

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

**ADDENDUM TO STATEMENT OF EVIDENCE OF JEFFREY DONALD
MORTON (EFFECTS ON BALLANTRAE TRIAL SITE) ON BEHALF OF THE
NEW ZEALAND TRANSPORT AGENCY**

25 March 2019

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INTRODUCTION

1. My name is **Jeffrey Donald Morton**
2. I submitted a statement of expert evidence ("**EIC**") on the effects of the Project on the Ballantrae trial site, on behalf of the New Zealand Transport Agency ("**Transport Agency**") dated 8 March 2019.
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 addendum I use the same defined terms as in my EIC.
6. I have read the scientific expert evidence filed on behalf of AgResearch and the Fertiliser Association of New Zealand ("**FANZ**"), and the evidence of Cory Matthew on his own behalf.
7. In this addendum to my EIC, I respond in particular to points made in the expert evidence of:
 - (a) Alec Mackay on behalf of AgResearch;
 - (b) Cory Matthew on behalf of himself; and
 - (c) Ants Roberts on behalf of FANZ.

RESPONSE TO EXPERT EVIDENCE

The area of the trial site that will be lost to the Project

8. Dr Horne's analysis, and subsequently my EIC, is based on the impact of the indicative construction footprint for the Project, as shown at Attachment A to Dr Horne's evidence. Dr Horne and I, along with Lonnie Dalzell and Greg Lee from the Transport Agency, explained that to the attendees at the 1 March 2019 meeting referred to in paragraph 4 of my EIC. We also assumed that the small residual parts of the LFNF, LFLF and HNFNF farmlets to the south of the indicative construction footprint will effectively be lost. This was clearly set out in our evidence.
9. However, the expert evidence on behalf of AgResearch, as well as Dr Matthew's evidence, is based on the premise that all of the Ballantrae trial site that is within the designation corridor will be acquired by the Transport Agency (either permanently or for construction activities), and will therefore

be removed from the trial site. That is a much larger area than the indicative construction footprint.

10. Dr Horne and I have advised the Transport Agency that it is important that the actual area of the trial site that is directly affected by construction activities be minimised as much as possible. We have also advised that the area ultimately affected should be similar (in terms of overall area as well as the various balances we referred to in our evidence) to the area that Dr Horne and I have assumed will be lost.
11. I understand that a draft condition is being developed to that end, ensuring that Dr Horne's analysis can be relied on in assessing the effects of the Project on AgResearch. That will I hope allow the experts to consider the total area of the trial site that will be affected by the Project on a certain and fully informed basis. At expert conferencing on 22 March 2019, we discussed the basis of Dr Horne's analysis and my evidence. However, the presumption was that all the land within the designation corridor would be outside the direct control of AgResearch, at least during the construction period.

Field measurement sites that will be lost

12. Experts giving evidence for AgResearch have included and referred to a map showing the location of the field measurement sites (or 'frame sites') at the Ballantrae trial site.¹ I saw a hard copy of this map at the 1 March meeting, but was not supplied with a copy at any point before the submitter evidence was filed.
13. Superimposed on the map is:
 - (a) an area within purple lines referred to as "NZTA Land Acquisition" (which I understand approximates the area included in the designation corridor); and
 - (b) an area within green lines referred to as "Roadworks Extent".
14. The submitter experts have relied on this map to state that 25 of the 72 sampling sites will be lost, on the basis that 23 are within the designation corridor, and two are within 20 metres of the designation corridor. However, presuming the directly affected area is limited to the indicative construction footprint and the residual LFNF, LFLF and HFNF, it would be

¹ The map is included and referred to in the evidence of Dr McKay, Dr Clothier, and Dr Henderson.

appropriate to consider how many of the measurement sites are within that area. That is the true number of measurement sites that will be lost.

15. The area within the green lines on the submitter experts' map does not precisely match the indicative construction footprint area that Dr Horne and I relied on. The submitters' map is also fairly small in scale, making it difficult to precisely identify which measurement sites would be lost. Based on my side-by-side review of both maps, it seems that somewhere between 12 and 16 sites would be lost (not 25).
16. With the above overall initial response in mind, I turn to address specific comments made by some of the witnesses.

