

BEFORE THE

**Bay of Plenty Regional Council
HEARING COMMITTEE**

IN THE MATTER

of the Resource Management Act 1991

AND

IN THE MATTER

of hearing of submissions on Proposed Plan
Change 5 (Kaituna River) (PC5) to the
Regional Policy Statement

**STATEMENT OF EVIDENCE BY BLAIR RICHARD THORNBURROW
FOR HORTICULTURE NEW ZEALAND**

Summary Statement

1. The regional policy statement provisions for freshwater management set out an approach for the region that gives effect to Kaituna He Taonga Tuku Iho – A Treasure Handed Down (The Kaituna River Document), however it could also confine the community's productive capability as a result of premature commentary regarding groundwater allocation status.
2. This evidence addresses the Horticulture New Zealand (Hort NZ) submission, further submissions and BOPRC response to the submissions on RPS Issues.
3. Hort NZ generally supports the provisions within the PC5.

1.0 QUALIFICATIONS AND EXPERIENCE

- 1.1 My name is Blair Richard Thornburrow. I currently hold the role of Technical Director - Water Resources at Pattle Delamore Partners Ltd (PDP) where I have worked since 2015. Prior to that, I was a Senior Water Resource Modeller at Jacobs/SKM in Perth, Western Australia (3 years), and a Water Resource Scientist at SKM, Auckland (7 years).
- 1.2 In total I have seventeen years of professional consulting experience in the fields of water resource science in New Zealand and Australia.
- 1.3 I hold a Master of Science (with honours) from the University of Waikato, majoring in Earth Science, which I obtained in 2005.
- 1.4 Of particular relevance to this hearing is my past experience providing specialist advice to various regional councils on groundwater allocation matters including Auckland Regional Council, Waikato Regional Council and Bay of Plenty Regional Council, and to the Government of Western Australia (Department of Water). This has included development of three-dimensional numerical groundwater flow models to support groundwater allocation decision making.
- 1.5 I am currently a member of the New Zealand Hydrological Society.
- 1.6 I have previously appeared as an expert witness before consent hearings.

2.0 INVOLVEMENT WITH HORTICULTURE NEW ZEALAND

- 2.1 I have been engaged by Horticulture New Zealand (Hort NZ) to prepare evidence for this hearing.

3.0 EXPERT WITNESS CODE OF CONDUCT

3.1 While this is a Council hearing, I acknowledge that I have read and agree to comply with the Environment Court's Code of Conduct for Expert Witnesses, contained in the Environment Court Practice Note 2014. My qualifications as an expert are set out above. Other than where I state that I am relying on the advice of another person, I confirm that the issues addressed in this statement of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

4.0 SCOPE OF EVIDENCE

4.1 This evidence provides technical support to, and is supplementary to evidence presented by Mr Simon Greening. The matters addressed in my evidence relate specifically to groundwater allocation in the Kaituna River catchment.

4.2 Accordingly, the structure of my evidence addresses the following:

- i. The background and proposed changes sought by Hort NZ;
- ii. Commentary on the interim groundwater allocation limits; and,
- iii. Commentary on potential allocation options subject to future plan change processes.

4.3 Matters outside of this scope are not addressed in my evidence. These include:

- i. Commentary on the suitability (or otherwise) of various technical methods for determining allocation limits.
- ii. Surface water allocation.

4.4 In preparing this evidence, I have read and considered the following documents:

- i. Submissions on the proposal made by Hort NZ;
- ii. BOPRC officers 'Overview report on submissions';
- iii. The evidence of Simon Greening (Planning) on behalf of Hort NZ.

5.0 EVALUATION

Background

5.1 Hort NZ's submission (8-1) sought amendments to Significant Issues 2.12.4(1) and Policy KR 4B.

5.2 As outlined in submission 8-1, Hort NZ does not agree with the statement in Significant Issue 2.12.4(1) that *"allocation exceeds water quantity limits in several sub-catchments of the Kaituna River, and in parts of the underlying groundwater resource"*

5.3 Accordingly, Hort NZ suggested changes to Significant Issue 2.12.4(1) as follows:

'~~Current consented allocation exceeds water quantity limits, In several subcatchments of the Kaituna River and in the Lower Kaituna aquifer current water allocation is approaching the peak of what would be suitable for freshwater outcomes. Groundwater across the region should be allocated through national policies (NPSFM & NES) and current and best knowledge of the aquifers at the Kaituna catchment scale~~'

5.4 Hort NZ's reason for this change was that this statement, where in reference to groundwater allocation, is *'not based on current and best knowledge of the groundwater aquifers in the Bay of Plenty Region or the Kaituna catchments'*.

5.5 In the BOPRC Officer's 'Overview report on submissions', the staff recommendations are for no change to the wording of Significant Issues 2.12.4(1). Their reasoning for this recommendation is as follows:

'The notified explanation text is correct in that consented allocation exceeds limits based on the interim allocation regime currently in use. New limits, to be implemented by 2024, will be based on new modelling and the freshwater objectives for each Freshwater Management Unit. BOPRC's understanding of appropriate limits is evolving and the community will be engaged on a suitable approach to setting limits. As noted in Forest & Bird's further submission, the NPS-FM and NES-FW are not water allocation tools.'

