BEFORE CANTERBURY REGIONAL COUNCIL
AT CHRISTCHURCH

In the matter of	the Resource Management Act 1991
And	
In the matter of	Proposed Variation 2 to the Proposed Canterbury Land and Water Plan
And	
In the matter of	a submission by Te Rūnanga o Ngāi Tahu

SUBMISSIONS ON BEHALF OF TE RŪNANGA O AROWHENUA TRUST AND TE RŪNANGA O NGĀI TAHU DATED 18 JUNE 2015

BUDDLE FINDLAY
Barristers and Solicitors
Christchurch

Solicitor Acting: **Kerry Smith**
Email: kerry.smith@buddlefindlay.com
Tel 64-3-379 1747 Fax 64-3-379 5659 PO Box 322 DX WX11135 Christchurch 8013

MAY IT PLEASE THE COMMISSIONERS

Introduction

1. Te Rūnanga o Ngāi Tahu (Te Rūnanga) is the iwi authority for a large part of Te Wai Pounamu, the South Island as recognised under Te Rūnanga o Ngāi Tahu Act 1996. As outlined in its submission, Te Rūnanga represents those people who descend from the primary tribes of Waitaha, Ngāti Mamoe and Ngāi Tahu.

2. The hapū of Ngāti Huirapa hold mana whenua over the Hekeao/Hinds catchment and are represented by Te Runanga o Arowhenua Trust; one of 18 papatipu rūnanga for Te Rūnanga under s9 Te Rūnanga of Ngāi Tahu Act 1996. Te rūnanga is obliged to consult with papatipu rūnanga under s15 of that Act and in practice Te Rūnanga supports ngā rūnanga work in the development of positions on many issues including the natural environment.

3. Te Rūnanga and ngā rūnanga ("Ngāi Tahu") have significant interests in the management of land, freshwater and other natural resources within the Ngāi Tahu takiwā. Those interests stem from both Ngāi Tahu as manawhenua and the commercial interests of the tribe. Ngāi Tahu are farmers, with interests in several high country stations and some 16,000 hectares of land being converted from exotic forestry to irrigated farm land in North Canterbury through one of its holding companies.

4. Consequently ensuring these resources are managed in ways which respect and give effect to Ngāi Tahu's cultural values and which provide for the economic, social and cultural well-being of people and communities which are reliant on an agricultural-based economy, are of fundamental importance to Ngāi Tahu.

5. In general terms the Ngāi Tahu submission endorses Variation 2 to the proposed Land and Water Plan, by supporting the identification of Hekeao/Hinds Lower Plains Catchment as over-allocated for abstraction, and adversely affected by nitrogen concentrations in lowlands streams and groundwater, and low flows in lowland streams.[1]

[1] Murchison at para 9(a)

6. The approach in Variation 2, of addressing those issues in parallel with providing for additional irrigation, and land use development, is also generally supported.[2]

7. Ngāi Tahu have concerns about how water quality and water quantity issues are proposed to be addressed in this catchment which has particular cultural significance.

8. Ngāi Tahu seek to add provisions to Variation 2 to recognise and provide for the cultural significance of the Hekeao/Hinds Catchment to Ngāi Tahu.[3] Ngāi Tahu have an alternative approach to managing nitrogen losses from farming activities and consider provision needs to be made to manage effects on water quality from the discharge of sediment and phosphorous.[4]

9. The Report and Recommendations of Hearings Commissioners adopted by the council on 5 December 2013 recognises land and water are tāonga to Ngāi Tahu.[5]

10. The relationship with wai Māori is recognised in the Ngāi Tahu Claim Settlement Act 1998. In Canterbury 11 lakes, nine rivers and two wetlands are included as areas of statutory acknowledgement.[6] Schedule 19 to the Ngāi Tahu Claim Settlement Act 1998 is the statutory acknowledgement for Hekeao/Hinds River. In that statutory acknowledgement Hekeao to Tokara (the two branches of the Hinds River) are acknowledged as traditionally supporting a number of settlements. As a result of this history of occupation there are a number of urupā associated with the river. The urupā are focusses for whanau traditions, these places holding the memories, traditions, victories and defeats of Ngāi Tahu tūpuna and are frequently protected by secret locations.

11. Ngāi Tahu do not intend to repeat the cultural evidence supporting the Statutory Acknowledgement or what the Commissioners have already heard and noted in the Report and Recommendations adopted by the council on 5 December 2013.[7]

12. However, cultural evidence is to be given by Ms Mandy Waaka-Home, who is kaitiaki of the Hekeao/Hinds Catchment, identifying the significance of this

[2] Murchison at para 9(b)
[3] Murchison at para 9(c)
[4] Murchison at paras 9(e) and (d)
[5] Report at 1.1.1
[6] Report at 1.1.1
[7] For example at 1.3.1 and following

catchment to Ngāti Huirapa and their ancestors. Ngāti Huirapa are the people who hold manawhenua over this catchment and who are represented by Te Rūnanga o Arowhenua.

13. As kaitiaki, Ms Waaka-Homes is passionate to ensure tāonga and other natural resources are passed on in as good a state, if not better, to future generations. Ms Waaka-Home's evidence is about evolving kaitiakitanga principles, especially about the role of kaitiaki to cope with intense demands placed on natural resources. Her evidence is that the Hekeao/Hinds catchment is a historic and contemporary source of mahika kai with numerous seasonal and temporary food gathering sites.

