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Cc: [Glenire Farm](#); ["Andrew Mockford"](#); [Julia Crossman](#); [Greg Ryder](#); [Richard Measures](#); [Keri Johnston](#); [Tim Ensor](#)
Subject: Plan Change 7: Opuha Water Limited - Evidence
Date: Friday, 17 July 2020 5:22:45 pm
Attachments: [Evidence in chief of Ryan O'Sullivan \(OWL\) 17.7.20.pdf](#)
[Evidence in Chief of Andrew Mockford \(OWL\) 17.7.20.pdf](#)
[Evidence in Chief of Julia Crossman \(OWL\) 17.7.20.pdf](#)
[Quick reference guide \(Annexure A to Evidence in Chief of Julia Crossman \(OWL\)\).pdf](#)
[Evidence in Chief of Richard Measures \(OWL\) 17.7.20.pdf](#)
[Evidence in Chief of Keri Johnston \(OWL\) 17.7.20.pdf](#)
[Evidence in Chief of Dr Gregory Ryder \(AMWG & OWL\) 17.7.20.pdf](#)
[Evidence in Chief of Tim Ensor \(OWL\) 17.7.20.pdf](#)

Dear Tavisha

We act for Opuha Water Limited (**OWL**), submitter no. PC7-381.

We **attach** for filing, in relation to the above matter, statements of evidence in chief of the following witnesses on behalf of OWL:

1. Ryan O'Sullivan (OWL Board Chair)
2. Andrew Mockford (OWL CEO)
3. Julia Crossman (OWL Environmental Manager)
4. Dr Greg Ryder (Lake Opuha - water quality) – note this statement of evidence addresses matters also pertaining to the submissions of the Adaptive Management Working Group (AMWG) and has also been filed with other AMWG evidence today.
5. Richard Measures (water quality)
6. Keri Johnston (hydrology/allocation)
7. Tim Ensor (planning)

We note that:

- Annexure A to the evidence of Ms Crossman comprises a "Quick Reference Guide" providing a location map and key information regarding the Opuha Scheme. This is also attached as a separate document for the assistance of the Hearings Commissioners.
- a flyover video of the Opihi catchment accompanies Mr Mockford's evidence. A link is provided within Mr Mockford's evidence by which the video can be accessed (<https://youtu.be/Kp6luxCqWsk>). The video is also downloadable in mp3 format from the following link, which can then be shared/posted (e.g. on ECan's PC7 webpage):
<https://we.tl/t-YgyExCMmGF>

Kind regards

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**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

**STATEMENT OF EVIDENCE IN CHIEF OF ANDREW MOCKFORD ON BEHALF
OF OPUHA WATER LIMITED (SUBMITTER NO. PC7-381)**

Dated: 17 July 2020

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1. INTRODUCTION

1.1 My full name is Andrew Keith Mockford. I am the Chief Executive of Opuha Water Ltd. I have held this role for two and half years.

1.2 This evidence is provided in support of OWL's submission on Part B of Proposed Plan Change 7 to the Canterbury Land and Water Plan (**PC7**). I am authorised to provide this evidence on behalf of OWL.

Qualifications and experience

1.3 I have held my current role for two and a half years. Previously I held a role with Trustpower as their Southern Regional Production Manager, responsible for their hydro generation assets in Otago And Canterbury. In that role I also briefly held a role on the Environment Canterbury Regional Water Management Committee.

Background

1.4 Since becoming Chief Executive of OWL, I have been activity involved in the work of the two collaborative groups, Adaptive Management Working Group (**AMWG**) and the Opihi Flow and Allocation Working Party (**FAWP**), which were set up in 2017 to provide assistance to the OTOP Zone Committee on future options for flow and allocation in the Opihi catchment and its main tributaries. During the intervening period, I have presented to the OTOP Zone Committee the findings from work undertaken by those groups, and have attended various number of meetings with the ECan planning team through this process.

1.5 I am familiar with the provisions of PC7 to which these proceedings relate. In preparing my evidence, I have reviewed the relevant parts of the section 32 Report and the section 42A Report. In preparing my evidence, I have also reviewed the evidence of OWL's Environmental Manager, Julia Crossman, and the OWL's consultants, Dr Greg Ryder, Mr Richard Measures and Mr Tim Ensor.

2. SCOPE OF EVIDENCE

2.1 My evidence is intended to provide an overview of OWL, the Opuha Dam and Opuha Scheme, OWL's contributions to the OTOP ZIPA 'solutions package',

OWL's collaborative work pre and post notification of PC7. I also outline OWL's summary position on PC7.

2.2 My evidence is structured as follows:

- (a) Overview of OWL, the Opuha Dam and the Opuha Scheme;
- (b) Scheme Management;
- (c) OWL's involvement in the development of the OTOP ZIPA and contributions to the OTOP "solutions package";
- (d) Work undertaken by OWL in respect of PC7;
- (e) OWL's summary position on PC7; and
- (f) Conclusions.

3. EXECUTIVE SUMMARY

3.1 OWL owns and operates the Opuha Dam and downstream water distribution infrastructure associated with the Opuha Scheme. The Dam augments flows in the mainstems of the Opuha and Opihi Rivers to maintain environmental flow and provide water for community supplies and irrigation, with priority awarded in that order. The dam also includes a 7MW hydro-electric station which generates electricity from all water release from storage. OWL is a co-operative, therefore all the Opuha scheme assets – Dam, generation assets, sub-scheme distribution infrastructure and all of its 58 regional consents, are owned by 243 shareholders.

3.2 The Opuha Scheme arose out of significant community concern that the Opihi River was unable to provide sufficient water for both instream and out of stream users. This, combined with climatic extremes, produced periods where the surface flow ceased in the lower reaches of the Opihi River above the Temuka confluence. The Opuha Dam was the culmination of a true community collaboration, where farmers, District Councils, energy company's and key stakeholders such as Central South Island Fish and Game, worked together to develop long-term solution for all parties.

- 3.3 Commissioned in 1998, the Opuha Dam has contributed to South Canterbury social and economic wellbeing for nearly 22 years. Over this time, a number of modifications and enhancements have been made to the Opuha dam and associated infrastructure, funded principally by shareholders.
- 3.4 A total of 16,000 shares are held by OWLs shareholders. The Opuha Dam releases water into the Opuha River which joins the Opihi River at Raincliff. There are four sub-schemes that draw water from the Opuha and Lower Opihi Rivers under take and divert consents held by OWL: Levels Plains, Totara Valley, Kakahu and Sutherlands.
- 3.5 Additional to the four sub-schemes there are also shareholder irrigators who operate directly off the mainstem of the Opuha and Lower Opihi Rivers, as well as the tributaries of the Te Ana a Wai, the Upper Opihi and the North and South Opuha Rivers above the dam. These shareholder irrigators take directly from rivers or shallow groundwater wells and have individual consents for their water takes. Water is released from Lake Opuha to augment the main stem of the Opihi River and make up the water abstracted from these tributaries.
- 3.6 OWL takes its environmental obligations seriously, and implements its Environmental Management Strategy through a number of initiatives including:
- a) Active participation in the Opuha Environmental Flow Release Advisory Group (OEFrag) where OEFrag inform operational and management decisions relating to the Opuha Dam;
 - b) A commitment to the trialling and use of artificial freshes as a tool for providing flow variability and managing nuisance periphyton (algae) in the Opuha and Opihi River systems;
 - c) Managing the potential of lake stratification through the proactive utilisation of an aeration system;
 - d) Development of an eel (tuna) trap and transfer programme of mature tuna downstream of the Dam;
 - e) A significant investment in a robust Farm Environment Plan and Audit Programme for shareholders;

- f) An ongoing commitment to increasing OWL's understanding of the Opuha/Opihi water resources, including defined water quality investigations.
- 3.7 OWL have participated in the Plan Change 7 process, since its origins in the development of the OTOP Zone Committee's Zone Implementation Programme Addendum, with the aim of ensuring the 'solutions package' for the Zone, and consequently the future PC7 did not compromise the benefits of the Opuha dam for both the environment and irrigators, and that recommendations made by the Zone Committee were fully informed and based on sound science and robust economic information.
- 3.8 OWL's involvement extended in to the Upper Opihi-Opuha Catchment Group, the Adaptive Management Working Group and the Flow and Allocation Working Party, the latter two groups making formal recommendations to the Zone Committee prior to the ZIPA being finalised. OWL committed significant time and resources into working with these groups and funded much of the technical work that underpin these groups' earlier recommendations to the OTOP Zone Committee and their submissions on PC7.
- 3.9 OWL supports the outcomes sought to be achieved for the OTOP Zone by PC7. The Opuha Dam, and OWL as operator of the Dam, will play a central role in contributing to the implementation of many of those outcomes. However, OWL has a number of serious concerns about key aspects of Part B of PC7:
- (a) The proposed Opuha/Opihi augmentation regime;
 - (b) The proposed tributary minimum flow and allocation regimes, including partial restrictions;
 - (c) The proposed nutrient management provisions and water quality targets/limits;
 - (d) The proposed planning framework to the taking and use of surface water, including water permit transfers.

