

**BEFORE INDEPENDANT HEARING COMMISSIONERS
APPOINTED BY THE CANTERBURY REGIONAL COUNCIL**

UNDER: the Resource Management Act 1991

IN THE MATTER OF: Proposed Plan Change 7 to the
Canterbury Land and Water Regional
Plan – Section 14: Orari-Temuka-Opihi-
Pareora

**RESPONSES OF KERI JOY JOHNSTON TO QUESTIONS FROM THE HEARINGS
PANEL ON BEHALF OF OPUHA WATER LIMITED (SUBMITTER NO. PC7-381)**

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1. INTRODUCTION

- 1.1 My full name is Keri Joy Johnston. My experience and qualifications are set out in my primary statement dated 17 July 2020.
- 1.2 The primary purpose of this statement is to respond to the questions posed by Commissioner van Voorthuysen to Opuha Water Ltd (OWL) witnesses during the Plan Change 7 (PC7) hearing on 2 November 2020 regarding the implications of the potential 'decoupling' of tributary abstractors from OWL due to proposed increases in minimum flows under PC7's 'step 2' minimum flow regimes for the South Opuha, Upper Opihi and Te Ana Wai Rivers.
- 1.3 I also provide, for the assistance of the Hearings Panel, in relation to other questions posed by Commissioner van Voorthuysen, suggested revisions to the Table included in [19] of the Joint Witness Statement – Hydrology to:
- (a) Update the BN allocation limit to include the available "headroom" in BN allocation provided for within the allocation limits set out in Table 14(y); and
 - (b) Rectify the Table's omission of the section of the Opuha/Opihi mainstem between the Opuha Dam and Raincliff.

