In the matter of:	Clauses 6 and 8 of Schedule 1 – Resource Management Act 1991 – Submissions on publicly notified plan change and variation – Proposed Plan Change 1 and Variation 1 to Waikato Regional Plan – Waikato and Waipa River Catchments
And:	**Wairakei Pastoral Ltd**
	Submitter
And:	**Waikato Regional Council**
	Local Authority

FURTHER REBUTTAL EVIDENCE OF RICHARD GEORGE CRESSWELL

Block 2 Hearing Topics

Dated: 17 May 2019

REBUTTAL EVIDENCE OF RICHARD GEORGE CRESSWELL

Block 2 Hearing Topics

SUMMARY

1   Relevant to my expertise, I wish to rebut the evidence of the following expert witnesses:

Name	Submitter
Dr Jane Marie Chrystal	**Beef + Lamb New Zealand Ltd ID 73369**
Dr Douglas Charles Edmeades	**Michael Joseph Peters ID 74197**

2   I support Dr Chrystal's scepticism of OVERSEERS®' capability to accurately represent soil, liveweight and climate inputs, particularly in the new (cloud-based) version of OverseerFM® that has superseded OVERSEER®.

3   I support Dr Chrystal's view that "*when rainfall occurs is critical in more accurately predicting the nitrogen leaching losses*" [28] and spatial and temporal variability are crucial considerations.

4   I support Dr Chrystal's integration of multiple modelling platforms to derive farm optimising solutions. The use of OVERSEER® alone cannot provide the necessary data to inform enterprise management decisions.

5   I support the use of Land Use Capability (**LUC**) assessments to augment models designed for uniform, regular landscapes.

6   I support Dr Edmeades view that "*Overseer should not be used in a regulatory setting. It is best used in a qualitative analysis where the concern in [sic] not the absolute number but the effect of changing farm management practice…*" [22a].

7   I support Dr Edmeades contention that a sub-catchment response is required (and should be promoted), rather than the "*pan-regional approach embedded in the proposed PC1*" [27].

8   I support Dr Edmeades determination that not all (or even any) contaminants should always be mitigated. A sub-catchment

assessment should determine which are critical, which do not need mitigation and whether mitigation is actually necessary.

9   I support Dr Edmeades example of a mitigation action that does not require restrictions placed on any of the four contaminants, yet still achieves the objectives of the quality goals set in PC1.

10   I support Dr Edmeades proposal that "*a water quality management plan could be developed for each subcatchment*" [55].

11   "*This subcatchment plan would then inform the landowners and the Regional Council as to what specific mitigation options are required to achieve the 80 yr. water quality goals*" [56].

REBUTTAL

12   My name is **Richard George Cresswell**. I have the qualifications and experience recorded in my statement of evidence filed in relation to the Block 1 Hearing Topics.

13   My rebuttal evidence has been prepared in accordance with the Code of Conduct for expert witnesses as set out in Section 7 of the Environment Court of New Zealand Practice Note 2014.

14   Relevant to my expertise, I wish to rebut the evidence of the following expert witnesses:

Name	Submitter
Dr Jane Marie Chrystal	**Beef + Lamb New Zealand Ltd ID 73369**
Dr Douglas Charles Edmeades	**Michael Joseph Peters ID 74197**

Dr Chrystal for Beef + Lamb New Zealand Ltd ID 73369

15   I am in general agreement with the evidence presented by Dr Chrystal. Dr Chrystal presents further theory and modelling relating to nutrient transport, specifically as it relates to the beef and lamb industry, the use of OVERSEER® and alternate approaches to managing nutrient losses.

16   Dr Chrystal highlights deficiencies and limitations of the OVERSEER® Nutrient Budgets model similar to those presented in my evidence for Topics C1 in Block 2 of these Hearings.

17   I support Dr Chrystal's scepticism of OVERSEERS®' capability to accurately represent soil, liveweight and climate inputs, particularly in the new (cloud-based) version of OverseerFM® that has superseded OVERSEER®.