- 3.10 PC7 has the potential to destabilise both the shareholding and hydrological model that forms the basis of the Opuha scheme should OWL's concerns with these aspects of PC7 not be fully addressed. This would significantly compromise OWL's ability to invest in infrastructural improvements and environmental initiatives in the Opihi catchment.
- 3.11 OWL has sought to refine the relief sought in its submissions and further submissions on PC7 and focus amendments that it considers are essential. Those amendments, which are addressed in the evidence of Ms Crossman and Mr Ensor for OWL, and the evidence of witnesses for the AMWG and FAWP, will ensure destabilisation of the Scheme does not occur and otherwise ensure:
- (e) The strategic importance of the Opuha Dam and the Opuha Scheme to the Opihi catchment and South Canterbury community, is appropriately recognised in PC7;
 - (f) The efficient use of OWL's assets and the resources on which those assets are dependent are not compromised; and
 - (g) The associated planning framework is effective in achieving the outcomes signalled in both the ZIPA and PC7.

4. OVERVIEW OF OWL, THE OPUHA DAM AND THE OPUHA SCHEME

- 4.1 OWL owns and operates the Opuha Dam as well as downstream water distribution infrastructure associated with the Opuha Scheme.
- 4.2 The Opuha Dam is a 50m high earth dam located immediately downstream of the confluence of the North and South Opuha rivers, approximately 17km north-east of Fairlie. The Dam, which is located wholly in the Mackenzie District, augments flows in the mainstems of the Opuha and Opihi rivers to maintain environmental flows and provide water to:
- (a) Community supply, as provided for under four consents held by Timaru District Council (as detailed in the evidence of Ms Crossman for OWL);
 - (b) The Kakahu irrigation scheme, which currently irrigates approximately 3040 ha;

- (c) The Totara Valley and Sutherlands irrigation schemes, which currently irrigate approximately 2250 ha;
 - (d) The Levels Plain irrigation scheme, which currently irrigates approximately 3,470 ha;
 - (e) 40 shareholders in the mainstems of the Opuha and Opihi Rivers, irrigating 3,980 ha;
 - (f) Compensate for the effects of takes authorised by AA and BA permits from the tributaries of the mainstem of the Opihi River – comprise the following approximate areas of irrigated land: Sth Opuha – 1,532 ha, Nth Opuha – 164 ha, Upper Opihi – 1108 ha, Te Ana Wai – 620 ha, minor tributaries – 72ha.
- 4.3 The Opuha Dam includes a 7MW hydroelectric power station, which generates electricity from all water released from storage. The Dam also plays a critical role in managing the health of the downstream river and lagoon through the strategic use of stored water for artificial freshes.
- 4.4 During its almost 22 years of operation, the Opuha Dam has played a pivotal role in providing for South Canterbury's social and economic wellbeing by enabling the development of a robust agricultural sector and industry through the supply of irrigation and community (including industrial) water. Today, the irrigation within the Opuha Scheme supports a wide range of land use activities including dairying, horticulture and arable cropping, sheep, beef and deer and specialist seed growing. These farming activities support numerous local industries such as vegetable processing facilities at Washdyke and dairy processing facilities at Clandeboye, and represent a significant part of the region's export economy and earnings. The processing facilities in and around Timaru also benefit from the reliable supply of water via Timaru District Council's community supply takes from the Opihi River (as detailed in the evidence of Ms Crossman).

- 4.5 The economic benefits of the Scheme were considered in a study by the Ministry of Economic Development in 2006.¹ The study evaluated the economic impact of the Opuha Dam over two “normal” seasons and found at the time that the Dam added \$124 million to the South Canterbury economy and \$20 million/year to the district’s households. It created 500 new full-time jobs.
- 4.6 The location of the Opuha scheme, shareholders and distribution infrastructure is shown in Figure 1. An overview of the Opihi catchment, including the Opuha Dam, is further provided in the flyover video that can be accessed using the following link:

<https://www.youtube.com/watch?v=Kp6luxCqWsk&feature=youtu.be>

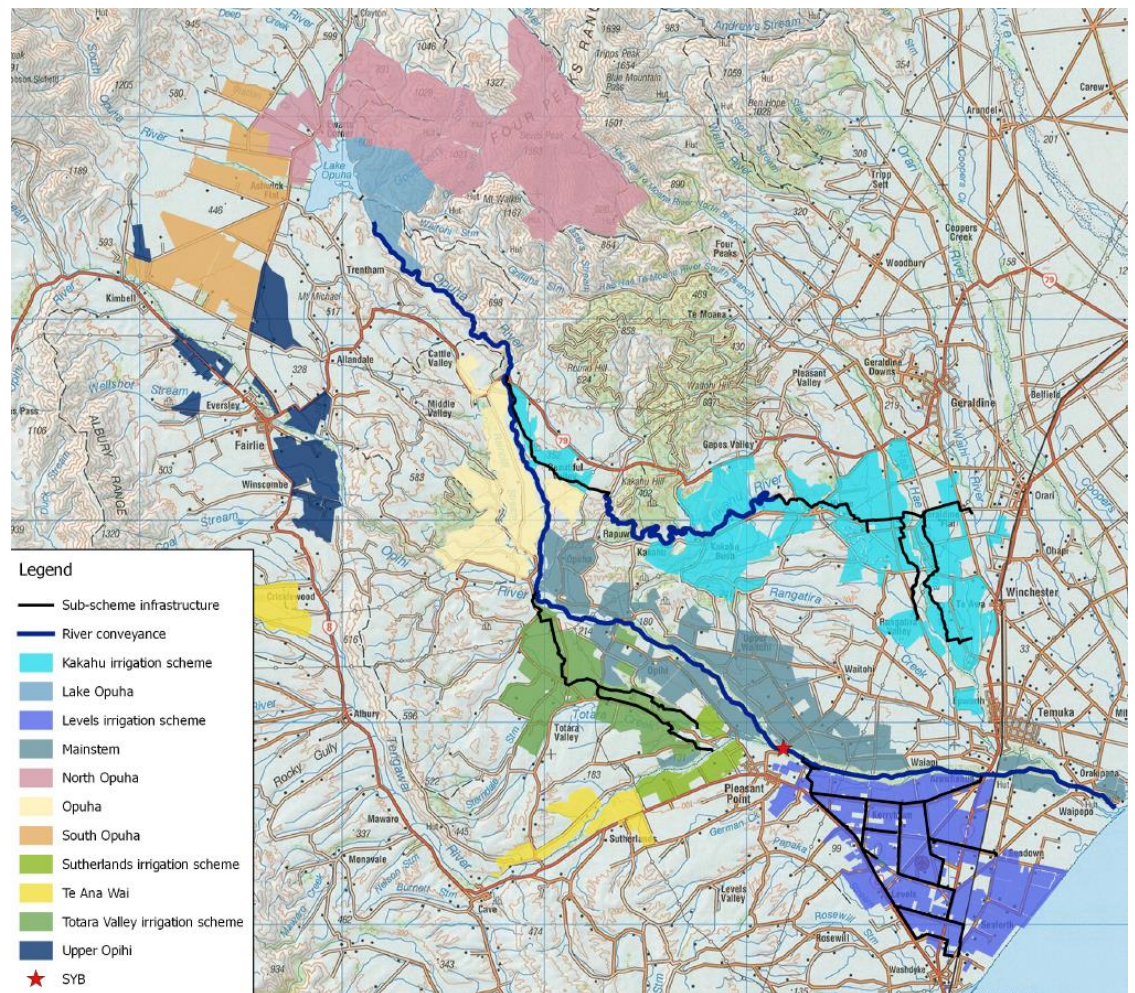


Figure 1. Location of the Opuha Scheme, shareholders and distribution infrastructure.