5.6 The interim allocation regime currently in use by BOPRC is due to be superseded following a programme of numerical groundwater flow modelling and a subsequent Freshwater Planning Process (FPP) to implement allocation limits. The modelling enables quantification and demonstration of the cumulative environmental effects for various groundwater allocation scenarios.

5.7 It is my understanding that the model results will provide a basis for stakeholder consultation, which will canvas a range of values, some of which are competing, and seek to select allocation limits which appropriately balance those values.

Interim Allocation Limits

- 5.8 BOPRC's interim groundwater allocation limits were set out based on water balance studies by White et al. (2008)¹. Unlike the numerical modelling programme, the water balance method did not consider or seek to quantify the cumulative effects of water abstraction/allocation options. Rather, it sought to estimate rates of aquifer recharge, and applied a series of subtractions to calculate water availability, the primary purpose of which was to safeguard surface water base flows.
- 5.9 The water balance method involved developing estimates of average annual recharge (AAR) for predefined catchments. A secondary water balance term: "residual average annual recharge" (RAAR) was conceived and calculated as AAR minus an estimate of the mean baseflow to streams and rivers.
- 5.10 Interim groundwater allocation limits were calculated by BOPRC as 35% of RAAR.
- 5.11 Since 2015, BOPRC has consulted with communities within the Kaituna and Pongakawa-Waitahanui Water Management Area (KPW-WMA) as part of the process to set more defined and defensible groundwater allocation limits.
- 5.12 In responses to community consultation questions for the KPW-WMA, BOPRC noted: *"Council's decision in PPC9 to allocate 35% of water balance calculated in the GNS mass balance model does not have any influence on future groundwater allocation limits set using the recently developed three-dimensional numerical groundwater model."*²
- 5.13 Given the uncertainty and large variations in estimated baseflow contributions to streams, calculated values for RAAR were highly variable. In some catchments RAAR was calculated to be very small, and in some cases, negative values of RAAR were calculated.
- 5.14 As a consequence of the adopted water balance methodology, interim groundwater allocation limits vary considerably from catchment to catchment. The variations in interim groundwater allocation limits are not necessarily consistent with variations in aquifer recharge rates or typical aquifer yields but are influenced to a greater degree by uncertainties in calculation inputs, specifically baseflow discharge estimates.
- 5.15 The aggregate of interim groundwater allocation limits in the lower Kaituna River catchment (comprising the Lower Kaituna (plains), Lower Kaituna (Hills), Mangorewa and WAI3 Ignimbrite groundwater zones) is 9,525,449 m³/year. This interim limit (relative to surface area) is

¹ White, P.A.; Meilhac, C., Zenamsky, G.; Kilgour, G. 2008. Groundwater resource investigations of the Western Bay of Plenty area stage 1 – conceptual geological and hydrological models and preliminary allocation assessment, GNS Science Consultancy Report 2008/240/ 232p.

²Combined Kaituna and Pongakawa-Waitahanui Freshwater Futures Community Group Workshop 11 Notes: Groundwater Quantity.

particularly low compared to adjacent zones and compared to rainfall volumes in the catchment.

- 5.16 I have aggregated groundwater zones in the lower Kaituna River catchment for the purposes of enabling a meaningful comparison of groundwater allocation volumes. It is noted that there is one “deep” groundwater zone (WAI3 Ignimbrite) underlying three “shallow” groundwater zones in the Lower Kaituna catchment. The zones are hydraulically connected, and groundwater naturally moves between the zones.
- 5.17 According to BOPRC’s online tool entitled “Indicative Groundwater Availability and Consented Allocation” (accessed 2 September 2022), the combined current allocation in groundwater zones in the lower Kaituna River catchment is 11,341,076 m³/year, which is 119% of the combined interim allocation limits across the catchment.
- 5.18 Across the four individual groundwater zones, current allocation exceeds the interim limits in three. This includes two zones (Lower Kaituna (hills) and Mangrorewa), which have an interim allocation limit of zero, which are attributable the adopted water balance method rather than any feature or property of the aquifer resource. This has led to BOPRC’s conclusion that current allocation is exceeding limits in parts of the groundwater resource underlying the Kaituna river catchment.
- 5.19 The land surface area occupied by the groundwater allocation zones in the Lower Kaituna catchment is 581.6 km². The interim allocation limit therefore corresponds to a depth of 16.4 mm/year across the catchment, which is less than one percent of catchment rainfall (approximately 1,800 mm/year). The current consented volume corresponds to 19.5 mm/year, or roughly 1% of rainfall.
- 5.20 Previous rainfall recharge estimates for the Lower Kaituna catchment are in the order of 50% of mean annual rainfall, owing to the highly permeable volcanic geology comprising ignimbrite³. Therefore, the current consented groundwater take volume is roughly 2% of estimated aquifer recharge from rainfall infiltration across the Lower Kaituna catchment.
- 5.21 The adjacent groundwater zone to the east, the “Kaikokopu-Pokopoko-Wharere” (K-P-W) zone, has an interim allocation limit of 15,938,294 m³/year and a current allocation of 12,446,852 m³/year. Expressed as a depth across the catchment area (196.2 km²), the allocation limit is 81.2 mm/year and current allocation is 63.4 mm/year. The interim groundwater allocation limit for K-P-W zone is approximately 5 times greater than that of the Lower Kaituna catchment, on a per unit area basis.

