Drinan (paragraph 102), Mr Hamill and I agree that the SEV and ECR are tools that require professional judgement and skill in their application. In my opinion, where Mr Hamill has deviated from standard practice in his use of these tools (described in Hamill rebuttal evidence at paragraph 16), his assessment has erred on the conservative side of what would have been required if he had applied the tools in the standard manner (i.e. his approach provides for more offset than would have resulted in a 'standard' application).

14. Notwithstanding Dr Drinan agreeing that the SEV requires professional judgement in its application (Dr Drinan paragraph 102), he raises concern with the 'subjective measures' used in the application of professional judgement by Mr Hamill and myself (Dr Drinan paragraph 112). In contrast, while recognising that there is no agreed approach for multiplication factors (Dr Drinan paragraph 107), Dr Drinan has unilaterally recommended such factors are used in the assessment. I suggest an assessment based on the SEV, a methodology that was developed by a panel of New Zealand's freshwater experts, has been subject to extensive peer review and published in at least two scientific papers (Rowe et al, 2009; Neale et al, 2017) offers greater objectivity.

VALUE OF CULVERTS

15. Dr Drinan has argued that culverts should be assigned a post-impact SEV score of zero in the ECR calculations on the basis that the culvert will no longer support biodiversity values, and that basal food resources (algae) will be severely diminished (Dr Drinan paragraph 105 (c)). I disagree with this approach for scientific and management reasons that I explain below.

16. In relation to biodiversity values, culverts are often assumed to be devoid of life and simply structures to allow the conveyance of water, yet there is little in the way of evidence to support such an assumption. In contrast, I investigated this issue as part of a study into biodiversity changes following removal of a culvert in urban Auckland.

17. To provide a baseline for this study, the invertebrate and fish communities in the culvert and in the wider catchment were sampled. The culvert supported invertebrate communities that were similar in biodiversity and ecological indices to the restored stream (i.e. post-culvert removal (Neale & Moffett, 2016)). Further, native fish were observed in the culvert pre-removal and a substantial population of banded kokopu (a migratory fish) were found upstream of the culvert (unpublished data).

18. For context, this study was carried out in a degraded urban catchment, in a culvert that was not consistent with the current (2018) Fish Passage Guidelines, so it could be expected that the culverts proposed as part of this Project could have greater biodiversity values. Clearly culverts can provide some biodiversity values, albeit less than a high-quality stream, and therefore I consider a SEV score of zero is inappropriate.

19. In relation to food resources, the food webs in small forested streams in New Zealand are dominated by terrestrial (or allochthonous) carbon. That is, the stream food web is based on inputs of carbon from terrestrial environments that falls or is washed into and along the stream (typically leaves and organic material, but also insects). The contribution to the food web from aquatic (or autochthonous) carbon, primarily from algae, in these types of streams is low (Winterbourn, 2000). Carbon from algae increases in importance for unshaded, pasture streams, but the current, and proposed state (following riparian restoration) of the streams in the Project area will be forested. Therefore, the contribution of algae to the food web in a culverted stream or a forested stream is unlikely to be substantially different.

20. As a result of the above, I do not consider the scientific evidence supports a SEV score of zero for culverts. It is also a dangerous precedent to deem that all culverts have no biodiversity values. Assigning a score of zero to a culvert implies that a culvert is no different to the complete loss of a stream channel. If there is no recognition of the benefits of culverts over stream loss, then there is no incentive for consent applicants to minimise stream loss or to design

culverts in an environmentally sensitive manner (i.e. that simulate stream habitat and provide for fish passage).

21. The use of the SEV and ECR tools is more advanced in Auckland, for example the SEV method is referred to in Auckland Council's statutory documents, and the value of culverts is an issue that was debated many times. The Auckland Council regulatory department now specify that all culverts are given a score of 0.2 in SEV and ECR assessments in recognition of the issues described above.

IMPORTANCE OF HEADWATERS

22. I agree with Dr Drinan that headwaters are important parts of stream networks and have previously been overlooked in management frameworks (Dr Drinan paragraph 85). Indeed, I developed the evidence base to successfully increase the protection of intermittent streams (some of the smallest headwater streams) in the development of Auckland's Unitary Plan.

23. However, I cannot support the extra weighting of headwaters proposed by Dr Drinan (Dr Drinan paragraphs 89 and 107) as such an approach is not supported by the current science.

24. Dr Drinan relies on a study by Smith (2007) of the adult aquatic insect fauna of the Mokau River and its headwaters. Given the geographical proximity of the Mokau catchment to the Project area, this is probably the most relevant of the headwater studies referred to by Dr Drinan. However, the study has methodological flaws that limit the applications of its findings. Superficially, the results of the study would support a greater weighting for headwaters (for example, 43% of species were only found in headwater streams), but a review of the methods used in the study raises some fundamental issues.

25. First and most importantly, the sampling effort used in the headwaters was far greater than that used in the main river. The headwater sampling utilised two types of collection devices (light traps and malaise traps) and used them 24 hours a day for the duration of the study. In contrast, the sampling of the Mokau River used only light traps, which are only effective during the hours of darkness. Given this substantial difference in sampling effort, it is not surprising that the headwaters were recorded as having greater diversity.

26. Second, any biodiversity differences that could be attributed to the intrinsic values of headwaters are confounded by the differing land use between the streams in this study. All of the Mokau River sites were described as being in pasture areas, whereas all of the headwaters in the study were described as forested. Again, given that we know stream invertebrate communities vary with land use, it is not surprising that the forested headwaters were recorded as having greater biodiversity than a river in a pastoral landscape. It is also noteworthy that the differences in biodiversity values in this Project area are

likely to be (at least in part) a result of similar land use effects, rather than solely a headwater effect.

27. These limitations described above are recognised by the author of the study and should be considered when applying the study's findings. Furthermore, the study clearly states that "*no species of special conservation interest were recorded*" either from the headwaters or the main river.

28. Part of the evidence base developed for the Auckland Unitary Plan hearings includes a study that Dr Drinan refers to and which I am a co-author of (Storey et al, 2011). This study was important for increasing the protection for these type of streams, as one of its conclusions is "*headwater streams should be given similar protection status to perennial streams*". I suggest this conclusion is not consistent with providing greater protection to headwater streams.

29. Finally, as part of the increase in protection of intermittent streams in the Auckland Unitary Plan, it was recognised that there needed to a reliable method for assessing the conditions of such streams. This led to investigations of the how the SEV tool could be applied to intermittent streams, and one of the key findings of the work was that the fish fauna of intermittent streams is less diverse than that of perennial streams of equivalent land use (Neale et al, 2016). This is consistent with the findings of Mr Hamill's assessment in the Project area (Hamill rebuttal paragraph 9)

Martin William Neale

30 July 2018

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