¹ The Opuha Dam: An ex post study of its impacts on the provincial economy and community, Harris, Butcher & Smith, Aug 2006
GH-148305-1-4214-V1

The Opuha Dam

Historical overview

- 4.7 I understand that prior to the construction of the Opuha Dam, there had been significant periods during which the natural hydrological storage within the Opihi catchment had been unable to provide sufficient water for both instream and out of stream users. This, combined with climatic extremes, produced periods where the surface flow ceased in the lower reaches of the Opihi River above the Temuka confluence. Records had shown that the river had experienced severe drought conditions in every decade since the 1930's.
- 4.8 The seriousness of the situation in the Opihi catchment at that time is reflected in the following passage taken from the Commissioners' decision report for the Opuha Dam consents dated 5 May 1995:²

The Commissioners have concluded that...the Opihi River is presently in a distressed and deteriorating state. Its value as an aquatic ecosystem, and for its range of recreational, agricultural, commercial, industrial and domestic water uses is under severe threat. It is very difficult to regard the river system as in its "natural" state....

- 4.9 During the early years, a canal from Lake Tekapo to the Timaru region was proposed. The Opihi Augmentation Society had obtained a consent to take water for irrigation from the Tekapo river, which was based on an allowance in an original agreement entered into when the Waitaki hydro scheme was developed. Electricity Corporation of New Zealand (**ECNZ**) at the time of taking over the consents for the Waitaki Scheme wished to see this allowance revoked, and funded studies to prove the feasibility of other sources.
- 4.10 The Tekapo canal concept was shelved in 1992 when the studies identified the Opuha as a feasible scheme - via building a dam at the confluence of the North and South Opuha Rivers.
- 4.11 The Opihi River Development Company Limited (**ORDC**) was incorporated in 1992. At that time, three principal parties were to be involved in the project -

² Page 54, para 63.
GH-148305-1-4214-V1

ORDC, Alpine Energy and ECNZ. In 1993, the ORDC approached Timaru District Council and Mackenzie District Council with a view to them investing in the project.

4.12 In 1994, Opuha Dam Limited (**ODL**) was incorporated with a purpose of being the interim entity through which the dam project would be financed and progressed. That role was later assumed by Opuha Dam Partnership (**ODP**), acting as the beneficial owner of the dam assets. The four main partners of ODP were:

- Alpine Energy via Timaru Electricity Ltd (50%);³
- Opihi River Development Company via Opihi River Holdings Ltd (36%);
- OWP (irrigation part of the ownership structure):
 - South Canterbury Farmers Society Ltd (**SCFIS**) via SCFIS Holdings Ltd (8.6%)
 - Levels Plain Irrigation Company Ltd via Levels Plain Holdings Ltd (5.4%)

4.13 Resource consents for the Dam and associated infrastructure were obtained by ODL in 1995. Construction began shortly thereafter, and the Dam was formally commissioned in November 1998.

4.14 Over this period of time, a parallel process was occurring with the drafting of the Opihi River Regional Plan (**ORRP**), which incorporated a new planning framework for the Opihi catchment in contemplation of the Dam and Opuha Scheme. The ORRP established a minimum flow regime for the Opihi River mainstem, and a consenting framework for permits affiliated and not affiliated to the Opuha Scheme. OWL's Environmental Manager, Ms Julia Crossman, provides a detailed summary of key elements of the ORRP consenting framework in her evidence and Mr Mark Webb has provided background to the

³ The Mackenzie District Council and Timaru District Council had equity interests in Alpine Energy Ltd. Additional to its equity interest, Timaru District Council via TDC Opuha Investments Ltd was initially a partner of ODP, but withdrew in December 1998, selling its equity interest to the three private sector partners.

development of the ORRP's minimum flow regime for the Opihi mainstem in his evidence for the Central South Island Fish and Game Council (**CSIFGC**) and the Adaptive Management Working Group (**AMWG**).

- 4.15 After nearly ten years of Dam operation, in April 2007, ODL amalgamated into Opuha Water Limited (**OWL**) and Opuha Water Partnership (**OWP**) brought out ODP. The outcome was that the farming interests became the 100% beneficial owner of the Dam assets, and since then, OWL has operated as a co-operative company.
- 4.16 However, all the farming interests were held by shares either directly or indirectly through other companies. There were three irrigation sub-schemes that operated as part of the Opuha group. Each of these sub-schemes owned their own separate irrigation infrastructure and resource consents related to the scheme operation and the diversion of water from the river into each distribution network.
- 4.17 OWL lead and successfully completed a restructure on 1 July 2014 so that the ultimate shareholders of OWL were farmers who take water for irrigation purposes. This involved each of the existing irrigation schemes taking water from the Opuha river systems (SCFIS, Levels Plain, Kakahu Irrigation Ltd and Totara Valley Irrigation Ltd) merging into OWL.
- 4.18 Today, OWL holds all the Opuha Scheme assets - Dam, generation assets, sub-scheme distribution infrastructure and all resource consents. Owned by its 243 irrigator shareholders, OWL is governed by a Board comprising five farmer shareholder Directors and two independent Directors. OWL also has a management and operation staff of ten, based at the OWL's office/depot near Pleasant Point.
- 4.19 OWL presently holds some 58 regional resource consents for land use, water and discharge permits for the Opuha Dam and other components of the wider Opuha Scheme. A detailed overview of those consents and key conditions is provided in the evidence of Ms Crossman.

Operational overview

- 4.20 Extending over 700ha, Lake Opuha is an artificial lake built first and foremost as a water reservoir for the purpose of maintaining and improving the flows and health of the river downstream and supplying reliable water for community supplies and irrigation. With the exception of the old riverbed of the North and South Opuha, the land under Lake Opuha and lake margins are owned by OWL. While legally it is a private facility, Lake Opuha provides ancillary amenity and recreational benefits to the community, particularly for fishing, rowing and other water-based sports, which is encouraged by OWL.
- 4.21 The catchment above the Opuha Dam extends along the Two Thumb Range from Mt Dobson through to north of Fox Peak. It is a lowlands hills, eastern facing catchment. The Dam is fed by inflows from the North and South Opuha Rivers and other natural inflows including from Ribbonwood and Station Streams.
- 4.22 The Opuha Dam has an operating range of 22.2m from RL370m – RL392.2m. Within this operating range, Lake Opuha stores 65.47 Mm³ of water. The Lake can never be completely drained; even at RL370m there is approximately 5 Mm³ of stored water remaining behind the Dam which protects the Lake's fish population should the Lake reach this critical low level. Under OWL's existing consents for the Dam, at RL370m, there is no requirement for OWL to release water from the Dam for environmental flows or irrigation, and outflows from the Dam must equal inflows.
- 4.23 The Opuha Dam's 7MW hydroelectric power station, which is located at the base of the Dam, generates electricity from all stored water released from the Dam. The conditions of OWL's consents preclude water from being released from the Dam solely for the purpose of generation.

- 4.24 The water from the power station discharges into a large 'regulating pond' and a control structure at the bottom end of the regulating pond (the downstream weir) regulates the amount of water released into the Opuha River. In Figure 2 below, the regulating pond is the body of water between the Opuha Dam in the background and the downstream weir in the foreground. This arrangement means the power station can operate intermittently at full load to get the best electricity price while the flow into the river is managed to meet minimum flow requirements and irrigation demand.



Figure 2. The Opuha dam, regulating pond and downstream weir (looking upstream).

- 4.25 The power station provides a valuable contribution to the local electricity network operated by Alpine Energy and onto Transpower's national grid via substations at Fairlie and Albury. The power station is operated and maintained under contract to Trustpower, and monitored and operated from their Control Centre in Tauranga.
- 4.26 The amount of electricity generated annually is entirely dependent on the hydrology of the Lake Opuha catchment, available stored water and downstream water demand. The output can vary considerably from year to year

and for any particular month. On average, however, the power generated from the Opuha Dam is sufficient to supply approximately 3800 households, and the revenue from the electricity sales accounts for approximately 40% of the OWL's income.

Modifications and enhancements

4.27 A number of modifications and enhancements have been made to the Opuha Dam and downstream weir since construction to increase its structural integrity at significant capital cost, as follows:

- (a) The left and right dam abutments were upgraded in 2005;
- (b) The toe of the dam had a buttress installed (Swedish berm) in 2006;
- (c) The DSW had an enhanced spillway installed in 2016.

4.28 OWL continues to invest significant capital into the dam to protect its long-term value and continued safety to the community is ensured. Currently this is in the form of:

- (a) Auxiliary spillway enhancement;
- (b) Crest wave wall enhancement;
- (c) Internal Erosion investigations; and
- (d) Catchment Hydrology Study.