³ Groundwater Recharge at the Kaharoa Rainfall Recharge Site – Rotorua. Bay of Plenty Regional Council Environmental Publication 2010/21.

5.22 The aggregate of interim groundwater allocation limits for zones within the Tauranga Harbour Water Management Area is 131,203,988 m³/year, or 101 mm/year across its 1,312 km² land surface area. This is 6 times greater than the aggregated interim allocation limits in the Lower Kaituna catchment, on a per unit area basis.

5.23 Comparison of current groundwater allocation (according to the Indicative Groundwater Availability and Consented Allocation) (Figure 1) illustrates that on a per unit area basis, current groundwater allocation in the Lower Kaituna catchment is very low relative to other nearby catchments.

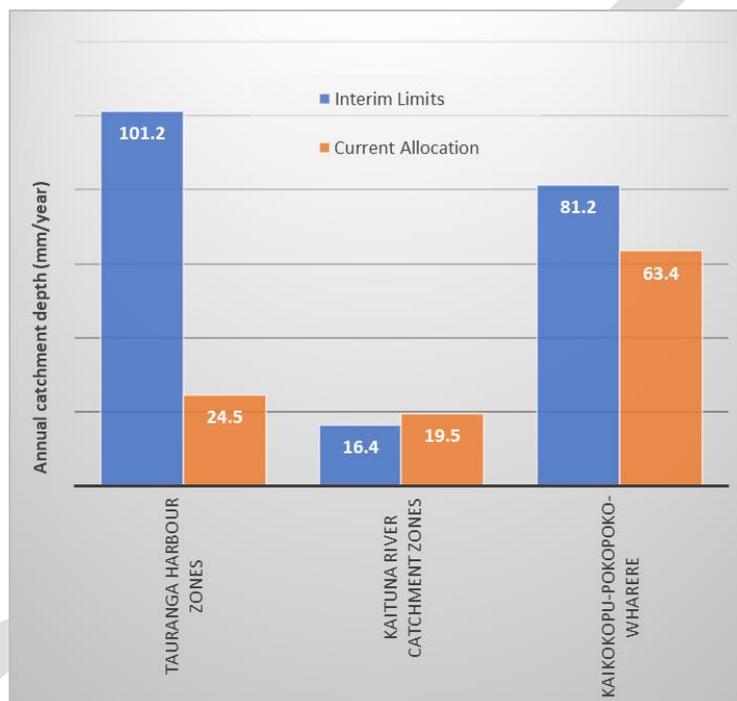


Figure 1: Aggregated current groundwater allocation and interim groundwater allocation limits for Tauranga Harbour, Lower Kaituna and K-P-W zone on a per unit area basis.

5.24 Numerical groundwater flow modelling results were presented to the Kaituna and Pongakawa-Waitahanui Freshwater Futures Community Groups (Workshop 11, 20 November 2019), and indicated that the current allocation level has little regional groundwater level impact⁴.

5.25 Modelling results were presented to the community groups (for their feedback) for three groundwater allocation scenarios comprising:

- i. the current allocation (the “base case” scenario),
- ii. an approximate doubling of current consented allocation; and
- iii. an approximate tripling of current consented allocation.

⁴ <https://atlas.boprc.govt.nz/api/v1/edms/document/A3470702/content>

- 5.26 The most favoured option based on a summary of feedback appeared to be option ii.
- 5.27 Whilst it would be premature to predict the final outcome of the consultation process and eventual definition of groundwater allocation limits, it is quite plausible that allocation limits will increase in comparison to current allocation and interim limits.
- 5.28 The potential consequences of this are outlined in the evidence of Mr Greening.

6.0 CONCLUSIONS

- 6.1 As outlined in submission 8-1, Hort NZ does not agree with the statement in Significant Issue 2.12.4(1) that *“allocation exceeds water quantity limits in several sub-catchments of the Kaituna River, and in parts of the underlying groundwater resource”*
- 6.2 In my evidence I have discussed the basis for current interim allocation limits adopted by BOPRC, which I consider to be extremely conservative for groundwater zones within the Kaituna River catchment.
- 6.3 It is quite plausible that allocation limits in groundwater resources within the Kaituna River catchment, which will be set as part of a future plan change process, will be considerably higher than the currently adopted interim limits.
- 6.4 My view is based on a quantitative comparison of interim limits and current allocation to those of neighbouring groundwater zones, catchment rainfall, and interim numerical groundwater modelling results presented to the community.

Blair Thornburrow
13 September 2022