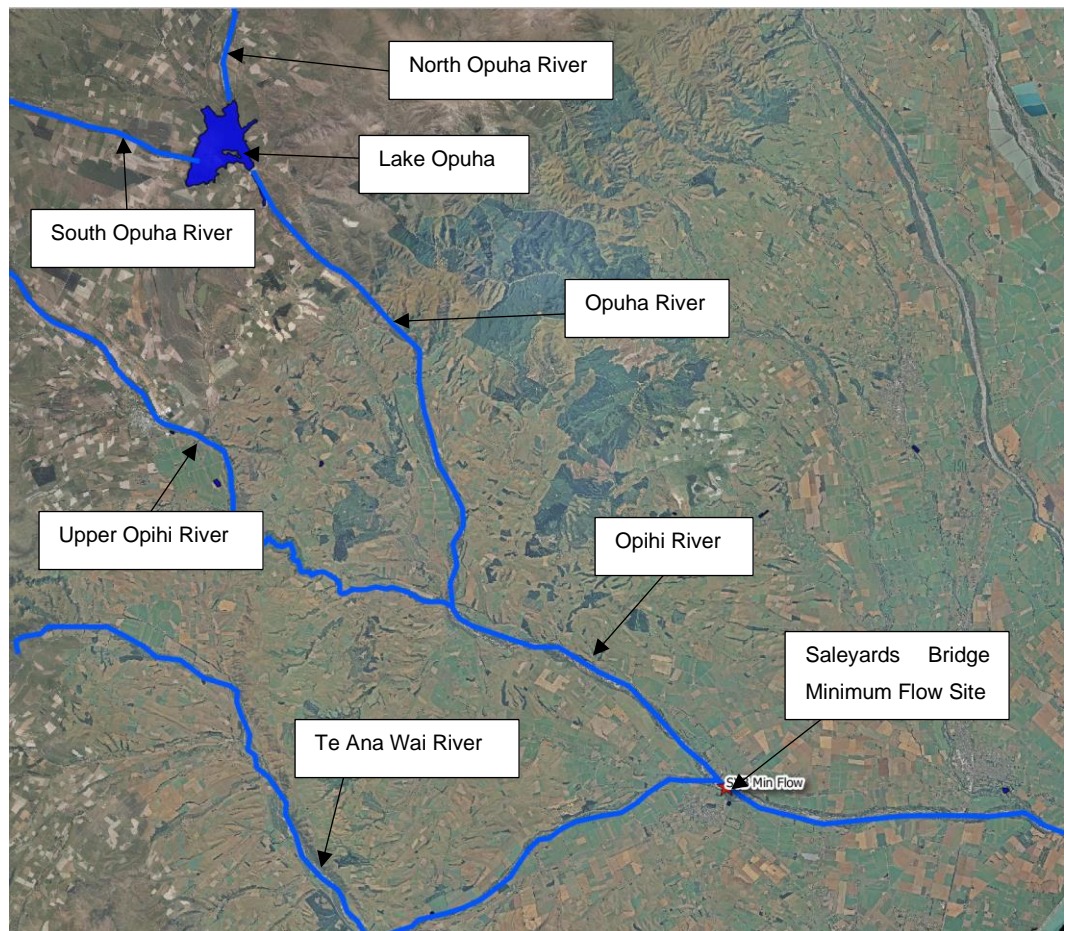
2 'DECOUPLING' OF TRIBUTARY ABSTRACTORS

- 2.1 In their evidence in chief, Mr O'Sullivan and Mr Mockford outline OWL's concern that a likely outcome of Plan Change 7's step 2 increases in minimum flows on the Opihi tributaries (South Opuha, Upper Opihi and Te Ana Wai Rivers) is that affiliated tributary abstractors will chose to 'decouple' from OWL, on the basis that these step 2 flows reduce irrigation reliability to such an extent that being affiliated to OWL no longer has a value proposition. Mr O'Sullivan outlines the significant risk of affiliated tributary abstractors relinquishing shares in the Opuha scheme and consequently their water permits moving from AA or BA permits to AN or BN permits, tied to State Highway One (SH1) minimum flows rather than the Saleyards Bridge (SYB) minimum flows. Mr Sullivan notes that these tributary irrigators would also continue to be subject to minimum flows on their tributaries, but would potentially supplement their existing takes with some on-farm storage (i.e. from PC7's BN allocation blocks).

- 2.2 Commissioner van Voorthuysen posed various questions to OWL's witness in relation to the 'decoupling' scenario during the PC7 hearing. In the following sections of this statement, I have sought to address those questions from a hydrological perspective by:
- (a) Explaining the effect that all abstractions from the tributaries above the Opuha Dam (North and South Opuha Rivers and minor tributaries) and those below the Opuha Dam (Upper Opihi and Te Ana Wai Rivers), irrespective of whether they are affiliated to the OWL or not, have on SYB flows; and
 - (b) Quantifying that effect and the implications of the potential 'decoupling' of tributary water permit holders affiliated to OWL with reference to PC7's proposed minimum flow regime for AN and BN permits and OWL's requested changes to provide for banding of AA/BA and AN permits within PC7's pro-rata partial restriction framework.
- 2.3 As a precursor to this section of my statement, I note that Mr. O'Sullivan's evidence was prepared and filed in advance of the expert caucusing that took place between the hydrology experts, and the update to my evidence on behalf of OWL (dated 27 October 2020) was prepared. It therefore does not take account of the changes recommended in the resulting Joint Witness Statement – Hydrology and my evidence update with respect to the PC7 allocation blocks and the implications of those changes for the decoupling scenario.

Effect of tributary abstraction on SYB flows

- 2.4 The location of the various tributaries and SYB minimum flow site are shown in the aerial photograph below.



- 2.5 The flow at SYB is made up of augmented flows that are released from dam storage, inflows from the Upper Opihi and Te Ana Wai Rivers (plus other minor tributaries), and natural baseflows. All abstraction from these waterbodies, as well as from the Opuha River and from the Opihi Mainstem upstream of SYB reduces the flow at SYB.
- 2.6 There are also tributaries of Lake Opuha, being the North Opuha and South Opuha rivers, plus other minor tributaries. While not having a direct effect on the flow at SYB, it is noted that abstraction from these waterbodies reduces the amount of storage in the lake, and therefore, the amount of water available for augmentation of the Opuha River and Opihi Mainstem (and ultimately, the flow at SYB).

- 2.7 To ensure that the SYB minimum flow requirements are met (and ensure that there is no breach of the minimum flows), OWL releases water from its storage in Lake Opuha to make up any “shortfall” in flow at SYB irrespective of whether the abstraction is under water permits affiliated or not affiliated to OWL.

Implications of PC7’s proposed flow regime for AN/BN permits on SYB flows

- 2.8 Currently under the Opihi River Regional Plan (ORRP), and as proposed by PC7, AN and BN abstractions are subject to a minimum flow for the Opihi River at SH1. For AN abstraction, the minimum flow is the unmodified flow, which is determined by ECan, and represents the flow that would have been in the Opihi river before the dam was established. For BN abstraction, the minimum flow is the actual recorded flow at SH1. This is in contrast to AA and BA abstractions, which are subject to a minimum flow at SYB. If the abstraction is from a tributary waterbody, then the appropriate tributary minimum flow also applies.
- 2.9 BN abstractions do not have any impact on OWL’s requirements to maintain flows at SYB as under the ORRP these have ceased at a flow of 15,000 L/s at SH1 (proposed to reduce to 12,000 L/s under PC7’s proposed Table 14(y)) and therefore no releases from the dam are necessary for BN abstraction. It is noted however that BN abstractions above Lake Opuha do have an impact on storage (and therefore the amount of water available for augmentation), but the lake level restriction of 391.2 metres proposed in PC7 minimises this impact.
- 2.10 However, AN abstraction, whilst being subject to a SH1 minimum flow, can impact on OWL’s requirements to maintain flows at SYB. There is 106 L/s of AN abstraction presently from the Upper Opihi and Te Ana Wai Rivers. Both of these rivers flow into the Opihi River upstream of SYB. Therefore, while these abstractions are able to be exercised (based on the unmodified flow at SH1), OWL needs to provide for them (by releasing water from storage to make up the shortfall in flow at SYB) to ensure that the minimum flow at SYB is not breached.
- 2.11 To assist the Commissioners, I have undertaken modelling to quantify how often this is likely to occur. I have used the flow data for the 2019/20 irrigation season (a total of 243 days), which from a hydrological perspective, was considered a typical/average year. The modelling outputs can be provided to the Commissioners in an excel spreadsheet if required.