18   Dr Chrystal further postulates that practical sheep and beef farm management cannot comply with OVERSEER®-derived Nitrogen Reference Points (**NRP**) as the NRP does not include sufficient temporal variability to match farm management strategies that respond to seasonal changes in climatic conditions.

19   Specifically, sheep and beef farms are reported to farm to the pasture growth curve (**PGR**) and (as a general rule) do not

significantly import fertiliser, nor supplementary feed. That is, they farm to local conditions.

20   I therefore support Dr Chrystal's view that "*when rainfall occurs is critical in more accurately predicting the nitrogen leaching losses*" [28] and spatial and temporal variability are crucial considerations in limiting any sheep and beef enterprise.

21   I believe that Dr Chrystal oversimplifies the use of "*stocking rate and presence or absence of high-risk activities*" [32] as proxies for nitrogen leaching risk. This focus on indirect elements (stock numbers and land use) does not incorporate direct risk of fertiliser application rate and crop management strategies that can both enhance or reduce leaching depending on timing and spatial distribution.

22   I acknowledge, however, that this approach is attractive and compares favourably in the Fonterra-proposed Nitrogen Risk Scorecard and is hence appealing to the beef and lamb industry.

23   I agree with Dr Chrystal's assessment of the inappropriate use of grandparenting to 2014/15 or 2015/16, although the key message should be that of enveloping the NRP as a band rather than a single value for each enterprise.

24   I support Dr Chrystal's integration of multiple modelling platforms to derive farm optimisation solutions. The use of OVERSEER® alone cannot provide the necessary data to inform enterprise management decisions.

25   Particularly, I support the use of Land Use Capability (**LUC**) assessments to augment models designed for uniform, regular landscapes.

Dr Edmeades for Michael Joseph Peters ID 74197

26   I am in general agreement with the evidence presented by Dr Edmeades. Dr Edmeades presents coherent background context and application of OVERSEER® (Dr Edmeades was one of the originators of the model) and specifically his arguments relating to the use of OVERSEER® as a qualitative, rather than quantitative tool.

27   I support Dr Edmeades view that "*Overseer should not be used in a regulatory setting. It is best used in a qualitative analysis where the concern in [sic] not the absolute number but the effect of changing farm management practice…*" [22a].

28   I support Dr Edmeades contention that a sub-catchment response is required (and should be promoted), rather than the "*pan-regional approach embedded in the proposed PC1*" [27].

29   I support Dr Edmeades determination that not all (or even any) contaminants should always be mitigated. A sub-catchment assessment should determine which are critical, which do not need mitigation and whether mitigation is actually necessary.

30   Indeed, I support Dr Edmeades example of a mitigation action (removal of koi carp from targeted sub-catchments) that does not require restrictions placed on any of the four contaminants, yet still achieves the objectives of the quality goals set in PC1.

31   I question Dr Edmeades confidence in OVERSEER® to accurately predict phosphorous (**P**) loss, however, based on the lack of transparency to determine exactly how OVERSEER® treats P, but I support his suggestion to use an alternate model (Mitigator) to model P loss at the farm level.

32   Whilst I support Dr Edmeades claim that LUC classes are not fit-for-purpose and are being used beyond their developed capability, I do not support his opinion that "*the LUC approach for allocating N losses is fatally flawed.*"[49] As described in Dr Chrystal's evidence, and supported above, the LUC approach is appropriate to support other modelling approaches to provide a landscape perspective within which to apply point, or one-dimensional modelling results.

33   I support Dr Edmeades proposal that "*a water quality management plan could be developed for each subcatchment*" [55].

34   "*This subcatchment plan would then inform the landowners and the Regional Council as to what specific mitigation options are required to achieve the 80 yr. water quality goals*" [56].

Dr Richard George Cresswell

Principal Hydrogeologist, Eco Logical Australia

15 May 2019