

Board Discussion Paper

May 2015

Title: Water Sub-Committee – initial establishment

Author: T McCormick

Purpose

This paper presents some discussion on the scope and mandate of the newly established Water Policy Sub-Committee and some initial comments on one of the specific topic areas – on farm storage.

The purpose is to provide some framework and basis for discussion at the initial meeting of the sub-committee.

Background

The OWL Board has identified the need for the development of company policies in a number of areas relating to water management and has established a Water Policy Sub-Committee to enable Director input into the policy formulation.

The merger in July 2014 of the various entities within the Opuha group provides a single platform for the development and implementation of policy across the whole operation of the company – in this case from water storage in the dam right through to on-farm use of water for irrigation.

As part of the merger process, the company Constitution and the Water Agreement (the contract relating to water supply to irrigator shareholders) were re-written and provide for the company to establish policies in relation to water management and supply. The first attachment to this paper contains the various clauses from the terms of the Water Agreement that refer to company policies and which provide some relevant context to this paper.

Discussion

Scope/Mandate of Water Policy Sub-Committee

There are a number of areas and issues relating to water management that have been identified in the context of policy development. These include:

Surplus Water – (includes incremental water) the allocation/contracting of water that may be present in the river above the minimum flow required at Saleyards Bridge. This topic could cover a number of aspects including:

- the AN consent previously held by LPIC
- the ‘Colletts’ agreement (based actually on ‘buffer water’?)
- other surplus water – in-river and in-scheme

On-Farm Storage – the new Water Agreement requires Board approval for the development of any on-farm ponds for storage of water supplied by OWL.

There are already a number of ponds (mainly in Kakahu but also including the new Kemford Farms pond below SYB) that existed before the new Water Agreements and there has been one pond constructed at Raincliff since the merger but without Board approval.

Water metering – water meters are currently not compulsory under OWL’s terms and, for those irrigators that are within the sub-schemes consent, are not required under Regulation. Only those abstracting more than 10 l/s under individual consents are currently required to have compliant water meters. In November 2016, this requirement will broaden to all consents for more than 5 l/s.

Water Storage/Dam Operation – we don’t have firm guidelines/operating policy on the dam storage but there has been some focus on this with the recent drought. We tend to run on a combination of rolling historical average, tempered with medium term weather outlook.

Water Restrictions – how do we allocate water under restrictions? This integrates with the operation of OEFrag but we may need something more transparent for shareholders and may need to consider:

- Above dam compared with below dam
- Differences within “Above Dam” (eg Opuha vs Ophi vs Te Ngawai)
- Surplus water – Gardner’s Pond incremental water provided higher reliability than shared water this season. Colletts Agreement
- Time allocation – can shareholders specify when they want water through the season (defer their take until later in the season)
- Water trading – short term transfer of entitlements between shareholders

Water Charges – is this a specific topic on its own or is it a case-by-case subject within each area of water policy?

Small users and special supply arrangements – there are a significant number of small shareholders, nearly all in Levels, that have special arrangements whereby they take more than their shared flow rate to be able to run an irrigator but they are meant to limit their operation to within their volumetric entitlement. There are also some that are irrigating without shares (SH8 scheme)

Border dyke/flood irrigation – there are still a small number of border dyke irrigators within Levels and Pearce’s operation at Waitohi. All these present disproportionate demands on water and operational resource and we need to be actively managing their conversion to spray or decommissioning.

Other areas/issues - this listing may not be complete?

These areas may overlap to some degree, so we should consider the inter-relationships and overall picture so that we can prioritise issues and progress specific issues without compromising subsequent policy work.

Process for Policy Development

The key role of the Water Policy Sub-Committee is to establish the key principles associated with each policy topic.

The CEO is responsible for the formulation and drafting of the policy document based on the key principles. These documents will be reviewed and passed by the Sub-Committee.

The Sub-Committee recommends policy to the Board for approval.

The Sub-Committee is responsible for review of existing policies.

On Farm Storage

There is a reasonably urgent need for a policy on on-farm water storage.

A new pond has been constructed at Raincliff ('Kowhais' property developed by Tom MacFarlane) without the prior approval of the Board. The shareholder has subsequently been advised that such approval is required and has provided some correspondence to support their 'case' for their storage facility. Refer Attachment 2 for this correspondence.

We are aware, although not formally advised, that storage ponds are being developed as part of the Cascade Creek scheme.

There are other shareholders that have approached OWL indicating they are considering on-farm storage.

There are a number of existing private storage facilities that were constructed prior to the merger when there were no 'conditions' under the terms of the Water Agreement. These include:

Glenire – (D O'Sullivan) Based on the Te Ngawai and constructed principally to deal with the frequent periods of restriction on the Te Ngawai that occur most summers. The Te Ngawai does not get direct augmentation from the Opuha Dam

Wainono – (J Wright) Based on the Opihi and constructed for the same purpose as Glenire. The farm (Opihi above Raincliff) does not benefit from direct augmentation from the Opuha Dam.

