BEFORE INDEPENDENT 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 and Proposed Plan Change 2 to the Waimakariri River Regional Plan

---

MEMORANDUM OF COUNSEL ON BEHALF OF THE CANTERBURY REGIONAL COUNCIL
23 September 2020

Canterbury Regional Council's Solicitor
PO Box 4341 CHRISTCHURCH 8140
DX WX11179
Tel +64 3 379 7622
Fax +64 379 2467

Solicitor: P A C Maw
(philip.maw@wynnwilliams.co.nz)

WYNNWILLIAMS

MAY IT PLEASE THE HEARING COMMISSIONERS

1 The purpose of this Memorandum is to update the Hearing Commissioners in respect of two technical matters that have arisen following the filing of the Canterbury Regional Council's (**Council**) section 42A report in respect of these proceedings.

2 The two technical matters relate to:

(a) First, the resource consent inventory (**RCI**) prepared in respect of the Orari-Temuka-Opihi-Pareora zone; and

(b) Second, the information published by the Council regarding bores in Canterbury on its online "Well Search".

3 Accordingly, enclosed with this Memorandum are two technical Memoranda addressing these issues:

(a) "Differences in groundwater allocations between the OTOP RCI and the Water Data accounting tool: Description, implications and possible solutions" authored by Daniel Clark (**Appendix A**); and

(b) "Adjustments CRC Wells Database for well BX23/0770 at Weedons Ross Road, Christchurch (Aero Club site)" authored by Amber Kreleger and Shaun Thomsen (**Appendix B**).

Dated this 23rd day of September 2020

.....

P A C Maw / I F Edwards

Counsel for the Canterbury Regional Council

Appendix A

Memo

Date	21/8/2020
To	Matthew McCallum-Clark
CC	Helen Shaw
From	Dan Clark

Differences in groundwater allocations between the OTOP RCI and the Water Data accounting tool: Description, implications and possible solutions

Background

As part of the Orari-Temuka-Opihi-Pareora (OTOP) ZIPA and Plan Change 7 (PC7) process a resource consent inventory (RCI) for the OTOP zone was developed (the 'OTOP RCI'). An RCI provides a single source of consent and allocation information for a project, at a point in time. Due to the complexity of consents and the database, an RCI can also be considered as a quality assurance check on the consents within the catchment.

The OTOP RCI reporting started in 2016 and was finalised in 2019. The OTOP RCI was externally reviewed by Keri Johnston of Irricon and comments were also provided by Julia Crossman (Opuha Water Limited). In OTOP there is considerable complexity which needed to be considered and incorporated into the OTOP RCI. This complexity included; many surface water and groundwater allocation zones, varying stream depletion rules, very few physical stream depletion tests, and the interaction between consents and Opuha Water Limited (OWL) shares. This meant that the OTOP RCI took a large effort to complete and the complexity resulting in many discussions about the accuracy of the currently allocated rates and volumes.

The large resource required to complete and challenges to the accuracy of an RCI is not unique to OTOP, and similar issues have been raised with previous RCI's. In an attempt to standardise the approach to developing RCI's, ECan contracted Pattle Delamore Partners (PDP) to complete a "Manual for Compiling and Reporting on Resource Consent Inventories". This document was prepared in consultation with ECan science, planning and consenting staff. This manual was released in July 2018. The OTOP RCI aligns with the methodology developed and reported by PDP.

Since the completion of the OTOP RCI and PDP manual, the ECan Water Data Programme has been working to develop an approach to organise and streamline ECan's water data and automate catchment accounting. This includes the development of a catchment accounting methodology that follows the method for catchment accounting set by Schedule 13 of the LWRP, including proposed changes to Schedule 9 sought via PC7. This methodology (referred to here as the 'new method') was developed to provide a consistent way of reporting water quantity allocation against limits across Canterbury, and has been approved for use as

a tool to apply catchment accounting per the LWRP across ECan. The new method has been implemented in a PowerBI tool and linked to ECan maps for ease of use across ECan. Currently only the groundwater allocations are considered fit for use. The tool to determine surface water allocations is still being finalised using the catchment accounting methodology.

This appears to be a logical progression of improving our accounting of allocation and increasing consistency. However, there are some differences between the OTOP RCI and the new method, which when combined with the timing of PC7 and the community process which was undertaken, poses a risk.