The Opuha Scheme

4.29 As noted earlier in my evidence, the Opuha Scheme plays a vital role in sustaining the in-river flows in the Opuha and Opihi Rivers while supplying reliable water to, or off-setting effects of takes by, affiliated irrigators and urban and industrial users through the Timaru District Council's community water supply take.

- 4.30 Collectively, shareholders and water users pay over \$4.37 million to OWL annually, via water and infrastructure charges⁴ to maintain the Opuha Dam facility and associated scheme irrigation infrastructure.

Community water supply

- 4.31 Ms Crossman provides an overview of the TDC community supply takes from the Opihi River, which are abstracted under agreements with OWL. Over four consents, TDC is entitled to abstract 500 L/s from the river system. Similar to OWL's irrigator shareholders, the TDC pays annual charges for water supplied by the Scheme.

Irrigation supply

- 4.32 A total of 16,000 shares are held by OWL's irrigator shareholders. OWL's water supply agreements with shareholders provide an entitlement to Scheme water with each 'share' held representing an allocation of 0.41336 L/s, which is based on an irrigation application rate of 25mm of water per hectare per week with a cap of 5,625 m³ per irrigation season (22.5 weeks from September to May). Shareholders and other water users⁵ must hold a Water Agreement with OWL. The water agreement is the "contract" for the supply of water and is subject to various terms and conditions on which Scheme water is supplied, or in the case of tributary shareholders (discussed later in my evidence), water is released from the Dam to compensate for the effect of tributary water takes on Opihi mainstem flows at Saleyards Bridge.
- 4.33 The Opuha Scheme was originally designed to achieve a 1:20 year reliability and provide sufficient water to meet a maximum irrigation demand of 7.035 cumecs.⁶ Ms Crossman has noted, the current irrigation demand of those with entitlements to Scheme water is 6.974 cumecs.

⁴Water charges are those relating to the supply of water, while infrastructure charges are those relating to the operation and maintenance of irrigation distribution infrastructure within the sub-schemes. All holders of shares are required to meet charges levied. Water and infrastructure charges are reviewed on an annual basis to enable all costs of operating the schemes to be recovered.

⁵ Water User refers to those that hold an unshared entitlement with OWL, as detailed in the evidence of Ms Julia Crossman

⁶ Opuha Dam Limited Resource Consent Applications to The Canterbury Regional Council, prepared by Attewell Irrigation Consultants Ltd, dated 27 October 1994, page 9.

- 4.34 16,000 hectares is notionally irrigated within the Opuha Scheme command area. However, it is up to individual shareholders to decide whether they chose to irrigate one hectare per share or spread their shared allocation over a larger area. As the types of soils and rainfall intensity vary considerably across the Opuha scheme area, irrigation water requirements and consequently application rates can also vary (ranging from around 1.8mm/day to 4.5mm/day).

Irrigation sub-schemes

- 4.35 The Opuha Dam releases water into the Opuha River which flows into the Opihi River at Raincliff. There are four sub-schemes that draw water from the Opuha and Lower Opihi (below the Opuha confluence) Rivers under divert and/or take consents held by OWL: Kakahu, Totara Valley, Sutherlands and Levels Plain. The Kakahu, Totara Valley and Levels Plain schemes were initially developed and operated as individual co-operatives. In 2014, these discrete irrigation companies and Opuha Water Ltd amalgamated to form Opuha Water Ltd as a single co-operative entity.

(a) *Kakahu*

- 4.36 The Kakahu irrigation scheme was built in 2005. A suite of resource consents held by OWL enables water to be diverted from the Opuha River into the Kakahu scheme immediately downstream of Skipton Bridge. Irrigation water is first conveyed through a pipeline for approx. 9km before discharging into the Kakahu River. The Kakahu River then conveys the water for 17km before it is diverted back into a race distribution network which goes for another approx. 22km. Kakahu shareholders abstract water either from the Kakahu River, the Kakahu irrigation race network, or the Waihi River which the race is consented to discharge into. The Kakahu Scheme currently irrigates approximately 3040 hectares, predominantly dairy with some smaller blocks of sheep, beef and arable. In 2014, The Kakahu scheme had an enterprise value of \$10.68M.

(b) *Totara Valley and Sutherlands*

- 4.37 The Totara Valley scheme was built in 2000. The Totara Valley scheme, operating under consents held by OWL, abstracts water from the Opihi River just below the confluence with the Opuha River at Raincliff. From the intake

and fish screen, water is conveyed through the Totara Valley area via a gravity distribution system of open races, approximately 14km long.

- 4.38 The Totara Valley Scheme currently irrigates approximately 2,250 hectares of mainly dairy and sheep and beef farms (including the 635 ha Sutherlands scheme owned by OWL which runs off the bottom of the Totara scheme). In 2014 the Totara Scheme had an enterprise value of \$1.23M.
- 4.39 The Totara Valley Scheme underwent expansion in 2008 and 2011 to include the Sutherlands irrigation scheme. The Sutherlands scheme is supplied via Gardner's Pond which is situated at the bottom of the Totara Valley scheme and captures the carriage water required to operate the scheme. From Gardner's Pond, water is pumped under the Te Ana Wai River and irrigates the area to the south of the Te Ana Wai River. The Sutherlands scheme landowners irrigate using resource consents held by OWL for the Totara Valley scheme i.e. there is no stand-alone take consent for the Sutherlands Scheme.

(c) *Levels Plain*

- 4.40 The Levels Plain scheme was built in the 1930s by the Ministry of Works. The scheme was sold to Levels Plains Irrigation Company in the 1970s and underwent some major upgrade and development work in the 1980s.
- 4.41 The Levels Plain scheme abstracts water on the true right of the lower Opihi River below Pleasant Point. It comprises a river diversion intake with control gates and a fish screen and then a gravity fed network of around 50km of open races around the Levels Plains area. OWL holds resource consents related to the operation of the Levels Plain scheme, including the diversion of water from the river into the irrigation distribution network.
- 4.42 Given the age of this scheme, it was historically predominantly borderdyke/flood irrigation. The last 20 years has seen a move away from borderdyke to more efficient spray irrigation. As a result, it has been documented⁷ that the water tables in the Levels Plains area have reduced overtime due to the reduction in groundwater recharge. The Levels Plains scheme currently irrigates

⁷ Zarour, H., Aitchison-Earl, P., Scott, M., Peaver, L., DeSilva, N. (2016). Current state of the groundwater resource in the Orari-Temuka-Opihi-Pareora area. ECan Report No. R16/41.
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approximately 3,470 hectares, supplying a diverse mixture of farms including large arable (vegetable, crop and seed), dairy, sheep and beef, orchards and berry blocks, and lifestyle properties. In 2014, the Levels Plain scheme had an enterprise value (implied market value of the on-going operations of a business) of \$2.63M.

Other irrigation

4.43 In addition to the four sub-schemes, there are also shareholders and water users that take water directly from the following rivers or stream depleting groundwater:

- (a) The mainstem of the Opuha and Lower Opihi (below Raincliff) Rivers;
or
- (b) The Te Ana a Wai, the Upper Opihi, the North and South Opuha Rivers and minor lake tributaries (**tributaries**).

4.44 All of these takes are authorised by water permits held by individual shareholders/water users.

4.45 The takes from the Opuha and Lower Opihi Rivers are directly augmented by releases from the Opuha Dam, and equate to 80% of the total shareholding. The remaining 20% of shareholding relate to takes from the tributaries which are unable to be supplied water directly from the Dam (North and South Opuha, Upper Opihi, Te Ana Wai and minor tributaries of the lake). Instead, OWL releases water from Lake Opuha to make up the water abstracted from them

OWL's future aspirations

4.46 The OWL Board and management team all have aspirations for the Opuha Scheme and its future. Each require time, finances and the support of shareholders, stakeholders and the wider community, and include (but are not limited to):

- (a) A drive for improving efficiencies, including automation, within the sub-scheme irrigation distribution infrastructure;
- (b) The direct supply of shared tributary takes from mainstem (augmented flows) or Lake Opuha as financial resources and consenting allows;

- (c) The global consenting of all scheme takes; and
- (d) Potentially, a scheme-wide nutrient discharge consent.