2.12 The modelling uses the Plan Change 7 step one (2025) environmental flow and allocation regime in the first instance to determine the number of days that season that each of the individual flow regimes would have enabled water to be taken at full rate of take, or partial rate of take (flow sharing).

2.13 This is as follows:

<u>DAYS</u>	<u>SYB</u>	<u>SH1</u>	<u>Te Ana Wai</u>	<u>Upper Opihi</u>
<u>Full Take</u>	219	121	166	180
<u>Partial Take</u>	0	122	19	59
<u>No Take</u>	24	0	58	4

2.14 What this shows is that the SH1 flow regime (for AN takes) is more restrictive than the corresponding tributary take, with full rate of take able to be taken for 121 days during the 2019/20 irrigation season versus 166 days for the Te Ana Wai River and 180 for the Upper Opihi River. As expected, the flow at SYB was maintained 219 days, and therefore, is the least restrictive of the flow regimes.

2.15 I then took the assessment to the next level and repeated it using dual management, with PC7's partial restriction regimes. Please note that I did not do this for the Upper Opihi River as it only has BA allocation (which under the ORRP and PC7 defaults to BN allocation as opposed to AN allocation if the requisite number of OWL shares/entitlements are not held). As noted at [2.9], in my opinion BN abstractions do not have any impact on OWL's requirements to maintain flows at SYB due to the level at which restrictions apply (under the ORRP and PC7) based on SH1 flows.

2.16 The results of this assessment are as follows:

<u>DAYS</u>	<u>AA/BA Te Ana Wai</u>	<u>AN Te Ana Wai</u>
<u>Full Take</u>	143	122
<u>Partial Take</u>	19	63
<u>No Take</u>	81	58

2.17 What this shows is that there were 122 days in the 2019/20 irrigation season when AN takes from the Te Ana Wai River were able to be fully utilised and OWL, in order to maintain the minimum flow at SYB, would have been augmenting from storage for those takes as well as the AA and BA takes, and

63 days where at least some augmentation was required to make up flows at SYB affected by the partial restrictions for AN takes.

- 2.18 Under the worst case scenario if decoupling occurs, and all tributary AA abstraction becomes AN abstraction, this increases the total able to be taken from the Te Ana Wai River as AN allocation to 356 L/s (noting that there is only BA abstraction on the Upper Opihi River), as well as takes from the Opihi River upstream of SYB to Raincliff.
- 2.19 As AN abstractors do not provide water orders to OWL, there is no way for OWL to know when water is being taken and when it's not. Therefore, the risk response to this is for OWL to make up for these takes through releases from lake storage to avoid any SYB minimum flow breach.

'Stacking' AA/BA and AN permits

- 2.20 There was also a query from Commissioner van Voorthuysen as to whether the SH1 flow regime and/or stacking of AA/BA and AN for pro-rata restrictions resolve the need for OWL to be making up the shortfall in flows at SYB. In my evidence in chief, I discussed the concept of stacking AN abstraction on top of AA/BA abstraction for the pro-rata restrictions on the tributary minimum flow.
- 2.21 As shown above, this does not solve the issue, as stacking (or banding as it is also called) simply changes the starting point for partial restrictions for AA takes, therefore it merely changes the flow requirements from full to partial augmentation. Augmentation to make up for the AN takes is still required under stacking/banding.

Potential solutions

- 2.14 In order to substantially lower the current risk to OWL with respect to providing for AN abstraction in flows at SYB, either the minimum flow at SH1 would need to be raised, or a corresponding reduction made to the required flows at SYB to take into account the change of allocation status of AA permits to AN permits.
- 2.15 However, I understand that neither of these options are likely to provide a possible solution for consideration under PC7 as they are either outside the scope of PC7 as notified or submissions. The second option may also have ramifications from an ecological health perspective.

3 ALLOCATION TABLE

3.1 Should the Hearings Panel's preference be to include in Plan Change 7 a table similar to that set out at [19] of the Joint Witness Statement – Hydrology, I recommend that the table be revised as follows to address the matters raised by Commissioner van Voorthysen (with revisions shown as tracked changes) including showing where that abstractions upstream of Raincliff on the Opihi River are included, and revising the BN allocation to include the headroom available within this allocation block (from Table 14(y) as notified).

Waterbody	AA	BA	AN	BN	Community Supply	TOTAL
North Opuha	61	7	187	20 500	8	283 763
South Opuha	0	634	0	200 800	97	934 1531
Upper Opihi	0	423	97	202 800	122	844 1442
Te Ana Wai	250	2	9	722 800	96	1079 1157
Lake Opuha Tributaries	0	39	0	254	0	293
Lake Opuha	0	33	0	0	0	33
Opuha River and Opihi Mainstem <u>including upstream of Raincliff</u>	2922	4213	1161	264 1700	581	9441 10577



Keri Joy Johnston
14 December 2020