The differences between the OTOP RCI and the new method results in the allocated volumes for groundwater in OTOP varying significantly between the OTOP RCI and the new method. These differences are of particular concern in the Levels Plain and Orari-Opihi groundwater allocation zones (GWAZ), as these were deemed over allocated in the OTOP RCI but are below the allocation limit using the new method. Throughout the Zone Committee process and PC7 development it was assumed (and communicated as such) that these GWAZ were overallocated and that no further allocation would be available in these.

What is the difference between methodologies?

There are several issues that cause a difference between the OTOP RCI and the new method which result in differences in allocation. Broadly these are:

- The Opihi River Regional Plan (ORRP) uses a 30-day stream depletion test and the Land and Water Regional Plan (LWRP) uses a 7 and 150-day stream depletion test. This means that in the Opihi and Temuka catchments the stream depletion is different to most of the region and this results in different consents being counted as stream depleting, and therefore a different distribution between the surface water and groundwater allocation blocks. The OTOP RCI tried to reflect the likely change to the LWRP rules, so this is unlikely to be the cause of a major difference.

- The interactions between consents and OWL shares held by abstractors is complex and the shareholding influence which surface water allocation block the consent is assigned to. In many cases the shareholding volumes and consented volumes are not identical. This complexity can also be variable as shares can be leased for periods of time, which would influence which consents are allocated into each allocation block. This issue was addressed in the OTOP RCI through discussion with OWL, but there are likely to still be some errors associated with these interactions. This is likely to impact the Levels -plains GWAZ more than the Orari-Opihi GWAZ.

- There is a difference in the discounting of the volume associated with stream depleting groundwater between the OTOP RCI and the new method. This is the major cause of the differences between the two methods. This is described in detail below.

Groundwater takes that are deemed to be stream depleting influence both the surface water and groundwater. These consents need to be recognised in the accounting for both surface water and groundwater. Schedule 9 of the LWRP sets out how the accounting of stream depleting groundwater takes is done within surface water and groundwater allocation blocks. The LWRP stipulates that a discount to the groundwater allocation block be applied based on

degree that the take is stream depleting. If discounting is not applied, stream depleting groundwater is accounted for in both the surface water and groundwater allocations and results in some double counting. This approach (not applying discounting) was previously taken by the science and planning teams within ECan as a conservative approach and was the agreed method in the PDP manual for RCI's, used to develop the OTOP RCI.

Schedule 9 of the LWRP relies on the assumption that there is certainty around the stream depletion associated with the pumping of each bore. Desktop stream depletion assessments are conservative estimates and may over-estimate the water that is derived from the stream. Therefore, physical testing is important to confirm how connected a groundwater take is to a stream. However, the numbers of tests which have been completed is low and most stream depletions categories have been based on a desktop assessment.

By not discounting the groundwater allocation for stream depleting takes, a conservative approach is taken for both surface water and groundwater. This recognises that there is uncertainty in the stream depletion estimates and protects both the surface water and groundwater resources. To recognise the uncertainty of desktop stream depletion assessments PC7 added the following footnote 3 to schedule 9. *A reduction in the annual volume allocated from the groundwater block will only be applied where site-specific stream depletion assessments have been carried out.*

The current allocation for GWAZs in the OTOP RCI and from the new method are in Table 1**Error! Reference source not found.**. Both have the GWAZs that are over the allocation limits highlighted in red.

Table 1 Current allocation as reported in the RCI and using the catchment accounting method (27 July 2020)

	Existing Allocation Limit	Current Allocation RCI	% Allocated	Current Allocation New method	% Allocated
Rangitata Orton	42.50	63.70	149.9	49.05	115.4
Fairlie Ashwick Flat	37.00	4.80	13.0	7.61	20.6
Levels Plains	32.90	48.60	147.7	26.13	79.4
Orari-Opihi	71.10	85.20	119.8	64.22	90.3
Pareora	7.19	21.60	300.4	10.92	151.9
Timaru	4.24	8.08	190.6	4.19	98.8
Upper Pareora	1.31	2.82	215.3	2.19	167.5

For the Levels Plains and Orari-Opihi GWAZs the undiscounted allocations in the OTOP RCI were above the allocation limits. In the memo by Dodson and Carmichael (2019) recommendations were made to treat the discounted groundwater allocation as A block groundwater takes and the difference between this and the existing allocation limit as a transfer (T) allocation block.