14. Part of this evidence is that the Hekeao/Hinds River was an important mahika kai, known particularly as a source of tuna (eel) and kanakana (lamprey). The coast, and the high country above the catchment, were known for shearwater species also an important aspect of mahinga kai.

15. Ms Waaka-Home describes the Mauri of the Hekeao/Hinds River, including the elements of the biophysical and spiritual components making up Mauri, and why the current Mauri of the Hekeao/Hinds River is degraded.

16. The current degraded state of the Lower Hekeao/Hinds catchment, in terms of both flow and water quality, affects the Mauri of the river, mahinga kai and therefore Ms Waaka-Home's success as kaitiaki.[8] Restoring flows in the Lower Hekeao/Hinds River and tributaries and improving water quality is essential. Maintaining the flow and water quality in the Upper Hekeao/Hinds catchment is also important.[9]

17. Ms Waaka-Home evidence is that, from her understanding of Variation 2, she is not convinced in its present form the variation will deliver its anticipated outcomes. Her concern is that there is no material shift in the way water is managed for abstraction in this catchment.[10]

18. Ms Waaka-Home states her reservations about focussing on nitrate-nitrogen and not considering sediment, phosphorous, pathogens and other contaminants as well.[11]

19. Ms Waaka-Home's evidence will be supported by Cultural Mapping evidence from Mr Kyle Davis, Ngāi Tahu's Environmental Adviser – Heritage.

[8] Waaka-Home at 9.1
[9] Waaka-Home at 9.2
[10] Waaka-Home at 9.3
[11] Waaka-Home at 9.4

Summary of the Submission by Rūnanga

20. The Ngāi Tahu submission acknowledged the ZIP Addendum identified two key water quality issues in the catchment:

    (a) High and increasing concentrations of nitrogen in groundwater as a result of nitrate-nitrogen (N) losses mainly from farming activities; and

    (b) Low flows in lowland streams and springs in the lowland catchment.[12]

21. The submission seeks to craft changes to Variation 2 that are considered appropriate to address these issues.

22. The differences between Ngāi Tahu and the regional council are, essentially, about how to give effect to the National Policy Statement for Freshwater 2014 (NPS Freshwater) and the Canterbury Regional Policy Statement (**CRPS**); and the most appropriate proposals. To achieve the outcomes for water quality and to address water quantity issues.

23. Described generally the amendments sought in the submission were:

    (a) A catchment objective;[13]

    (b) A new policy to adequately recognise the cultural significance of the catchment and the concept of continual improvement in the management of freshwater quality and flows over time to restore the Mauri of the waterways and to enhance mahinga kai;[14]

    New policies and consequential changes to rules to remove the rules limited all activities to no increase in their current nitrogen losses (grandparenting of nitrogen losses) and making nitrogen loss reductions based on land use type; and replacing them with more universally applicable thresholds for nitrogen loss as a permitted activity and as a consented activity, and requirements to make nitrogen loss reductions based on the quantum of nitrogen lost.

    The submission seeks to introduce A, B and C Banding with limits based on nitrogen loads on a per hectare per year basis. Band A in the Upper Hekeao/Hinds Plains would have a limit of up to 10kgN/ha/year for a permitted activity. Band A in the Lower Hekeao/Hinds Plains area would have a limit of up to 15kgN/ha/year as a permitted activity.

[12] Submission at para 7
[13] At paras 2.2 and 2.4
[14] At para 3.4

Band B in the Lower Hekeao/Hinds Plains area would create a restricted discretionary activity status where nitrogen loss was greater than 15kgN/ha/year and up to 27kgN/ha/year (and if land use was established after 27 September 2014 a maximum cap of 214 tonnes per year).

Band C in all areas would apply where nitrogen losses are over 27kgN/ha/year. The activity would be discretionary if established before 27 September 2014 or, if the activity changes but does not increase the nitrogen loss calculation. Otherwise the activity is prohibited if it is established after 27 September 2014.

24. The main thrust for this change requested by Ngāi Tahu is due to:

    (a) Opposition to 'grandparenting nitrogen losses' as a way to manage catchments with high nitrogen concentrations. Ngāi Tahu see grandparenting as essentially rewarding high polluters, not incentivising reductions in nitrogen losses, nor encouraging development of the land uses that should be encouraged – those with low nitrogen losses.

    (b) A desire to ensure nitrogen is managed as a contaminant; and

    (c) A need to improve water quality in this catchment while also providing flexibility for continued growth and change in agricultural land use.

25. Ngāi Tahu's submission also seeks to replace the provisions around 'land use baseline' with a rule requiring Overseer™ estimates of nitrogen loss to be done when there is a change in land use.

26. Change of land use is intended to capture discharges from increase in land irrigated, land under cultivation, increases in the number of weaned cattle grazed or the amount of effluent, sewage, biosolids or other organic material spread or disposed of on site. The driver for this request is twofold:

    (a) To reduce compliance costs by only requiring repeated Overseer™ assessments where land use changes are occurring that have the potential to substantially increase nitrogen losses; and

    (b) As part of rule regime which uses Overseer™ more to measure relative change in nitrogen loss with changes in land use of farm practices, rather than to set absolute numbers for compliance. Ngāi Tahu understand that is the form in which Overseer™ is more accurate.