Response to evidence of Alec Mackay for AgResearch

The effects of the Project

17. At paragraphs 25 to 30 of his evidence, Dr Mackay sets out what he considers will be the effects of the Project on the Ballantrae trial site. As noted above, the areas referred to at paragraph 25 are based on the premise that all of the trial site within the designation corridor will be lost. That then flows through to his comments about the impact of the loss of this proportion of each farmlet, and the trial measurement sites, in paragraphs 26 and 27.
18. Dr Mackay correctly points out that neither Dr Horne or I directly consider frame sites in our evidence. At the time we prepared our evidence, we did not have a clear understanding of where the measurement sites are located. I note that in his letter attached to my EIC,² Dr Gillingham referred to the importance of measurement sites, I of course read those comments before finalising my evidence.
19. In my view, having information as to the location of the measurement sites is helpful (we were able to discuss this information at expert witness conferencing on 22 March 2019, though ideally it would have been provided earlier). For example, and without wishing to speak for the Transport Agency, it may be possible to avoid measurement sites that are on the margin of the indicative construction footprint.
20. In general terms my view is that not all replacement measurement sites can be established in appropriate locations. In line with my EIC (and Dr Horne's

² On the third page of his letter.

evidence), I recognise that might not be feasible in respect of the south facing aspects of the LFLF farmlet.

21. Dr Mackay refers to behavioural changes associated with the change in configuration of the farmlets, and the potential impact on measurements. I address that point in response to Dr Matthew below; in simple terms I think that concern is overstated.
22. My EIC addresses the potential impact and mitigations for dust during construction, and potential contamination during and after contamination (noting I have recommended monitoring in respect of contamination).

Research levels

23. From paragraph 31 of his evidence, Dr Mackay discusses the ongoing effort put into maintaining the trial, as well as research levels (current and planned).
24. In my evidence I continually emphasise the value of the trial site for future research, and do not diminish what work has already been carried out there. I have commended the efforts of AgResearch to maintain the trial site, and the long-term experiment, both in my evidence and verbally at our 1 March meeting with submitters.
25. As set out in my EIC (and the evidence of Dr Horne), it is clear that ongoing research on the site from Post-Graduate students has declined in frequency since 1988. In particular, I think it is important to understand that research publication citations (referred to by Dr Mackay at paragraphs 31 – 34) do not necessarily mean that new research is actually being carried out at the trial site.
26. Recording the reduced level of research activity at the trial site was not intended as a criticism. I am well familiar with the vagaries of funding for scientific research. The crux of my evidence, and the measures I have proposed, is to encourage and support future research on the trial site. Ideally that would include continuation of the long-term trial, but if not, then other research building on the results of the trial (and the environment created through the trial) could carry on.
27. One particular note is that at paragraph 44 Dr Mackay refers to measurements that have continued. There have been no continual annual pasture growth and composition measurements since 1988 (those measurements being the original core measurements arising from the trial).

“Steady state” and providing for a stable environment for future research

28. At paragraph 47(a) of my EIC, I recorded that the key parameters of the trial are in steady state for the LFLF and HFHF farmlets, meaning there will be little further change over time, and there is a stable environment for further small-scale research.
29. Dr Mackay takes issue with this. Having read his evidence on this point I consider the changes in stocking rates he refers to (at paragraph 38) are relatively small, and consistent with the view expressed in my EIC.³ For LFLF and HFHF, the soil Olsen P levels referred to by Dr Mackay (at paragraph 42) are stable over time. As noted above (and discussed below in response to Dr Matthew), I do not consider the Project will result in significant changes to animal behaviour that would affect the stability of the environment in a significant way.
30. I stand by my view that the site will still be suitable for smaller scale research after the Project is constructed, and the mitigation measures will make it more so. In addition, I have specifically proposed post-Project monitoring to assess the effects of the road on future use of the site.

Response to evidence of Antony Roberts for FANZ

31. I note that Dr Roberts’ comments at paragraph 26 of his evidence use Dr Horne’s analysis (including in particular as to the area of the trial site that will be lost) as a starting point, in contrast to the AgResearch experts and Dr Matthew. Dr Horne’s evidence highlights the impact on southerly aspects on the LFLF farmlet. I accept the amount of this category of land with a southerly aspect will be substantially reduced as a result of the Project. That does potentially have an effect on the validity of future pasture growth and soil nutrient measurements if the farmlet grazing trial pasture measurements were to be revived. However, it does not invalidate the use of the farmlets for future smaller scale component research, or even a continuation in the form of the current trial (albeit with a different balance of aspects between farmlets).