5. SCHEME MANAGEMENT

5.1 OWL's guiding principle "enabling sustainable growth" underpins all aspects of its operations and is codified in the Scheme's Environmental Management Strategy (**EMS**). The EMS sets out the policies and procedures that OWL must follow in the storage, release and use of water from the Opihi catchment, which are built around the following outcomes:

- (a) Meeting or exceeding legal requirements including resource consent conditions, regional and national environmental policies, plans and standards.
- (b) Encouraging and supporting shareholders to meet or exceed their resource consent conditions and achieve ongoing improvements in on-farm environmental management
- (c) Fully integrating environmental considerations into all improvements and new developments
- (d) Maintaining and further developing positive and open relationships with all those affected by the Scheme operations and take their views into account in decision-making
- (e) Actively participating in opportunities to protect, restore and enhance biodiversity
- (f) Understanding, upholding and respecting cultural heritage, in particular respecting tangata whenua values in relation to water, the natural environment and other taonga
- (g) Regularly reviewing environmental performance and reporting to Canterbury Regional Council, shareholders and the community
- (h) Contributing to the Canterbury Water Management Strategy (**CWMS**) and assist Environment Canterbury and others to understand the

quantitative demands for additional water (volume and flows) in the OTO zone, and options to meet that demand.

- 5.2 In the following sections, I provide an overview of key aspects of OWL's current operations and initiatives that implement the EMS. Ms Crossman has addressed OWL's approach to nutrient management across the Scheme in her evidence.

Opuha Environmental Flow Release Group

- 5.3 OEFRAG, which was established shortly after the Opihi River Regional Plan (**ORRP**) became operative in 2000, currently plays an important role in water management decisions in the Opihi catchment.
- 5.4 The ORRP defines OEFRAG as the group '*responsible for modifying the environmental release flows within the provisions of the Plan*' with membership comprising:
- (a) A representative of the Opuha Dam Partnership
 - (b) An instream representative appointed by the Department of Conservation and Central South Island Fish and Game Council
 - (c) A tangata whenua representative
 - (d) An irrigation representative appointed by Federated Farmer
 - (e) A representative of the Timaru and Mackenzie district councils
- 5.5 The Opuha Dam Partnership, and OWL (as its successor) have been active members of OEFRAG.
- 5.6 The primary functions of OEFRAG are set out by the ORRP and include advising OWL on:
- (a) Transitioning of flows between the ORRP's monthly minimum flows;
 - (b) Artificial freshes and compensatory flows following the release of artificial freshes;

- (c) Releases of water from Opuha Dam storage to provide buffering for anticipated flood inflows.
- 5.7 Since 2004, OEFRAG's role has informally expanded to include providing recommendations to Environment Canterbury on Water Shortage Directions (**WSD**) under section 329 of the Resource Management Act 1991 (**RMA**). As explained in the evidence of the AMWG, due to significant shortcomings in the ORRP's current environmental flow regime for the Opihi River at Saleyards Bridge (**SYB**), WSD have become the primary mechanism for managing minimum flows and restrictions in anticipation of, or during, water short periods. Through the experience gained in that role, OEFRAG's members have built a considerable body of knowledge about the water resources of the Lake Opuha catchment, climatic conditions that can trigger water short events and river/lagoon health situations that can arise during such periods.
- 5.8 This knowledge continues to inform river management decisions, and the collaborative approach is enabled by a high level of respect and trust between OEFRAG members. OEFRAG provides a mechanism for the sharing of information and viewpoints, and robust discussion. For OWL, OEFRAG also provides a critical 'sounding board' for decisions relating to the management of the Dam and river flows as listed above.
- 5.9 For OEFRAG to make informed decisions, a breadth of technical information is required. Given OWL's accessibility to data relating to lake levels and lake drawdown, inflows, outflows, snow storage, irrigation demand, periphyton levels, and snow storage, OWL synthesises and distributes this data around OEFRAG members prior to any meetings held. Where technical advice has been required by consultants, particularly in the hydrological space, these costs have historically been met by OWL.
- 5.10 Through OEFRAG, OWL has a high level of confidence that decisions taken that effect water quantity and quality in the Opihi system are the correct ones because of the diversity of thought and perspectives within the group, and ultimately the need for unanimous decisions. The best interests of the river system are ever-present in OEFRAG discussions; from OWL's perspective, the group takes a balanced and considered approach to best serve the whole of the community that has interest in the river.

Artificial freshes

- 5.11 The Opuha/Opihi river systems are braided rivers; these types of rivers are dynamic in nature in that they move about their wider river bed and change flow paths with the variable flows experienced. Braided rivers need flow variability for river health, sediment transport and river mouth functioning. As the Opuha Dam is a man-made structure in the river, it restricts natural fresh events. Artificial freshes are therefore released by OWL from the Opuha Dam as a tool for providing flow variability and managing nuisance periphyton (algae) such as didymo and phormidium within the Opuha and Opihi River systems. As noted above, OWL's consents and the ORRP planning framework require OWL to obtain the prior written approval of all members of OEFRAG to any artificial fresh proposal.
- 5.12 Artificial freshes have been trialled in the Opuha/Opihi system by the National Institute of Water and Atmospheric Research (**NIWA**) since an initial programme commenced in 2004, with varying degrees of success. In 2016, OWL invested significantly in modifications to the downstream weir with the installation of a new set of spillway gates. As discussed in my evidence for the AMWG, the new system now enables an artificial fresh of greater peak flow to be released into the Opuha River and monitoring is showing significant improvements in terms of effectiveness in periphyton removal.
- 5.13 Where possible, the freshes are released to coincide with high rainfall events in wider catchment – providing higher flows and more effective periphyton removal in the lower reaches of the Opihi River. The management of artificial freshes is constantly being adapted by OWL in accordance with advice from its consultants in order to improve effectiveness and benefit to the river system health as knowledge and experience grows.
- 5.14 In his evidence for the AMWG, Mr Richard Measures provides a detailed summary of the research and trials that have been conducted by NIWA, and the current knowledge and experience around artificial freshes in the Opihi river system.

Managing lake stratification

- 5.15 Soon after the Dam was opened in 1998, concerns were raised by ECan regarding the quality of water being released from Lake Opuha. In warm summer conditions, the Lake would thermally stratify i.e. the Lake would separate into warm and cold 'layers', and sediment oxygen demand had caused the colder water at the bottom of the Lake to have very low dissolved oxygen levels. The situation was initially exacerbated by the fertile pasture which had been submerged by the Lake, providing a large carbon reserve that consumed oxygen as it decomposed. During the early part of its operation, the lower levels of the Lake became anaerobic, which resulted in elevated levels of iron and manganese in the water released from the Dam.
- 5.16 In 2001, conditions were placed on OWL consent CRC950579.1 setting out monitoring requirements for a range of attributes, including dissolved oxygen. Conditions also required the installation of an aeration system in the Lake, and specified the dissolved oxygen triggers⁸ that would necessitate the operation of the aeration system to oxygenate the water layers. Today, OWL uses its best endeavours to operate the aerator in a proactive way to ensure the consent triggers are never breached. This system is constantly reviewed for improvements by OWL with valuable input and guidance from experts at NIWA.
- 5.17 OWL remains firmly committed to continue to learn, develop and enhance how it positively influences the lake water quality so as to meet local and national expectations. As the owner and operator of the dam, OWL acknowledges the interconnected nature of the Opuha/Opihi River system and accept that the Lake water quality can influence the water quality of the river system downstream of the Dam. OWL has an ongoing commitment to maintaining quality of Lake at current state to ensure compliance with national policy requirements, through both active lake management and encouraging and incentivising shareholders and water users of the Scheme to adopt good management practice on farm around the Lake Opuha catchment.

⁸ CRC950579.1 (now CRC950579.3) specifies a dissolved oxygen trigger of 40% percent at RL 360. If these triggers are reached, the aeration system must be operated until dissolved oxygen concentration is greater than 70%.

Eel (Tuna) migration

- 5.18 Lake Opuha is a habitat of the New Zealand longfin eel. Migration up the Opuha River and into Lake Opuha is made possible by the elver bypasses on both the downstream weir and the Opuha Dam. Once in the Lake, the elvers grow into adult eel and enjoy the lake environment or head further upstream to the headwaters until they are ready to migrate downstream (aged anywhere between 25-80 years old), back to the Pacific Ocean where they breed and die.
- 5.19 OWL is currently engaging with Te Rūnanga o Arowhenua to develop a Tuna (eel) trap and transfer programme to facilitate the movement of mature Tuna downstream. In OWL's view, once implemented, the programme will assist in delivering on outcomes identified in the OTOP ZIPA centred on improving mahinga kai opportunities in the OTOP Zone, as noted later in my evidence.