27. The Ngāi Tahu submission supports the direction of Variation 2, about water quantity, because it is recognising the issue of low flows in lowland streams and springs in the Lower Hekeao/Hinds Plains, and attributes the cause to a combination of the amount of groundwater extracted from the catchment and improved irrigation efficiency reducing recharge.[15]

28. However, what is sought in this part of the submission is:

    (a) Managing groundwater and surface water as a single resource with a new policy 13.4.14 to be added.

    (b) Deletion of policies 13.4.18 and 13.4.19 but with them being substituted by a plan to phase out over allocation of groundwater and to improve the flows of lowland springs and streams.

    (c) Deep groundwater abstraction is opposed in part with an amendment sought to policy 13.4.5 and the introduction of a new policy 13.4.5(b) and the deletion and replacement of rule 13.5.31 to better manage potential effects of abstracting deeper groundwater which is still hydraulically connected to surface water.

29. Stream augmentation and managed aquifer recharge are supported in part.

30. Finally, Ngāi Tahu supports the concept in policy 13.4.16 and rules 13.5.33 and 13.5.34; that is the transfer of water permits should not result in an increase in water abstracted from the Valetta Groundwater Allocation Zone. An amendment to the rules is proposed that would allow a permanent or temporary transfer of water permits as a discretionary activity where certain stated conditions are met. Otherwise a transfer is a non-complying activity.

The RMA

31. Under s67 of the RMA a regional council has to state the objectives for the region, the policies to implement the objectives and the rules (if any) to implement the policies.[16]

32. A regional plan may also state issues the plan seeks to address, methods other than rules for implementing the policies, the principal reasons for adopting the policies and methods, the environmental results expected from

[15] At para 6.3
[16] 67(1)

the policies and methods and the procedures for monitoring the efficiency and effectiveness of the policies and methods.[17]

33. A regional council must give effect to:

    (a) Any national policy statement; and

    (b) Any New Zealand coastal policy statement; and

    (c) Any regional policy statement.

34. Section 67(3) provides a regional plan must give effect to any national policy statement.

35. The National Policy Statement for Freshwater Management 2014 was gazetted on 4 July 2014 and came into effect 28 days later.

36. Nitrate toxicity in rivers is dealt with in Appendix 2 of the NPS for Freshwater (page 28) by setting numerical values. This appendix contains a national bottom line for an annual median numerical attribute state for nitrate (toxicity) of 6.9 milligrams per litre (mg/L) with an annual 95th percentile of 9.8.

37. The policies in the NPS for Freshwater dealing with both the quality and quantity of water are designed to ensure this national bottom line is achieved over time, a concept consistent with the Ngāi Tahu concept of continuous improvement over time.

38. The regional council may extend the implementation date of no later than 31 December 2015 by a programme of defined time-limited stages so it is to be fully implemented by 31 December 2025 or 31 December 2030.

39. The NPS for Freshwater does not state whether what is proposed to be implemented is the policy or the outcomes from the policy. However, given the overall fresh water quality issues being dealt with, and its preamble, what was intended is that the policies are to be implemented by the nominated dates. Had the NPS for Freshwater expected otherwise a more directive expression would have been used. Given the long lag time sometimes encountered in dealing with water-borne contaminants, and inherent uncertainties about now long problems may take to manifest themselves, it is unlikely the policy intends outcomes to be achieved in these time frames.

[17] s67(2)

40. The regional council has extended the timeframe for implementation of the policies of NPS for Freshwater using Policy E1.[18] However, the extension under the Policy E1 does not alter meeting the objectives of the NPS for Freshwater, or defer s67 of the RMA, requiring the NPS to be given effect to.

41. In s67 "give effect to" means implement.[19] Although the *King Salmon case* dealt with the New Zealand Coastal Policy Statement the same approach applies in this case. At paragraph 75 of the Supreme Court's decision the Court noted s67(3) provides that a regional plan must give effect to any national policy statement as well as any New Zealand coastal policy statement. Nothing in the decision suggests a different approach applies to other national policy statements.

42. At paragraph 80 of the decision the Court noted:

> **We have said that the "give effect to" requirement is a strong directive, particularly when viewed against the background that it replaced the previous "not inconsistent with" requirements. There is a caveat, however. The implementation of such a directive will be affected by what it relates to, that is, what must be given effect to. A requirement to give effect to a policy which is framed in a specific and unqualified way may, in a practical sense, be more prescriptive than a requirement to give effect to a policy which is worded at a higher level of abstraction.**

43. Later, at paragraph 91, the Court noted the fact the RMA and the NZ Coastal Policy Statement allow regional councils scope for choice does not mean the scope is infinite. The requirement to "give effect to" the NZ Coastal Policy Statement is intended to constrain decision makers. The Supreme Court thought it was implausible Parliament intended that the ultimate determinate of an application would be Part 2 of the RMA and not, in that case, the NZ Coastal Policy Statement itself.[20]

44. The decision also stated that national policy statements allow Ministers a measure of control over decisions by regional and district councils. The Court said it was difficult to see why the RMA would require regional councils, as a matter of course, to go beyond (in that case) the NZ Coastal Policy Statement and to Part 2.