Implications of the difference

The Zone Committee recommended the following in their ZIPA;

4.9.3. III. Groundwater abstraction is to be capped at current volume of abstraction, and an additional allocation block provided to allow holders of surface water and/or stream depleting groundwater permits to abstract deep groundwater provided the surface water and/ or stream depleting groundwater permit is surrendered and not reallocated.

In the notified PC7 this was reflected as a T block being set in the Orari-Opihi GWAZ. The Temuka Catchment Working Group proposed that T blocks were applied in both the Levels Plains and Orari-Opihi GWAZs. Following submissions, the S42A Report authors have recommended that the T block in the Orari-Opihi GWAZ be removed as it is considered to pose a risk of increasing over allocation in the short term. The new method (and the current method used by the consents team) will result in allocation being available in both the Levels Plains and Orari-Opihi GWAZs. This available allocation could be applied for by any party, including new abstractors.

Possible solutions

It is untenable to use different methodology and tools to determine existing allocation and grant or decline consents across different parts of the region, and a consistent approach is preferred. ECan has accepted that the new method, described by the Water Data Programme and representing the LWRP, should be used going forward to ensure a consistent approach. This needs to be considered when setting the limits in PC7, so that the plan reflects the intent of the ZIPA.

This could be done in the following ways:

- Retain the existing GWAZ limits for the Levels Plains and Orari-Opihi GWAZ's. As the catchment allocation method indicates current allocation is below the limit, this will 'free up' some groundwater allocation which could be applied for by anyone on a first-in basis. This would provide some opportunity for surface water and /or stream depleting groundwater abstractors to swap to lower stream depleting groundwater. This could reduce pressure on the surface water bodies. However, this allocation could also be applied for by new abstractors, who would only be constrained by their ability to source a suitable yield. This option could increase the overall catchment allocation.

- The allocation in the Levels Plains and Orari-Opihi GWAZ's could be capped at current, based on the catchment accounting methodology. This would stop any further allocation in the catchment but would not provide any pathway for surface water and/ or stream depleting groundwater takes to swap for lower stream depleting groundwater.

- Retain the total existing GWAZ limits for the Levels Plains and Orari-Opihi GWAZ's but split these into A and T blocks to reflect the intent of the Zone Committee's recommendation in the notified PC7 Limits. This could be achieved by setting the A block at the current 'discounted' allocation using the catchment accounting methodology and the volume remaining within the existing limit could be assigned as a T block. This would provide a pathway for surface water and/ or stream depleting groundwater abstractors to swap for lower depleting groundwater. This would help

reduce surface water allocation in the Temuka Catchment where the catchment is deemed to be over allocated. There would however be the possibility that surrendered surface water may be re-allocated in catchments which are not deemed over-allocated.

References

Dodson, M, Carmichael, L. 2019. Recommended changes to the Groundwater Allocation Zone limits and boundaries within the Orari Temuka Opihi Pareora zone

Appendix B

Memo

Date	17 September 2020
To	LWRP Plan Change 7 - Planning Team
CC	Maureen Whalen (Science Manager)
From	Amber Kreleger (Senior Scientist) and Shaun Thomsen (Science Field Team Leader)

Adjustments CRC Wells Database for well BX23/0770 at Weedons Ross Road, Christchurch (Aero Club site)

Purpose of this memorandum

The Council has updated the well card of one well (BX23/0770, see Appendix 1 for location) in the CRC Wells Database. For completeness, the details of this update are provided in this technical memorandum. The changes in the well card for well BX23/0770 have no material impact on the technical work relied on in the Plan Change 7 process.

Process followed

In preparation for the Groundwater Science Caucusing we realised that many of the well details we hold in our CRC Wells Database for well BX23/0770 were incorrect and referred to a previously installed well that had been replaced by BX23/0770.