FEP audit programme

- 5.20 As outlined in the evidence of Ms Crossman, OWL has invested significantly in the development of a robust Farm Environment Plan (**FEP**) and FEP Audit programme for shareholders. Over the last six years of facilitating this programme, OWL management has observed a noticeable increase in farmer awareness and engagement in implementing good management practice on farm. This will continue to be encouraged and fostered by OWL through continued farmer support and the provision of training and educational opportunities such as the Cultural Values training which is currently in development and discussed later in my evidence.

Opihi Environmental Enhancement Grant

- 5.21 OWL has recently established an Opihi Environmental Enhancement Grant in partnership with Central South Island Fish and Game Council, Department of Conservation and Te Rūnanga o Arowhenua. From OWL's perspective, the Grant is a hugely positive step for the OTOP Zone and will be a valuable contribution to the OTOP ZIPA's outcomes around protecting and enhancing indigenous biodiversity Ki uta Ki Tai in the OTOP Zone, which I refer to later in my evidence.
- 5.22 OWL has budgeted \$20,000 on an annual basis for the purpose of establishing biodiversity corridors on or adjacent to the waterways of the Opihi catchment

from the headwaters to the coast, to improve water quality and biodiversity. The fund provides for either part or full funding of projects, and it is hoped that other funding partners may emerge when the fund is fully implemented. The fund will be used to assist groups and individuals in Opihi catchment, to undertake maintenance, restoration and improvement projects or activities. It is proposed that a Governance Panel consisting of representatives from the four parties listed above will assess the applications and award the funding. OWL anticipates that the first applications for the grant will be accepted prior to the end of 2020.

Upper Opihi and North Opuha water quality study

- 5.23 OWL has identified, through recent water quality monitoring and analysis, that the lower North Opuha River and the Opihi River from below Ashwick Flat through to the confluence with the Opuha River have elevated Dissolved Inorganic Nitrogen concentrations, principally due to nitrate.
- 5.24 OWL has set aside a budget in the 2020-21 financial year for surveys of these tributaries together with a longitudinal survey of the Opihi River, and potentially shallow groundwater bores, to be undertaken for nitrate profiling. The aim is for the investigations to pin-point the sub-catchments that are potentially over-representative in terms of their nitrate contributions, so that possible sub-catchment specific mitigations can be identified and implemented.

6. OWL'S INVOLVEMENT IN THE DEVELOPMENT OF THE OTOP ZIPA AND CONTRIBUTIONS TO THE OTOP "SOLUTIONS PACKAGE"

- 6.1 As noted earlier in my evidence, OWL's EMS confirms OWL's ongoing commitment to contributing to the CWMS. OWL has had direct involvement with the OTOZ Zone Committee since its establishment in 2010. Three OWL directors sat on the first Zone Committee⁹ and contributed to the 2012 Orari-Opihi-Pareora Zone Implementation Programme (**ZIP**), which was produced under the CWMS. One OWL director and one part-time OWL staff member currently sit on the Zone Committee.

⁹ The Orari-Opihi-Pareora Zone Committee.
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- 6.2 During the tenure of the OTOP Zone Committee, OWL has hosted its members on a number of field trips and has provided full and timely responses to information requests they have made to OWL. Since 2016 when the OTOP Zone Committee first started engaging with the public on the Healthy Catchments Project, OWL's focus has centred on supporting the work of the Zone Committee through the development of the OTOP ZIPA.
- 6.3 OWL has also been actively involved in the stakeholder engagement process lead by the Zone Committee to assist with the development of its solutions package for the OTOP Zone, which was included in the OTOP ZIPA issued in December 2018. OWL management staff participated in various meetings and workshops hosted by the OTOP Zone Committee during 2016/17, and OWL subsequently provided feedback to the Zone Committee on draft ZIPA recommendations during 2018.
- 6.4 OWL's feedback to the Zone Committee during the ZIPA development phase was primarily focused on ensuring the solutions package developed for the OTOP Zone (and consequently the future PC7):
- (a) Recognised the benefits of the Opuha Dam and associated infrastructure, including environmental benefits;
 - (b) Enabled the environment and affiliated users to retain the benefit of augmentation;
 - (c) Did not compromise the scale and efficiency of the existing structure of OWL and the Opuha Scheme, and consequently the central role of the Opuha Dam in the Opihi catchment;
 - (d) Provided realistic timeframes for the achievement of water quality and quantity limits/outcomes;
 - (e) Included flow and allocation regimes developed in consultation with affected water users and take account of relevant hydrological, ecological, cultural, economic and social considerations; and
 - (f) Included a suite of recommendations specifically for affiliated water users.

- 6.5 Since 2014, OWL has also been involved in various stakeholder groups that have contributed to the development of the ZIPA in different ways. I provide an overview of OWL's involvement with and contributions to those groups in the following paragraphs together with a summary of OWL's contributions to the "community outcomes" that form the basis of the ZIPA solutions package.

Involvement in stakeholder groups

Opuha Catchment Groups

- 6.6 A key recommendation of the 2012 ZIP was to encourage local leadership in the Zone. "Establishing and supporting vibrant catchment groups" was one of the desired outcomes identified by the Zone Committee in this regard, and was seen as a means to facilitate:¹⁰
- (a) The protection and enhancement of local waterways; and
 - (b) Assisting farmers to develop comprehensive on-farm management plans that demonstrate they are monitoring and managing nutrient and water uses and (where relevant) activities to retain, protect and restore wetland.
- 6.7 With support from the NZ Landcare Trust, the Zone Committee was successful in securing a grant from the Sustainable Farming Fund to set up and support a number of Catchment Groups in the Opihi Catchment as part of the 'WOW-Working for Opihi Water' project. The intent behind the project was that the Catchment Groups provided the best mechanism to implement the on-the-ground changes required to implement the ZIP. OWL, along with a number of other industry support organisations, were approached and agreed to contribute to the project 'in-kind'.
- 6.8 Internal OWL staffing resources have since (even after the conclusion of the three year project) been allocated to supporting and facilitating the Opuha Catchment Group, which subsequently merged with the Upper Opihi Catchment Group to form the Upper Opihi-Opuha Catchment Group. This is now a diverse

¹⁰ Orari-Opihi-Pareora Zone Implementation Programme, Recommendations 1.2.1 and 1.2.2, at page 13.
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group made up of irrigated and dryland farmers from a range of farming types, as well as some recreational users of the waterbodies in the catchment.

- 6.9 This catchment group has, over the last 5 years, worked together and have become more informed about the environment in which they live, and the environmental challenges and opportunities within their catchment. These discussions have informed their submission presented in response to the notification of PC7. The 'on-the-ground' work of the catchment group has been side-tracked due to the focus on PC7 over recent years, however group members have indicated a willingness to re-engage following the PC7 Hearing to establish a clear direction of what they wish to achieve within the catchment.

Adaptive Management Working Group and Opihi Flow and Allocation Working Party

- 6.10 In 2016, the AMWG was formed by OWL, Fish and Game, Department of Conservation and the Timaru District Council, all being long-standing participants of OEFRAG. One notable omission from this group is Te Rūnanga o Arowhenua. As Ms Blakemore has indicated in her evidence for the AMWG, the AMWG has actively sought the Rūnanga's participation in the AMWG since its formation. However, after a considerable period with no engagement or feedback from the Rūnanga (understood by the AMWG members to be due to resourcing), the AMWG proceeded without their involvement.
- 6.11 The AMWG was initiated as a technical group, supported by consulting hydrological and water quality experts. Its primary focus was on developing the key elements of an adaptive river management regime for the Opihi River to recommend to the OTOP for consideration as part of the development of the ZIPA, as discussed in Ms Blakemore's evidence.
- 6.12 OWL provided resources to the group in terms of co-ordination and facilitation, developing agendas and translating the groups discussions into a coherent package of recommendations. Data and institutional knowledge of the dam operation and river management was provided to the AMWG by OWL management to assist the group in developing their proposal to the Zone Committee. OWL also funded the technical consultants called upon by the AMWG to assist and inform the discussions.