---

*18 s*42A report
19 Environmental Defence Society Inc v The New Zealand Salmon Co. Limited [2014] NZSC 38 at 75 and following
20 at para 86

45. The danger the Supreme Court was concerned about is that such an approach may see Part 2 trumping the NZ Coastal Policy Statement rather than the statement being the mechanism by which Part 2 is given effect to.[21]

46. The Supreme Court noted three qualifications:

    (a) Where there is any question of a legal challenge to the validity of the policy statement.

    (b) Where the policy statement does not "cover the field" and a decision maker will have to consider whether Part 2 provides assistance in dealing with the matters not covered. The Supreme Court made the observation that s8, to have regard to the principles of the Treaty of Waitangi, will have procedural as well as substantive implications which decision makers must always have in mind when giving effect to the NZ Coastal Policy Statement.

    (c) Third, if there is uncertainty as to the meaning of the particular policies Part 2 may be used to assist in a purposive interpretation. [22]

47. Although *King Salmon* was a decision about the NZ Coastal Policy Statement the principles in that case apply to all national policy statements. The NPS for Freshwater should be given effect to in this case applying *King Salmon* without an overall judgment under Part 2. Under s45 of the RMA the purpose of a national policy statement is to state objectives and policies for matters of national significance relevant to achieving the purpose of the RMA.

48. The objectives of this NPS for Freshwater state goals for managing the quality and quantity of Freshwater. While the policies may be achieved over time, there is no obvious gap in the coverage of NPS for Freshwater from which it might be possible to say it has not "covered the field" in the sense used in *King Salmon*. The NPS for Freshwater deals with water quality, water quantity, integrated management, National Objectives Frameworks, provides for monitoring, addresses tangata whenua roles and interests and deals with progressive implementation.

49. In addition to the NPS for Freshwater, regard must be had to the visions and principles of the CWMS because of the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010.

---

21 at para 86
[22] At para 88

50. Schedule 1 to the ECan Act is the vision and principles from the CWMS. The primary principles are:

    (a) Sustainable management;

    (b) Regional approach

    (c) Kaitiakitanga.

51. Within the primary principles, sustainable management refers to water as a public resource which must be managed in accordance with the sustainability principles and be consistent with the RMA and Local Government Acts.

52. There are two fundamental primary principles divided between first order priority considerations and second order priority considerations.

53. First order priority considerations are the environment, customary uses, community supplies and stockwater. Second order considerations are irrigation, renewable electricity generation, recreation, tourism and amenity. Schedule 1 to the ECan Act refers to a cautious approach being taken when information is uncertain, unreliable, or inadequate.

54. Importantly, the third primary principle is exercising Kaitiakitanga by Ngāi Tahu to all water in lakes, rivers, hapua, waterways and wetlands and should be carried out in accordance with tikanga Māori.

55. The requirement under the ECan Act "to have particular regard to" is to take the matter into account recognising it is something important in the decision making to be considered and carefully weighed in coming to a conclusion.[23]

56. The position for Ngāi Tahu is that their approach to Variation 2 is one which better achieves the NPS for Freshwater than the approach in Variation 2 and also is consistent with Schedule 1 of the ECan Act and the CRPS. The suggested changes proposed by Ngāi Tahu will deliver more appropriate water quality or quantity outcomes when compared to the regional council's approach, because the council depends, in part, on uncertain science and methods.

[23] *Marlborough District Council v Southern Seafoods* [1995] NZRMA 220 and *Meridian Energy Limited v Central Otago District Council* [2010] NZRMA 477.

Ngāi Tahu Evidence

57. Dr Burrell, who is a specialist in freshwater ecology, provides an ecological overview of this part of Canterbury. He discusses Variation 2 water quality and quantity related issues.

58. Dr Burrell's opinion is a healthy freshwater ecosystem is one that provides the correct mix of water quality and habitat to support a range and abundance of species naturally expected to be present with little human disturbance.[24]

59. His evidence is the presence of water is not, by itself, sufficient to support healthy and diverse fresh water communities. Species differ in their flow-related habitat requirements and flood disturbance and low flows are particularly important factors affecting biota.[25]

60. Dr Burrell's opinion includes the observation that low flows and water levels affect aquatic communities with different species affected differently depending on their flow preferences. For example he notes adult eels and brown trout favour deeper water and pools, small native fish favour shallow swift velocities and inanga prefer slower velocities. [26]

61. Ms Waaka-Home has identified the significance of eels (tuna) to Te Rūnanga o Arowhenua. Dr Burrell notes the role of nutrient and periphyton guidelines and refers to the attribute table for the NPS for Freshwater with a nitrate toxicity bottom line of 6.9mg/L, equivalent to 80% protection.