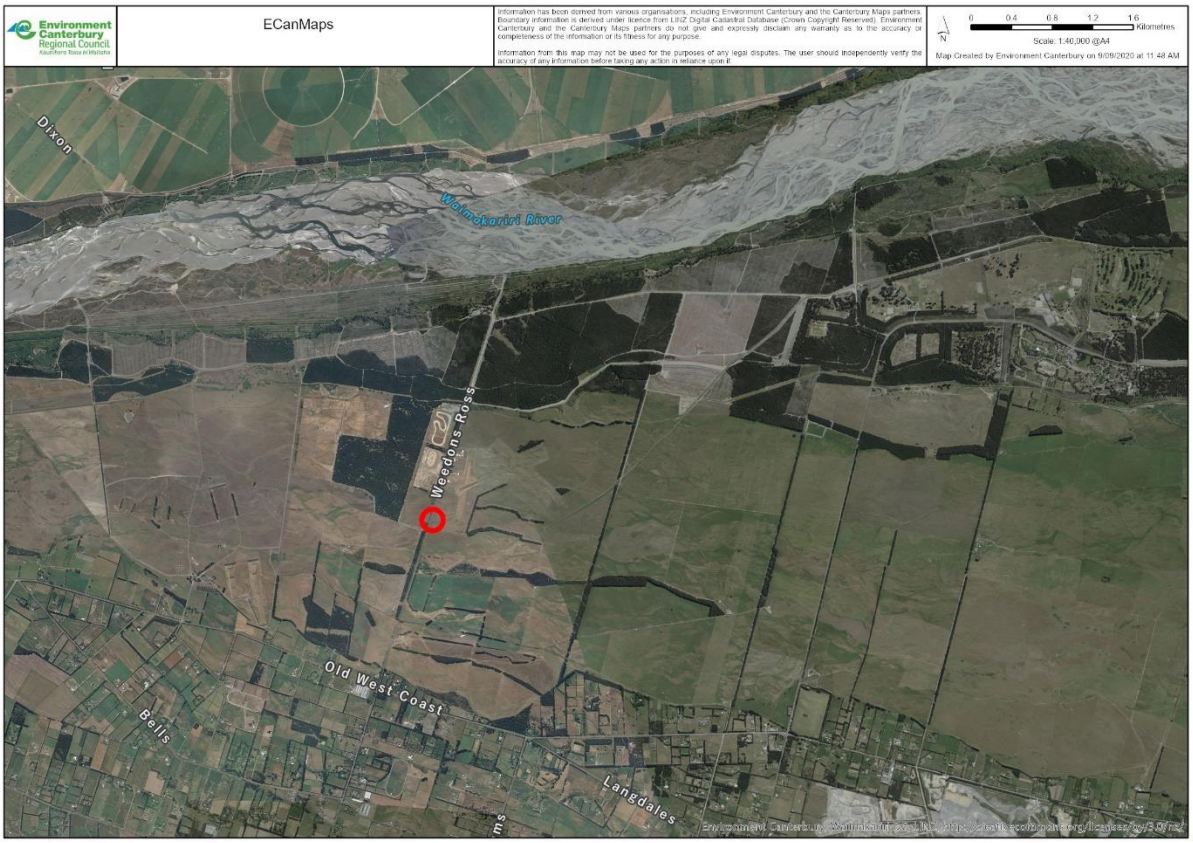
The correct data was not available during Groundwater Science caucusing. The technical experts involved in the Groundwater Science caucusing have been made aware of the issue during caucusing and have been updated on the changes on 9 September 2020, which was after signing of the Joint Witness Statement.

We refer to Appendix 2 for a description the well installation process, well details and the well inspection.

Attachments:

- Appendix 1 – Location of well BX23/0770 on Weedons Ross Road, Christchurch
- Appendix 2 – Well installation, description and inspection
- Appendix 3 – Bore report BX23/0770

Appendix 1 – Location of well BX23/0770 on Weedons Ross Road, Christchurch



Appendix 2 – Well installation, description and inspection

BX23/0770, 150 metres deep, is one of three wells drilled at the site Aero Club site at Weedons Road. The two other wells are BX23/0768 at 103 metres deep and BX23/0769 at 47.5 metres deep.

The first attempt to install well BX23/0770, in August 2017, was only successful to a depth of 125.2 metres instead of the target depth of 150 metres. The well was screened from 123.2 to 125.2 metres. The well details for the 125-metre installation were provided to us by the driller and we uploaded the details into the CRC Wells Database. Groundwater levels were measured in the well for two months and entered in our database as well.

After a review of the groundwater level data it was determined that the 125 metre deep well had the same water level as the 103 metre deep well at the same site – BX23/0768. Further discussions were held with the drilling company and a decision was made to make a second attempt to get to the original target depth of 150 metres.

The second attempt was made as a new standalone installation, rather than deepening the existing 125-metre installation. The new well was drilled slightly to the east of the original three wells, which were in a line alongside the boundary fence line. The 125 metre deep well was decommissioned at the same time by retrieving the casing.