Kakahu – there are a number of storage ponds on properties within the Kakahu scheme.

Kemford Farm – a new pond has been built as part of new dairy conversion on the north side of the Opihi River below Saleyards Bridge (and below Levels intake). The owners (Cartwright and Woodley) have had initial discussions with OWL about an agreement for surplus water to utilise through this facility.

Riverton Farm - (Stratford) a new pond that has yet to be commissioned. This pond has been the subject of on-going discussions (pre-merger) relating to the ability to divert 'excess operational water' into the pond (not dissimilar to the concept of Gardner's Pond except it is via a diversion rather than a simple end-of-scheme catch all).

Discussion on On-Farm Storage

The letter from Andy MacFarlane provides some plausible rationale for having on-farm storage on the Opuha scheme. I actually think there is little to dispute on most of the points mentioned in the letter regarding the on farm benefits – namely efficiencies in water use, water application, electricity use, labour use and capital use.

There are potential benefits to the scheme from the 'smoothing' of the water take. At the extreme is a scenario whereby the supply to the pond runs virtually continuously all season which is the most efficient (getting stored water on to farm) regime as far as managing releases from the dam.

In the letter, there is a strong line that the pond is not a 'storage pond' but is simply a 'buffer' pond. Is there some measure by which these can be differentiated? (if a pond can hold a week's supply of water is that storage or buffer?) Is there a difference in how we ought treat storage vs buffer ponds.

The fundamental issue that is not identified in the correspondence, is that fact that the pond will enable the shareholder, in theory, to utilise their full water entitlement in

any season since they can generally take their entitled flow rate continuously - which is not the case for most other shareholders whose off take is interrupted, for instance, as irrigators are switched over or simply turned off when irrigation is not needed for a period. Extending this concept, compared with the status quo (no significant on farm storage within the scheme), then every new development of on-farm storage improves the reliability of the individual with the storage at the expense of the reliability of all the other shareholders. Those with on-farm storage can access their entitlement quicker than those without.

[Note there is a 'efficiency discount' to this concept (in favour of the shareholder with storage) in that they will generally get (take) all the water they order (and therefore, in concept, that is released from the dam) compared with the shareholder without storage who will 'lose' some water that they have ordered and has been released when they are temporarily off line or unable to take their full amount.]

Extending this across the whole scheme, as more on-farm storage is developed, the reliability of the remaining shareholders will be steadily eroded. The history of the scheme to date (2014/15 excluded) has been one of nearly 100% reliability due, in some part at least, to the fact that no shareholder can normally take their full allocation in a season – the limit on their flow rate (0.41 l/s per share) requires them to operate continuously for 126 days in a season to reach 80% and 158 days to reach 100% of their seasonal entitlement of 5,625 m³.

There are scheme operational advantages with on-farm/off-line storage where they can have a 'buffer' role. This extends from that mentioned previously whereby the more uniform abstraction rate is more efficient to supply from the dam to a further point where the downstream storage may be capable of taking out surplus water from the river when the conditions are right. This should, in theory, result in less water being released from the dam over a subsequent period as the surplus water abstracted at a peak can then be used later when water is held back in the dam.

Several of the ponds within Kakahu do provide some buffering advantage within the scheme, enabling transient water to be diverted into the pond when it might otherwise end up as 'by-wash' to the river or, on occasion, potentially cause some problem with overflow further down the scheme.

The 'value' of a pond as far as providing operational 'buffer' is dependent on its location on the river or within a scheme. There are, for example, some areas on the outer extent of Levels where some buffer storage would enable a more efficient distribution of water.

So what are some of the 'controls' that we may want to give effect to under a policy? Is there a limit on the size of a storage/buffer pond relative to shareholding or landholding? Should we differentiate price for water if it is going into a pond (more or less expensive?). Given the increased likelihood that the pond owner will extract their full seasonal entitlement, at the expense of other shareholders in a dry season, should there be a differential pricing for >80% use with a pond? If some space in the pond is available to OWL/the scheme to provide some operational buffer/flexibility that results in some tangible operational efficiency – should there be some credit to the pond owner. Can we 'insist' on some access to pond volume or right to be able to include some additional infrastructure in the pond construction (eg oversize the intake capability and have some control capability)

Conclusion and Recommendation

There are a number of water policy issues to be considered by the new sub-committee.

It is recommended that at least 50% of the first meeting be allocated to considering the range of issues and determining what is within the scope/mandate of the committee.