62. Dr Burrell notes the upper Hekeao/Hinds River is in a relatively good condition. However, the lowland streams are in a degraded state impacted by extraction from surface water and ground water.[27] Water quality data from 2001 and 2014 show a substantial increase in nitrate concentrations in 2014 and declines in DPR (Dissolved Reactive Phosphorous).[28]

63. Low flows are associated with reduced run off and erosion, so reduced flows are a likely cause of declining DPR and suspended solids concentrations in lowland streams of the Hekeao/Hinds Plains. [29]

[24] At para. 9
[25] At para 10
[26] At para 12
[27] At para 34
[28] At para 35
[29] At para 37

64. Dr Burrell noticed changes between his earlier field work in 2007 and a site visit in April 2015. By 2015 all the lowland waterways he visited were dry with the only exception being several streams receiving water from the Eiffelton Irrigation Scheme to keep them flowing.[30]

65. Interestingly, Dr Burrell noted that, despite the degraded state, these lowland streams still supported a diverse range of fish species.[31]

66. As to the mitigation measures proposed by Variation 2, Dr Burrell has reservations, but supports mitigation measures such as improved riparian management and fencing, improved drain management, protection of springheads, instream habitat enhancement and improved fish passage.[32] However, Dr Burrell would prefer to focus on mitigating the effects of existing land use activities before allowing further intensification.[33]

67. In order to get to the bottom line of nitrate in the NPS for Freshwater at 6.9mg/L there would need to be a significant improvement in the water quality of the lowland streams. In his evidence, at paragraph 57, Dr Burrell notes median nitrate concentrations are currently in the order of 9-10mg/L. His evidence is that 6.9mg/L of nitrate-N is still very high and well above any limits that would prevent excessive plant and periphyton growth.[34]

68. Dr Burrell proposes limits for DPR in the hill-fed upland of 0.02mg/L and for the hill-fed lower and spring-fed plains of 0.008mg/L.[35]

69. His evidence supports excluding intensively farmed stock from drains and streams, setting nitrogen load and leaching limits and implementing farm practices in Schedule 24a or implementing Farm Environment Plans. However, he has asked for more detail.[36] In particular he is concerned about ephemeral waterway overland flows as demonstrated in his Figure 9.

70. Dr Burrell's opinion is that Variation 2 should include limits on both DIN and DRP to maintain existing water quality and to achieve the freshwater outcomes in Table 13(a). He recommends an annual median DIN (dissolved inorganic nitrogen) limit of 0.6mg/L and an annual median DRP limit of 0.02mg/L. His proposed limits would place a cap on existing nutrient concentrations which would help with maintaining current water quality and

[30] At para 37
[31] At para 40
[32] At para 54
[33] At para 55
[34] At para 57
[35] At para 59
[36] At para 61

achieving the proposed freshwater outcomes in the upper Hekeao/Hinds Plains streams.

71. The alternative method suggested in the Ngāi Tahu submission is supported by the work of Dr Dudley. Dr Dudley calculated nitrate-N loading and groundwater N concentrations under four scenarios.[37] He used the same methods relied on by the regional council[38] with the same assumptions and limitations. He observed that measured or modelled figures for losses of nitrate from agriculture are uncertain so estimates are normally presented as a range is in scientific literature rather than as an absolute number.[39] He contrasts the use of ranges of values in scientific literature with the single values relied on by the council.[40]

72. The results of Dr Dudley's assessment are that imposing nitrate-N loading limits of 27kg/ha/yr to all land within the catchment would reduce catchment nitrate-N loading below current levels with or without the addition of irrigated land proposed under Variation 2.

73. Dr Dudley's opinion about using nitrate-N as a proxy for nutrient loading effects on aquatic systems is that it is not sufficient for preservation of water quality in rivers and streams in Hinds catchment.

74. That evidence is complimented by Dr Warwick Scott's evidence of the role of nitrogen in plant growth and feed quality. Dr Scott has carefully detailed the role nitrogen plays in photosynthesis and the need for nitrogen in pastures throughout the year.[41]

75. Dr Scott's evidence discusses how temperature, moisture and nitrogen are the three main factors affecting pasture growth.[42] He says the amount of dry matter and pasture quality will depend on whether, and for how long, any one of these factors limits pasture growth. The ability to use inorganic nitrogen strategically is, in Dr Scott's opinion, an important tool for pasture management on dryland farms.[43] Dr Scott notes the level at which nitrogen fixation reduces in response to soil nitrogen is an important component required to assess the impact on soil nitrogen of nitrate leaching. In legume-dominant pasture nitrogen may build up in the soil. Whether nitrogen leaches or not depends on the rainfall, land use and grazing management

[37] At para 12
[38] At para 18
[39] At para 19
[40] At para 20
[41] At paras 4.1 and 4.3
[42] At para 4.10
[43] At para4.7

employed on an individual farm.[44] His evidence is that in low rainfall environments with soils of high water holding capacity nitrogen may be retained in the soil for many years. As a contrast, he says shallow soils of low water holding capacity that are irrigated or are in high rainfall zones are most prone to leaching.[45]

76. A pathway is required for excess nitrogen in the soil to leach. In Dr Scott's opinion this pathway is most frequently from excess nitrogen returned to the soil in urine patches and dairy cows grazed on irrigated pastures of soils of low water holding capacity.[46]

77. Dr Scott contrasted arable farms, sheep and beef cattle, and dairy (including dairy support) in his evidence. He notes the main causes of nitrogen leaching from farm systems are urine patches high in nitrogen because of a mis-match between plant and animal demands for nitrogen; animal excreta delivering more nitrogen than can be taken up by the plant needs for nitrogen.[47] Concentrated nitrogen in excreta combined with shallow soils can enhance leaching. [48] Dr Scott also observed the main soil types in the Hinds catchment are light or very light at about 70% of the area.[49]

78. Dr Scott's conclusions are:

    (a) In Canterbury the main cause of leaching is intensive dairying on pastures and winter support of intensive dairying where losses are in the range of 70-100kg N ha/yr.[50]