“Steady state”

32. Like Dr Mackay, Dr Roberts refers to my “steady state” comment at paragraph 47(a) of my EIC. To expand on my response to Dr Mackay, I

³ I note I do not use the term “*equilibrium*” in my EIC.

note that I based my “steady state” assessment mainly on the soil Olsen P measurements.

33. In Figure 5 of Dr Mackay’s evidence, from a report describing the 2015/16 pasture growth and composition results (Mackay et al. 2016)⁴, the soil Olsen P levels from the LFNF farmlet from 1980 to 2014 slightly decline from about 5 ug/ml, while in the LFLF farmlet they remain reasonably constant at about 10 µg/ml. From 2003 to 2014, Olsen P levels have appeared to stabilise at about 50 µg/ml, albeit from only two measurements.
34. Because the 2015/16 results compare one year with thirteen years results from 1975 to 1988 leading to possible temporal variability, I do not think that you can put a large amount of reliability in the long-term trends in pasture growth and composition. This is also noted in the report of Mackay et al. (2016). For example, in Figure 3 from Mackay et al. (2016), the percentage of high fertility grasses are higher in the LFLF than in the HFHF farmlet, a complete and unexpected reversal from the 1975-1988 results. Furthermore, pasture growth and presumably composition was measured from six sites per farmlet in 2015/16, compared with eighteen sites per farmlet in 1975 to 1988 introducing large spatial variability between the two periods. However, the large future unknown is climate change and this could greatly affect pasture growth and composition in the years to come eg. invasion of more C4 grasses. This makes the trial site even more valuable as a future resource (and hence my proposed measures intended to facilitate future research use of the trial site).

Potential for smaller scale research

35. Dr Roberts refers to the future use of the trial site likely being for extension and smaller-scale research rather than system studies. That may be the case, depending on the approach taken by AgResearch in future.
36. In any event, the measures I have proposed are intended to facilitate future research activities at the site. The current grazing trial has been maintained, but with only a few direct pasture growth or composition measurements for a long period. As such I do not consider a programme of

⁴ Mackay AD, Costall D, Koolard J 2016. AgResearch Ballantrae long-term phosphorus fertiliser and sheep grazing study: Monitoring in 2015/2016. Report prepared for FANZ. 15 pp.

smaller-scale research activities would necessarily represent a reduction in the current research value of the trial site.

Response to evidence of Cory Matthew

37. In his evidence, Dr Matthew sets out four “*questions at play*”. His third question asks what the impact of the Project will be on the current trial.
38. In answering that question he refers first to loss of area (at paragraph 23(a)). As per Dr Mackay and the other AgResearch witnesses, Dr Matthew assumes that all of the trial site within the designation corridor (and associated field measurement sites) will be lost. Again, the intention as I understand it is not to acquire all the land within the designation corridor, but only to acquire (and directly affect) an area similar to the area that formed the basis of Dr Horne’s analysis.
39. Dr Matthew also refers to a potential fertility transfer gradient. However, it is difficult to compare fertility transfer gradients on flat land with hill country. With flat paddocks sheep tend to camp around shelter belts, gates and water troughs, but there is still a much more uniform spatial return of excreta than in hill country where the sheep transfer much larger amounts of dung and urine from steeper areas where they graze to flatter areas where they camp. Hence for hill country sites like the Ballantrae trial site, the potential transfer of excreta and fertility from areas adjacent to road traffic noise will be minor compared with this overriding process.
40. In reference to that issue, and the vehicle emissions issue flagged in paragraph 23(c), I note that Saddle Road bisects the trial site. That road has recently been subject to a significant increase in traffic, and will revert to more normal levels following the construction of the Project. As set out in my EIC, I have proposed monitoring to consider the effects of the Project on the trial site, both during and after construction. At the conferencing on 22 March, all experts agreed that vehicle emissions were outside their area of expertise.
41. Dr Matthew’s fourth question asked whether reduced trial usage in the last 20 years (in fact I refer to a 30 year period, from 1988) is relevant. In my view, that does form part of the overall picture as to the use being made of the trial site, and appropriate measures to address the effects of the Project.
42. Again, the measures I have proposed are intended to help secure the future research use of the site. Whether that is in the form of restarting pasture

growth measurements (after a 30 year gap for continual annual measurements), or for some other use, should be considered by AgResearch. As explained in my EIC, I do not think that the continuation of the trial (once results are captured to date, as I have proposed), or the restarting of pasture growth measurements, is essential.

Jeff Morton

25 March 2019