- 6.13 The FAWP was initiated by OWL in October 2017 during the collaborative planning phase of PC7 in response to concerns by its shareholders that the OTOP Zone Committee would be making recommendations for future environmental flow and allocation regimes for the main tributaries of the Opihi catchment in the absence of critical information (e.g. ecological and economic assessments) and robust community consultation with affected consent holders and key stakeholders.
- 6.14 As with the AMWG, OWL co-ordinated/facilitated the technical consultants called upon by the FAWP to assist and inform the group recommendations. It should be noted that while the preceding paragraphs state that OWL funded the technical consultants, this funding is derived from water charges paid for by all shareholders and water users of OWL. This highlights how important it was to OWL shareholders and water users to ensure PC7 was fully informed and based on sound science.
- 6.15 Both the AMWG and FAWP were endorsed by the OTOP Zone Committee and their contributions have shaped key recommendations in the OTOP ZIPA regarding the minimum flow and partial restriction regimes for the Opihi River (at Saleyards Bridge), the North Opuha, South Opuha, the Upper Opihi and Te Ana Wai Rivers. Those contributions are outlined in the evidence of the AMWG and FAWP members and expert witnesses.

OWL's Contribution to the OTOP ZIPA's solutions package

- 6.16 The OTOP ZIPA sets out various statutory and non-statutory recommendations that *contribute to the sustainable management of freshwater resources in the OTOP Zone, and to protect and enhance cultural values and biodiversity in the Zone.*¹¹ Those recommendations are intended to achieve the following “community outcomes” for the Zone that were developed by the Zone Committee with input from Papatipu Rūnanga and the community:¹²
- *Protect and enhance the natural character and function of the zone's rivers, waterways and lake whilst providing a sufficient level of flood protection*

¹¹ ZIPA, page 5.

¹² ZIPA, page 13.

- *Safe and reliable drinking water for community and domestic supplies both now and in the future.*
- *All surface waterbodies safe for recreation and gathering mahinga kai.*
- *Increase recreational opportunities in the zone by ensuring appropriate management of river flows.*
- *Rectify loss and improve opportunities for mahinga kai gathering in the zone.*
- *Protect and enhance sites of cultural significance.*
- *Protect and enhance indigenous biodiversity Ki uta Ki Tai, particularly high naturalness areas, coastal lagoons, and wetlands and springs in the upper parts of catchments.*
- *Maintain or increase the reliability of water available for industry and irrigation in the zone.*
- *Maintain or increase the area of land irrigated in the zone.*
- *Maintain and improve economic value in the zone and provide for community wellbeing.*

6.17 As I have noted earlier in my evidence, the various initiatives that OWL is presently collaborating with other stakeholders in the Zone on will contribute to the outcomes identified in the ZIPA for indigenous biodiversity and mahinga kai.

6.18 The Opuha Dam, and consequently OWL as its owner and operator, will play a central role in the delivery of all other ZIPA outcomes. However, the nature and extent of OWL's future contribution to those outcomes will be largely dependent on the planning framework for the Opuha Dam that is adopted under PC7.

6.19 Since the AMWG's formation in 2016, its various workstreams have primarily focused on the development of potential elements of a new augmentation regime for the Opuha and Opihi Rivers for inclusion in PC7. Knowledge and experience gained by its members during the more than 20 years of Dam operations, including water short events during the 2014 – 2016 period, and the technical work addressed later in my evidence, underpin the proposal that the AMWG subsequently presented to the Zone Committee in October 2018 (and the refinements reflected in its submissions on PC7). A key feature of that proposal was flexibility to enable adjustments to SYB minimums flows and

irrigation restrictions to respond to changing climatic and river/lagoon health conditions in the Opihi catchment.

- 6.20 The AMWG's preference for PC7's augmentation regime to include flexibility/adaptability was expressly recognised Zone Committee in the ZIPA and forms the basis of the following ZIPA recommendation:

5.3.1 Recommendation: Augmentation of the Opuha and Opihi Rivers

I. The OTO sub-region plan change includes an Adaptive Management Regime for the augmentation of the Opuha and Opihi rivers that provides for:

- a. Environmental Flows;*
- b. Mahinga Kai Values;*
- c. Flow variability;*
- d. Flushing Flows and Freshes;*
- e. All flow gains achieved by minimum flow increases on the Upper Opihi and Te Ana Wai Rivers remaining in the mainstem of the Opihi River, and not being available for abstraction, and should be reflected in the minimum flows measured at Saleyards Bridge;*
- f. Community Drinking Water Supplies;*
- g. Irrigation Abstractions;*
- h. The Opuha Environmental Flow Release Advisory Group (OEFrag);*
- i. A flow regime that can be adapted to reflect the available water in the catchment and that recognises the priority of flows set out in clauses (a) – (h) above.*

- 6.21 This recommendation has subsequently been translated into various PC7 provisions, including the proposed environmental flow and 'alternative management' regime for SYB within Table 14 (v), (w) and (x), and supplying policy and rules. As I explain later in my evidence, OWL is concerned that these provisions miss the mark in various respects and require substantial revision to ensure that the outcomes envisaged by Recommendation 5.3.1(I) and alignment with the relevant statutory documents are achieved.

7. WORK UNDERTAKEN IN RESPECT OF PC7

- 7.1 Even before the ZIPA development phase commenced, OWL was committed to ensuring that recommendations made by the Zone Committee, which would form the basis of the future PC7 planning framework, were fully informed and based on sound science and robust economic information.

- 7.2 PC7 presented an opportunity to revise the current ORRP SYB minimum flow regime for water permits affiliated to OWL so as to reduce reliance on WSDs as the primary means for managing river flows and abstraction during water short events. Considerable technical work was needed to inform the identification of an alternative regime that would achieve community expectations and the relevant statutory tests.
- 7.3 OWL also shared the concerns of many of its shareholders and the members of the wider South Canterbury farming community that draft ZIPA recommendations on environmental flow regimes for the main tributaries in Opihi catchment were being developed by the Zone Committee in the absence of any independent advice on hydrology, freshwater ecology and water quality and economics implications. There was a need for this significant information gap to be filled and the underlying assumptions for the draft ZIPA recommendations to be independently verified.
- 7.4 This led to the following technical workstreams initiated by OWL to assist the work of the AMWG and FAWP:
- (a) Adaptive management minimum flow regime for the Opihi River at SYB:
 - (i) A computer model was developed by Dr Tim Kerr, Rainfall.NZ Ltd (previously of Aqualinc Research Ltd) to estimate the daily snow storage in the Lake Opuha catchment. This is a custom snow accumulation and melt model that uses daily temperature and rainfall observations collected by OWL. These observations are used to estimate the amount of snow accumulating or melting each day throughout the catchment. Daily accounting of the snow accumulation and melt enables the total snow storage to be estimated.
 - (ii) Dr Kerr engaged with the AMWG to develop appropriate water shortage regime triggers (snow storage, inflows and lake levels) for the SYB minimum flow regime.
 - (iii) Following notification of PC7, Dr Kerr developed the Lake Opuha Model to identify the comparative effects of different flow regime

options and enable the simulation of how different management decisions reflect in lake storage.

- (b) Minimum flow regimes for the North, South, Upper Opihi and Te Ana Wai Rivers (**tributaries**):
- (i) The hydrological, ecological and economic (farm scale and macro) analysis of minimum flow options by Ms Keri Johnson, Dr Greg Ryder, Mr Grant Porter and Dr Caroline Saunders respectively.
 - (ii) OWL initiated a water quality monitoring programme for the Opihi tributaries and mainstem, which commenced in January 2019 and is ongoing. This programme was initiated by OWL as it was concerned ECan's 'state of the environment' monitoring programme did not include monitoring at key sites within the Opihi catchment or cover the range of water quality attributes that would be beneficial from the perspective of informing future decisions on PC7. Sampling was undertaken by Irricon, and data analysed by Dr Greg Ryder (as referred to in his evidence for the FAWP).
 - (iii) In conjunction with the water quality monitoring OWL also commissioned gaugings in the Te Ana Wai River and concurrent dipping of adjacent groundwater bores, to obtain a greater understanding of the hydrology downstream of the Cave recorder site.

8. OWL'S KEY CONCERNS WITH PC7

- 8.1 OWL recognises the significant challenges in putting in place a land and water management regime within the framework of the CWMS, which seeks to maximise opportunities for the environment, economy and communities within Canterbury, but at the same time ensuring alignment with the directions of statutory requirements and national and regional policy documents. OWL also recognises that the Opihi catchment and its existing consenting framework is highly complex and that presents its own RMA plan drafting challenges. OWL therefore acknowledges the considerable work of the OTOP Zone Committee

and Environment Canterbury in developing the extensive recommendations underpinning the OTOIP ZIPA and subsequently PC7.