    (b) Nitrogen leaching losses in Canterbury have doubled between 1990 and 2010 attributed to a tenfold increase in dairy cattle numbers over the same period.[51]

    (c) The main source of nitrogen leaching is dairy cow urine patches where nitrogen may be applied at 600-1000 kg N/ha, higher than pasture plants or decapitated forage crops can absorb.[52]

    (d) Feed supplements can act as an extra form of nitrogen fertiliser because much of their nitrogen content is excreted.[53]

[44] At para5.11
[45] At para5.11
[46] At para5.12
[47] At para 7.1
[48] At para 7.2
[49] At para 7.3
[50] At para 8.1
[51] At para 8.2
[52] At para 8.3

(e) The off-farm wintering of mature dairy cows on forage crops of brassicas or fodder beet adds about 180kg N/ha or excreted nitrogen to a soil which has no living roots to absorb it and is prone to leaching.[54]

79. Dr Scott notes there are well researched methods of reducing leaching losses with the most effective being:

(a) The use of grass/clover pastures with little or no fertiliser nitrogen;

(b) A reduction in the stocking rate of 2.5-3 cows/ha;

(c) A reduction in the use of externally sourced feeds;

(d) A reduction in the proportion of dairy support farm sown in winter feeds;

(e) Mitigation measures involving pads or sheds where winter excreta can be collected for spreading later.

80. Importantly, Dr Scott's final observation is that tinkering with sheep, beef and dairy farming systems where leaching losses are less than 10kg N ha/yr seems a futile exercise compared with the huge reductions required in intensive dairy farms and their support areas.

81. The weight of this evidence about water quality issues supports the need to make significant changes. However, the evidence goes further than merely supporting Variation 2 and illustrates the approach proposed by Variation 2 is unnecessarily restrictive. As an example, Dr Scott recognises that even though intensive dairying on light soils is a significant problem for the risk of leaching, there are farm management techniques that could serve to mitigate problems if properly managed.

82. The evidence from Dr Burrell, Dr Dudley and Dr Scott supports the submission by Ngāi Tahu that a change is appropriate to the methods underpinning Variation 2 and in support of the alternative methods recommended by Ngāi Tahu.

83. Ngāi Tahu have taken a twofold approach to water quantity issues. First, Mr Thorley has considered the existing groundwater resource, reviewed the water balance and considered aquifer recharge.

84. Secondly, Mr Goff has provided evidence about the concept of managed aquifer recharge expressing cautious support for the concept but identifying

[53] At para 8.4
[54] At para 8.5

limitations for the success of this technique to address the problems identified for this catchment.

85. Mr Thorley describes the geological material of the Hekeao/Hinds Plains as highly variable and permeable particularly in channel deposits which tend to follow former streams or river flow directions.[55] The geology is highly transmissive.[56]

86. Mr Thorley's evidence begins with the observation that any take from a groundwater system will alter the equilibrium of that system resulting in diminished natural discharges.

87. The groundwater system has been artificially topped-up by border-dyke irrigation and by losses of water by a conveyance race leakage.[57] A significant recharge is provided in this area through the Valetta and Mayfield-Hinds irrigation schemes supplying water primarily from the Rangitata Diversion Race.

88. Mr Thorley agrees that a move to more efficient irrigation and water conveyance methods has seen recharge to the aquifer reduce with a corresponding decline in groundwater levels and spring-fed stream flows occurring. This alteration has coincided with increased volumes of water extracted from the groundwater resource which is likely to reduce groundwater levels and spring-fed stream flows.[58]

89. Mr Thorley has reservations about the water balance work supporting Variation 2. Technical reports published by the council used an array of recharge estimates and there is a lack of consistency.[59] As a result it was difficult for Mr Thorley to compare water balance estimates with the modelled estimates because additional zones in the areas are included in the modelling report.[60] The accuracy of Tables 7.1, 10-6 or 10-7 in the technical reports is unclear because the data does not match.[61]

90. The model used includes a substantial component of cross-zone flow from surrounding zones introducing what he considers to be a major inconsistency in the water balance. It is unclear what bearing this inconsistency has on the

[55] At para 11
[56] At para 11
[57] At para 15
[58] At para 16
[59] At para 18
[60] At para 18
[61] At para 19

model, the applicability of its predictions and the resulting management approaches proposed by Variation 2.[62]

91. There is also a lack of clarity about how the report Scott (2004) provides estimates of land surface recharge excluding race losses and border-dyke irrigation. Peer review reports requested by Mr Thorley have not been provided and he has not been able to contact the council's scientists for clarification, making the uncertainties he has identified unable to be resolved.[63]

92. Mr Thorley also has reservations about the concept in Variation 2, of replacing surface water and shallow groundwater takes with deeper groundwater. He has noted there is a relatively high connectivity indicated between deep and shallow saturated strata in this catchment.[64] His evidence gives an example about how quickly vertical leakage in the Valetta Groundwater Allocation Zone occurs.