The second attempt was successful in reaching the target depth of 150 metres in December 2017. The well was screened from 150.05 to 153.05 metres. The water level at time of drilling was approximately 3 metres lower than the water levels previously measured in the 125 metre deep well. Groundwater levels have been measured in the well since.

Unfortunately, the full suite of well details for the 150-metre installation were not added to our Wells Database; only the depth of BX23/0770 was updated from 125.2 to 150 metres. All other well details from the 125-metre installation remained on the well record.

In addition, groundwater level data published for BX23/0770 via the Environment Canterbury Well Search, was a combination of water level data from the 125- and 150-metre installations. Groundwater level data from 2017 was from the 125-metre installation. Groundwater level data from Jan 2018 onwards was from the 150-metre installation.

Actions have now been taken to correct the storage and publication of data for both the 125- and 150-metre installations. BX23/0770 remains as the 150-metre installation and all the correct well details provided by the drilling company have been added to the record. All the well details for the 125-metre installation have been shifted to a new well record – BX23/1017. Data available via the Well Search shall be updated accordingly.

On 4 September 2020 the Council's Groundwater Field Scientists have visited well BX23/0770 and performed a visual inspection of the casing seals by using a down well camera. The casing seals show no sign of leaking and still have a good seal. They also surveyed the measuring point of the 150-metre installation and obtained the bore report from the drilling company (see Appendix 3).

Appendix 3 - Bore report BX23/0770

BORE INSTALLATION REPORT

Client	Environment Canterbury	**GPS** DD	**East** **North**	2460257 5747159
Consent No.	870-17/18	**Bore No.**	6	
Bore Location	Weedons Ross Road			
Client Address	200 Tuam Street, Christchurch			
Phone	0272285674			
Driller	Matthew Taylor	**Drill Method**	Dual Rotary	
Machine/Rig	Rig 4 - Foremost DR24	**Bore Diameter**	200mm - 49.8m, 150mm - 137.7, 100mm - 153.05	

Start Date	17/10/2017	**Date Completed**	20/12/2017
Water Level	34.7 m	**Final Bore Depth**	153.05 m

Has the bore been capped or covered?	Yes
Does the bore have a concrete pad?	No
Is the bore sealed with concrete or Bentonite around the annulus?	Yes

Bacterial Water Test	No
Chemical Water Test	No
Photo of Bore	No
Overdrilled (m)	No

TEST PUMPING

Test Pump Size		**Pump Depth**	
Test Pump Period	0 hours	**Rate**	

DRAWDOWN

	1	2	3	4	5
Flow Rate					
Drawdown from SWL (metres)					
Duration (hours)					

SCREEN

Screen Installed	Yes	**Screen Type**	Stainless Steel		
Top of Screen	150.05 m	**Bottom of Screen**	153.05 m		
Screen Slot	2 mm	**ID**	101 mm	**OD**	110 mm

CASING

Casing Material	Diameter	Height Above Ground	Set From	Set To	Length
Steel	200 mm	0.5 m	-0.5 m	49.8 m	50.3 m
Steel	150 mm		39.8 m	137.7 m	97.9 m

WASHINGTONS EXPLORATIONLIMITEDNZ

BORE INSTALLATION REPORT **CLIENT:** Environment Canterb

STRATA

Top Depth (m)	Bottom Depth (m)	Soil Type	Colour	Grain Size	Water Content
0	10	Silt Sand Soil	Grey, Brown	Fine	Dry
10	35	Gravel Sand	Grey, Brown	Medium	Water bearing
35	50.5	Gravel Cobbles Sand	Brown	Medium	Water bearing
50.5	55	Sand Gravel Silt	Brown	Medium	Water bearing
55	76	Gravel Sand Cobbles	Brown	Medium to coarse	Water bearing
76	84.5	Gravel Cobbles Sand	Grey, Brown	Fine to coarse	Water bearing
84.5	99	Gravel Silt Sand	Grey, Brown	Fine to coarse	Water bearing
99	109.5	Cobbles Gravel Sand	Brown	Medium to coarse	Water bearing
109.5	118.5	Gravel Sand	Brown	Coarse	Water bearing
118.5	153	Gravel Cobbles Sand	Grey, Brown	Fine to coarse	Water bearing

Cemented annulas between 200mm & 150mm casing. 40 litres cement