
in the matter of: the Resource Management Act 1991

and

in the matter of: an application by the Central Plains Water Trust to take water from the Waimakariri River

and applications by the Central Plains Water Trust to use water from the Waimakariri and Rakaia Rivers and for all associated consents required for the construction and operation of the Central Plains Water Enhancement Scheme

in the matter of: a Notice of Requirement by Central Plains Water Limited to the Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

Brief of evidence of Don Young

Dated: 19 June 2008

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BRIEF OF EVIDENCE OF DON YOUNG

- 1 My name is Don Young.
- 2 I hold the position of Manager, Utilities and Roothing for the Waimakariri District Council. I am a qualified civil engineer with 24 years experience in engineering, asset management and senior management.
- 3 I have been requested to give evidence on behalf of the Waimakariri District Council, with particular focus on the assets of the Council.

Waimakariri District Council stockwater

- 4 The Council currently has two direct river abstractions, being an intake for the Oxford Rural #1 water Supply at the end of Rockford Road, and an intake for the Waimakariri Stock Water Race Scheme at the end of Browns Rock Road.
- 5 The Oxford Rural #1 intake utilises two river galleries. Its area of supply relative to Central Plains is shown in **Figure 1**, attached to my evidence.
- 6 The Waimakariri Stock Race system is a shared intake with Waimakariri Irrigation Limited. Its area of supply is also shown in **Figure 2**, also attached to my evidence.
- 7 The Council has concerns about the impact of the proposal on both of these intakes, and this will be covered in more detail by Mr Callander.

Coastal aquifers

- 8 In addition, the Council has a number of supplies that draw water from the Coastal Aquifers, including Kaiapoi, Pines Kairaki, Woodend, Waikuku Beach, and shortly Rangiora. It is generally accepted that these aquifers are partially recharged from flows in the Waimakariri River, although the exact mechanism for this, and the proportion from this and other sources, is not fully understood.
- 9 The "age" of the water in the Coastal aquifers has been tested from the Council's current abstractions, and has been recorded at greater than one hundred years old for bores abstracting from the deep Kaiapoi confined aquifer system. This indicates that the aquifer resource is of significant value, which has taken many hundreds or thousands of years to establish.

- 10 The effect on these aquifers of increased water abstraction from the river is far from understood. On the one hand, some may consider from the above that a reduction in flow in the recharge flows will not have an impact for more than one hundred years. However, this opinion ignores the issue of "*hydraulic head*". This view would conclude that a reduction in recharge flows will lessen the head pushing on the aquifers, and therefore lessen the artesian pressure. This will result in a lowering of the free surface of the aquifer, which in turn will result in a reduction in available head in the water supply wells, and consequently a reduction in capacity.
- 11 It must also be recognised that less flows in the river must have some impact on the amount of water available to recharge the aquifers. Given that the amount of water seeping into the ground will be proportional to the wetted perimeter of the flow in the river, then it is an obvious conclusion to reach that a reduction in flow of the magnitude being requested must have a proportional impact on the flow available for recharge.
- 12 This Waimakariri River seepage not only recharges the groundwater aquifers, but also affects the springfed streams, including the Kaiapoi River system.
- 13 It is noted that the application does not envisage taking of flows at low levels in the river. Even if the application regains priority over the consents granted to Ngai Tahu then it would still primarily be a *B permit* take.
- 14 However, given that the recharge of the aquifers is currently taking place continuously throughout the year, then significant reductions in river flow at any time (including during periods of high flow in the river) will have some impact on volumes available for recharge.
- 15 This may have a significant impact on not only the present residents, but also future generations. The Eastern part of the Waimakariri District Council (that area in the Greater Christchurch Urban Development Strategy) is projected to grow by approximately 52% from a population of 35,200 to 53,500 in the next 35 years. By far the majority of these will be connected to a public water supply that draws from the Coastal Aquifers.
- 16 Therefore, it is submitted that the uncertainties surrounding the effect of the proposed abstraction on the aquifers, and the importance of those aquifers on the health and well being of

residents in the eastern part of the Waimakariri District, are too great to be ignored.

- 17 While it is recognised that this information is currently not available to assist in defining this matter precisely, it is submitted that a better understanding of the recharge system needs to be had prior to approving the application.

Flooding risks

- 18 The final point to be raised by this Council relates to the uncertainty relating to the impact of the abstraction as applied for on flooding risks.
- 19 WDC has a particular concern about the potential effects of the CPW activities on flooding risk in the lower river environment. This relates to the changes that the CPW activities might make to the bed profile further down the river, which might in turn create an increased risk of flood breakouts from the main channel.
- 20 It is generally accepted that braided rivers such as the Waimakariri have a very mobile bed, and that the gravel in the bed is mobilised and transported along the river length in varying degrees depending on the size and length of a particular flood event.
- 21 The Council has recently submitted in support of Environment Canterbury's proposal to strengthen the river protection system on the Waimakariri River. We also submitted our concerns at aspects of the application, and in particular we noted the evidence of the applicant regarding the uncertainty relating to the flooding risk.
- 22 In evidence put forward by Environment Canterbury and subject to peer review, it was noted that there was a 100% probability that the river protection systems would fail at considerably lower flows than the design capacity of the stopbanks, due to the effects of the mobile riverbed. This could occur due to either a build up in the bed level leading to overtopping at flows lower than design level, or a lowering of the bed leading to undermining and instability.
- 23 It was also apparent that this uncertainty meant it was difficult to predict to likely failure mechanism or location.
- 24 The abstraction of 40 cumecs from the river could play a role in altering the pattern of flood events, especially in the small to medium size category. The impact of this on long term aggradation or degradation is far from understood, and yet could have a

significant effect over time in terms of reducing the protection to the wider community afforded by the stopbank system. If for instance, the removal of this flow from the river lead to a build-up of the bed level at a particular site over a period of time when otherwise moderate freshes would have moved the gravels on, then the risk of flooding during a large event may well be increased.

- 25 Again, due to the degree of uncertainty of this impact, and the significant consequences to the community should it occur, an element of caution must be retained. The size of the proposed CPW activities in the Waimakariri River is of such a large scale that it is probably difficult to be absolutely certain about the effects that will occur and it would therefore be prudent (if consents are granted) to include a review or adaptive management condition that allows the CPW allocation regime from the river to be altered if it proves to contribute to problematic changes in bed elevation.

Conclusion

- 26 In summary, it is the opinion of this Council that insufficient work has been carried out to date on either of the following matters to at this stage warrant granting the consent. This includes the
- 26.1 effect of the reduced river flow on the recharge of the Coastal Aquifers; and
- 26.2 impact of the reduction of flows during small-medium freshes in the river, in terms of the effect on gravel movement in the river, and consequential changes to the flooding risk.
- 27 This Council submits that the application should not be approved until such time as the above matters are investigated and resolved to the Councils satisfaction. In the alternative, it should only be granted with such conditions that provide sufficient protections and review mechanisms to ensure all existing values and dynamics are protected – at the moment this does not appear to be the case.

Dated: 19 June 2008

Don Young