93. As part of his work Mr Thorley has calculated that, in the Valetta area, if all the surface water allocation from spring fed streams was moved to groundwater the Valetta Groundwater Allocation Zone could become 180% allocated. In Mayfield Hinds a similar assessment has led Mr Thorley to believe that the resource may be 101% allocated. His opinion is that, from information supplied by the council, many of the surface water takes already have groundwater takes associated with the properties, but it is not clear how much additional water may be required beyond existing groundwater entitlements.[65]

94. Mr Thorley's opinion is that if replacement of surface water takes to groundwater proceeds a minimum well depth of greater than 50 metres and/or a cumulative seasonal leakage ratio of the average annual pumping rate (<10%) could be required to achieve the benefit sought.[66]

95. Mr Thorley also comments about the use of managed aquifer recharge as a tool. The managed aquifer recharge proposed is up to 4 m^3/s but estimates have ranged up to 7.5 m^3/s.[67] Mr Thorley cautions that very specific targets (flow and/or ground water levels) will be required and iterative processes of

[62] At para 21
[63] At para 23
[64] Paragraphs 12 and 27
[65] At para 30
[66] At para 32
[67] At para 36.

trial and error of adding recharge under different aquifer conditions will be needed.[68]

96. Importantly, he notes managed aquifer recharge is untested in Canterbury and carries uncertainties. There is no clear source of water in the catchment and the claimed benefits to spring-fed streams and water quality is debatable.[69] He notes direct or highly targeted stream augmentation may be a better option.[70] He also has reservations that the managed aquifer recharge analysis *"point source"* approach does not match the way in which it was represented in the ground water model.[71]

97. The weight of Mr Thorley's evidence is that to produce the water quantity outcomes anticipated by Variation 2, it is necessary to properly understand the water balance, but there are uncertainties in what has been made available by the regional council leaving doubt the methods being chosen are appropriate.

98. Mr Goff's evidence is a cautionary tale about managed aquifer recharge. He agrees managed aquifer recharge is a potential tool but it depends on factors including establishing appropriate and attainable goals, proper planning, suitable geology and hydrogeology, availability of surplus water and availability of aquifer storage capacity.[72] Mr Goff notes aquifer recharge does not work in all situations.[73] Aquifer transmissivity needs to be adequately understood[74] and there needs to be water for recharge available in sufficient quantity and suitable quality to meet the goals which are established.[75]
Mr Goff's experience in managed aquifer recharge is extensive, but he does not know of examples where the managed recharge has been used to improve the water quality within an aquifer of poor quality water as is proposed in Variation 2 for the remediation of nitrate concentrations.[76] He continues his opinion by saying that in most cases the volume of water required to dilute an aquifer would be too great to be cost-effective and may ultimately be unsuccessful.

[68] At para 37.
[69] At para 45.
[70] At para 46.
[71] At para 48.
[72] At para 6.
[73] At para 11.
[74] At para 12.
[75] At para 15.
[76] At para 19.

99. In his evidence Mr Goff notes there is a range of proposed outputs totalling 45% of the water balance which is a significant uncertainty.[77] His opinion is that the estimates for planning need to be more accurate for this project given its size and importance.[78]

100. As to the goals and targets of the aquifer recharge project Mr Goff has two comments. Modelling of the groundwater system as a mass dilution solution is unrealistically simplistic.[79] The application of additional recharge to unconfined aquifers with water levels near land surface may lead to water logging and consequent damage to infrastructure and crops in addition to meeting the recharge quantities and project goals.[80]

101. Having made those observations, including concerns about costs and whether the project is sustainable on that basis, Mr Goff says the capture of stormwater could be used for targeted stream augmentation.[81]

102. In summary there are uncertainties about the quantity of water in this catchment and the ability of the proposed remediation programme to address the problem of nitrate contamination. The obvious frailty in the regional council's method in Variation 2 is the lack of any source of the water to be used in managed aquifer recharge and a lack of robust scientific information about the water balance in the catchment.

103. That is not an adequate foundation for the promotion of the solutions proposed by Variation 2 even if they are intended to be temporary solutions.

Response by Te Rūnanga o Arowhenua and Te Rūnanga o Ngāi Tahu

104. The response proposed by Ngāi Tahu is described in Mrs Murchison's evidence. Mrs Murchison's evidence reviews the original submission and updates it by recommending necessary amendments to suggested replacement policies or rules.

105. Mrs Murchison's evidence describes what she considers to be the appropriate framework for establishing policies and rules in this chapter of the regional plan. In particular Mrs Murchison develops a theme that the plan should regulate activities which have the same or similar effects consistently

[77] At para 21.
[78] At para 22.
[79] At para 26.
[80] At para 27.
[81] At para 46.

and are commensurate with their effects on the environment such as on freshwater.[82]

106. In the context of her planning evidence Mrs Murchison says the state of the catchment, so far as water quality and quantity is concerned, and the scale of reductions required to phase out over-allocation means that there are, in her words, few quick fixes.[83] However, what she recommends is the adoption of the Ngāi Tahu concept of continual improvement over time and she expresses an opinion that this approach is key to addressing issues about water quality and flows in the catchment.[84] The notion is not new because Mrs Murchison records where it is referred to in the ZIP Addendum. It is also consistent with the NPS for Freshwater.

107. Mrs Murchison evidence addresses each of the submission points by Ngāi Tahu. In places, in response to decisions that had been made previously, some development of either the proposed wording of the policies or proposed rules has taken place and Mrs Murchison suggests minor amendments. For example, where the Ngāi Tahu submission sought the introduction of a chapter objective including a reference to a prosperous land-based economy, Mrs Murchison recommends an alteration to remove any uncertainty over the choice of words.