8.2 That said, OWL has serious concerns about key aspects of Part B of PC7, which broadly fall into the following topic areas:

- (a) The proposed Opuha/Opihi augmentation regime;
- (b) The proposed tributary minimum flow and allocation regimes, including partial restrictions;
- (c) The proposed nutrient management provisions and water quality targets/limits;
- (d) The proposed planning framework to the taking and use of surface water, including water permit transfers.

8.3 In the following sections of my evidence, I outline OWL's summary position in relation to PC7 and these topic areas in light of the recommendations made in the Section 42A Report¹³, which are addressed further in Ms Crossman's evidence.

OWL's overall position on PC7

8.4 OWL's overriding concern is that Part B of PC7, as notified, fails to recognise the central role of the Opuha Dam and the Opuha Scheme in the Opihi catchment, and consequently, in contributing to many of the outcomes identified in the ZIPA and PC7. In particular, OWL considers that:

- (a) Critical elements of the existing planning and operational framework for the Opuha Dam and water abstractions from the mainstem and tributaries of the Opihi River have not been recognised or provided for;
- (b) The translation of ZIPA Recommendation 5.3.1(I) into Tables 14(v), (w) and (x) and Policy 14.4.35:
 - (i) Is unnecessarily simplistic (and to some extent erroneous); and

¹³ Updated version with errata adjustments, dated 29 April 2020.
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- (ii) Has various shortcomings, which will compromise OWL's ability to manage the Opuha Dam so as to maintain connectivity, ecological health and flow variability in the mainstems of the Opuha and Opihi rivers (per Policy 14.4.35); and
 - (c) The proposed "second step" (2030) minimum flow regimes for the main tributaries of the Opihi catchment are aspirational at best, and have not taken proper account of ecological and economic effects.
- 8.5 OWL is also concerned that elements of the planning framework governing the take and use of surface water would preclude future opportunities and alternatives for the Opuha Scheme.
- 8.6 On review of the Section 42A Report, OWL's concerns have heightened significantly. Various comments and responses to submissions provided in the Report indicate to OWL that the authors of the Report do not have a full grasp of the hydrology of the catchments above and below Lake Opuha, the Opuha Dam's operational constraints or the current planning framework of the Opuha Dam and the Opuha Scheme. OWL is also concerned that the underlying intention of many of the notified PC7 provisions have been lost as a result of that, and otherwise due to the drafting preferences of the Section 42A Report's authors. In short, OWL considers that in various respects, the recommendations in the Report go too far, posing considerable risk to the Opuha Scheme and the Opihi catchment.
- 8.7 OWL has taken a pragmatic and pro-active approach to its submissions on PC7. It sought to clearly articulate its concerns and offer sensible, well informed, planning solutions to address them. For the most part, its submissions have been informed by stakeholder knowledge and experience of the Opihi catchment and the technical and field work referred to in section 7 of my evidence.
- 8.8 For the PC7 hearing, OWL's approach to evidence has been to focus on the most critical aspects of PC7 for the environment and the Opuha Scheme. I address OWL's specific concerns and position on those aspects of PC7 in the following section of my evidence.

OWL's specific concerns

Augmentation and tributary environmental flow regimes

- 8.9 OWL fully supports the decisions sought by the AMWG and FAWP in relation to the Opuha/Opihi augmentation and tributary environmental flow regimes proposed by PC7. In addition to matters addressed in the evidence of the AMWG and FAWP on these aspects of PC7, OWL is concerned about the potential consequences of those regimes for the Opuha Scheme and OWL, and the outcomes sought to be achieved by the OTOP ZIPA and PC7.
- 8.10 Several of OWL's tributary shareholders have advised OWL management staff of their concerns that the expected reductions in water availability under PC7's increased tributary minimum flows could put them in a position where they no longer see any benefit from continuing to hold OWL shares. The shareholders in the South Opuha, Upper Opihi and Te Ana Wai are most affected, equating to 18.4% of Scheme shareholding or approximately 2,950 shares.
- 8.11 OWL has given considerable thought to how the potential risk of existing shareholders could be managed. One potential solution would be for tributary shareholders to sell their existing shares to other irrigators downstream in the Opihi catchment (either affiliated or non-affiliated). However, the market for shares in the downstream catchment is limited for two key reasons:
- (a) Existing and proposed (i.e. as a result of PC7) nutrient management constraints within the Opihi catchment, which prevent opportunities for "new" irrigation.
- 8.12 While there is a possibility that there may be some interest in these shares from existing groundwater permit holders affected by PC7's proposal to bring the OTOP planning framework into line with the region-wide stream depletion methodology, OWL understands from the Resource Consent Inventory Report, this opportunity may be limited. The significant impact of suddenly having 18.4% of your shareholders not wishing to remain shareholders and contribute to the ongoing financial viability of the business is a perverse outcome when they will be effectively trapped by an inability to on-sell the shares. Under OWL's Water Agreements, a shareholder/water user is required to pay annual water charges irrespective of whether they take water.

- 8.13 If OWL was forced to buy-back the shares at nominal value, to effectively release the shareholders of their obligations then significant revenue would be lost (estimated in the order of 610,355/annum), and the burden of ongoing capital and operational costs would sit on the shoulders of the remaining shareholders. This would effectively reduce any ability for discretionary spending towards community valued initiatives, such as those I have referred to earlier in my evidence.
- 8.14 There would also be significant implications for the hydrological model that forms the basis of the current ORRP consenting framework and the Opuha Scheme, which is in large part proposed to be carried over under PC7. This is because OWL would still have to compensate for previously affiliated tributary takes in water releases from the Dam to meet SYB minimum flows, in addition to releasing water for the takes of any “new” shareholders in the Opihi mainstem. In effect, under this scenario, OWL would need to release more water from storage than at present, which in turn would have implications for its ability to maintain minimum flows at SYB and release artificial freshes for the benefit of the downstream river and lagoon.
- 8.15 OWL’s long-term aspirations and/or options for the Scheme would also be compromised. For example:
- (a) OWL remains supportive of PC7 retaining an option for OWL, as a Principal Water Supplier, to hold a scheme-wide nutrient discharge consent. If tributary shareholders exited from the Scheme, OWL would not be able to oversee their on-farm activities through audited farm environment plans and nutrient allocation requirements required by such a consent, or utilise the mechanisms in OWL Water Agreements referred to in Ms Crossman’s evidence in situations of serious environmental non-compliance. Nor would they be eligible for the training and education OWL provides to shareholders relating to good management practice on-farm.
 - (b) Large-scale infrastructure solutions, such as supplying water to tributary shareholders from Scheme infrastructure (instead of direct tributary takes) would no longer be possible.

- 8.16 While OWL appreciates that this issue arises as a consequence of the structure of the Opuha Scheme and OWL rather than as a direct effect of the changes proposed by PC7, it considers that the potentially significant negative implications are a relevant “effect” for consideration under PC7.

Other matters

- 8.17 As Ms Crossman explains, OWL also seeks various amendments to PC7 to ensure:
- (a) The current ORRP consenting categorisation and essential parts of the associated consenting framework are brought forward into PC7;
 - (b) PC7 does not unnecessarily foreclose future opportunities for the Opuha Scheme and alternatives;
 - (c) An equitable nutrient management planning framework;
 - (d) Various errors, including in PC7’s proposed allocation limits, are corrected.

9. CONCLUSIONS

- 9.1 OWL supports the outcomes sought to be achieved for the OTOP Zone by PC7. The Opuha Dam, and OWL as operator of the Dam, will play a central role in contributing to the implementation of many of those outcomes.
- 9.2 OWL takes its environmental management and compliance very seriously and continues to invest considerable resource into additional monitoring and research to inform ongoing management practices. OWL is also committed to additional non-regulatory initiatives and collaboration with other stakeholders such as Te Rūnanga o Arowhenua, the Department of Conservation and Central South Island Fish and Game Council that will assist in achieving the wider outcomes envisaged by PC7 and the OTOP ZIPA.
- 9.3 OWL has sought to refine the relief sought in its submissions and further submissions on PC7 and focus amendments that it considers are essential. Those amendments, which are addressed in the evidence of Ms Crossman and Mr Ensor for OWL, and the evidence of witnesses for the AMWG and FAWP, will ensure that destabilisation of the Scheme does not occur, and also ensure:

- (e) The strategic importance of the Opuha Dam and the Opuha Scheme to the Opihi catchment and South Canterbury community is appropriately recognised in PC7;
- (f) The efficient use of OWL's assets and the resources on which those assets are dependent are not compromised; and
- (g) The associated planning framework is effective in achieving the outcomes signalled in both the ZIPA and PC7.

Andrew Keith Mockford

17 July 2020