108. Mrs Murchison's evidence is divided between water quality and water quantity matters . As to quality she supports the development by Ngāi Tahu of an alternative approach to managing nitrogen, phosphorous and sediment discharges based on band allocations.

109. The attractiveness of the Ngāi Tahu approach is captured in paragraph 79 of Mrs Murchison's evidence recognising the severe limits placed on farming operations which may already have low nitrogen losses restricting abilities to modify operations. There is a lack of responsiveness in Variation 2 which has the potential to disadvantage those activities which cause low levels of nitrogen loss now. The variation provides an incentive for those activities which are already causing higher nitrogen losses.

110. The approach taken by Ngāi Tahu is, as Mrs Murchison observes, one where nitrogen loss is seen as a contaminant or an adverse effect of land use that is

[82] At 21
[83] At para 41
[84] At para 42

to be regulated at defined levels.[85] This approach means that managing nitrogen losses, will be consistent regardless of land use type.

111. Although Mrs Murchison acknowledges the Ngāi Tahu approach would still lead to nitrate concentrations in lowland streams of 8.7mg/L, higher than the NPS Freshwater bottom line of 6.9mg/L, her opinion is that this value is closer to the bottom line than the target in Variation 2. Even allowing for the fact that this plan is interim, a more immediate step towards that bottom line is appropriate.

112. As to water quantity Mrs Murchison recommends a policy that rule 13.5.31 would implement and recognition of moderate hydraulic-connectivity between surface water and groundwater taking into account Mr Thorley's evidence about deep abstraction. Mrs Murchison also addresses the transferability of water permits and options for groundwater over-allocation.

Sundry Matters

113. There are three further matters that need to be addressed as follows:

    (a) The "entitlements" issue referred to by Mrs Murchison at paragraph 83 of her evidence;

    (b) Comments in the s42A report (at paragraph 9.24 on page 108) about whether the Ngāi Tahu proposal can be considered because it is different from what was recommended in the ZIP Addendum; and

    (c) The duty under s32 to look at efficiency and effectiveness and alternatives.

114. These issues can be addressed briefly. First, Mrs Murchison at paragraph 83 of her evidence describes the differences in approach between Variation 2 and the Ngāi Tahu submission.

115. There is no presumption in the RMA that existing lawfully established activities are entitled to continue without further controls or restrictions. Section 32 requires the preparation of an evaluation report. Amongst the matters examined in that report are whether the provisions in the proposal are the most appropriate way to achieve the objectives by:

    (a) Identifying other reasonably practicable options for achieving the objectives; and

[85] At para 83(b)

(b) Assessing the efficiency and effectiveness of the provisions in achieving the objectives; and

(c) Summarising the reasons for deciding on the provision.

116. Under s32(2) the assessment has to identify and assess the benefits and costs of the environmental, economic, social and cultural effects that are anticipated from the implementation of the provisions including the opportunities for:

(i) Economic growth anticipated to be provided or reduced; and

(ii) Employment anticipated to be provided or reduced; and

(b) If practicable, quantify the benefits and costs referred to; and

(c) Assess the risk of acting or not acting if there is uncertainty or insufficient information about the subject matter of the provisions.

117. Aside from the possibility that existing lawfully established activities may be assessed in a favourable way under s32, there is no other provision that could be said to be an entitlement in the sense used by Mrs Murchison.

118. Section 20A provides a measure of protection for existing lawful activities if as the result of a rule in a proposed regional plan taking legal effect an activity requires a resource consent. Otherwise there is a mechanism in s85 of the RMA to apply to the Court.

119. The second point is to address paragraph 9.24 in the s42A report commenting that the Ngāi Tahu approach is significantly different from the framework adopted in the remainder of Canterbury. Inconsistency with the Zone Committee's approaches is signalled in that passage, as a reason not to adopt the Ngāi Tahu proposal. The officer's report stops short of arguing that you are incapable of considering the Ngāi Tahu proposal.

120. Section 4 of the pLWRP deals with policies specifically recognising Sub-regional Section Development at (Policy 4.9 and following). While Sub-regional Section Development Policy 4.9(c) refers to having particular regard to collaboratively developed local water quality and quantity outcomes and methods, nothing in the plan prevents a specific response in this sub-region tailored to particular problems.

121. Section 32 of the RMA requires the Council to examine whether the provisions in the proposal are the most appropriate way to achieve the objectives (s32(1)(b)(ii)). Amongst the matters taken into account are the efficiency and effectiveness of the provisions in achieving the objectives. While the High Court has noted the most appropriate method does not need to be a superior method, what the section requires is a value judgment as to what, on balance, is the most appropriate when measured against relevant objectives. In this context appropriate means suitable.[86]

Conclusion

122. In my submission the approach requested by Ngāi Tahu is to be preferred as more appropriate. It satisfies Part 2 of the RMA, meets the council's obligations under s67 to give effect to the NPS for Freshwater and is the most appropriate method under s32 bearing in mind that deficiencies identified in the council's proposals.

Witness order

123. The proposed order of witnesses will be:

    (i) Ms Waaka-Home

    (ii) Dr Burrell

    (iii) Dr Dudley

    (iv) Dr Scott

    (v) Mr Thorley

    (vi) Mr Goff

    (vii) Mrs Murchison

K G Smith
18 June 2015

[86] *Rational Transport Inc v New Zealand Transport Agency* [2012] NZRMA 298