The issues should be prioritised with consideration of any interdependencies and a preliminary programme established.

An initial start should be made on establishing the key principles relating to on-farm storage.



Tony McCormick
Chief Executive

19th May 2015

Attachments:

1. Extracts from 'Terms and provisions for supply of water by Opuha Water Limited to Shareholders'
2. Letter from A Macfarlane supporting the development of an on-farm pond

Attachment 1

Extracts from ‘Terms and provisions for supply of water by Opuha Water Limited to Shareholders’

4 SUPPLY OF WATER

4.2 Water to be used for complying purpose

The water to be supplied by the Company to the Shareholder is to be used for irrigation purposes and such other purposes that comply with all conditions of any Resource Consent and any further purposes which are approved by the Board in any relevant **policy statement** posted on the Website of the Company. Water for purposes other than irrigation may be taken during each Year as determined by the Board.

5 DELIVERY SYSTEM FOR WATER

5.1 Policies on Water Delivery

The Company shall on a regular basis and from time to time provide to all Shareholders who are entitled to Water from the Scheme a **policy** relating to the ordering of water from the Company, how the infrastructure of the Company on each Property must be protected and other rules on the processes relating to the ordering, delivery and supply of that Water , which **policies** must be complied with by all Shareholders, taking into account the following factors:

- a) the restrictions that may be placed on the supply of that Water due to insufficient Water being available for take from the Stored Water under the Resource Consents and the requirement for that Water to be equitably distributed to all farmers and other persons entitled to that Water over each Irrigation Season;
- b) the utilisation of water from ponds established by the Company;
- c) any requirements under any Statutory Requirements for restricting the supply of that Water;
- d) the right to manage the supply of that Water so it is supplied at varying intervals and rates and for varying periods during the Irrigation Season to meet as far as may be practicable the requirements of farmers during the Irrigation Season.

5.3 Company has right to store water

The Company shall have the right, in priority to Shareholders, to take water for the purposes of storing that water in Lake Opuha or storage ponds controlled by the Company. In respect of any water stored in those ponds the Company:

- a) shall have a discretion as to how and when that stored water is released to Shareholders;
and
- b) the Company shall ensure that all Shareholders have the first right to utilise that stored water that is available for irrigation in priority to any other user of that water;

5.4 Storage Ponds must be approved

The Shareholder will not create any storage ponds to store water taken under these Terms except as approved by the Company.

5.5 Water to be fairly distributed

The Company will at all times seek to act in an equitable manner as between all farmers and other persons entitled to Water so that they **all receive a fair proportion of Water**, based on the volume to which they are entitled, during each Irrigation Season.

6 EXCESS WATER

6.1 Board can manage excess water

For the avoidance of doubt this clause applies to any Water which the Board determines is Water to which a Shareholder is entitled that is not being taken and utilised by that Shareholder and this excess water has been ascertained on a consistent basis from records taken over a number of years. That water being Excess Water may be dealt with by the Company provided that the right of the Shareholder to take a full allocation of Water under these Terms is not detrimentally affected but subject to the provisions of clause 6.2. The Company may enter into arrangements relating to Excess Water by:

- a) allocating or licensing the right to use that Excess Water on such terms and conditions as the Company considers appropriate;
- b) establishing a trading platform or system (including **policies** and guidelines for implementing the same) for trading rights to any Excess Water;
- c) determining the terms and conditions under which that Excess Water is allocated and/or distributed within the Scheme Area.
- d) requiring those Shareholders who are allocated Excess Water to pay such charges as the Board determines for the supply of that water including any water taken above the weekly allocation of water at the Maximum Supply Rate.

8 FARM ENVIRONMENT PLANS

8.1 Regulatory Authority Requirements

Each Shareholder shall comply with and meet the requirements of any Regulatory Authority to provide such farm environment plan, farm operating plan or other plans as determined by that Regulatory Authority and in accordance with the requirements of that Regulatory Authority.

8.2 Audit

The Company may implement for each Property an audited self-management programme approved by the relevant Regulatory Authority under which the following shall occur:

- e) an audit of the farm practices and environmental management for the relevant Property shall be carried out ; and
- f) the Shareholder will provide such information, questionnaires and reports to the Company as reasonably required by the Company;

- g) such audit may be subject to such external audit as determined by the Company to audit the Shareholder's compliance with all **Regulatory Policies**;
- h) the Shareholder shall comply with any requirements of any Regulatory Authority and the Company in respect of farm and **water management policies** required and imposed on all Shareholders taking water from the Company and conveyed using any of the Distribution System.

8.7 Must use water in accordance with policies

The Shareholder acknowledges that in respect of any water released to the Shareholders Property that the Shareholder shall:

- a) only use and distribute that Water in accordance with Good Management Practice in compliance of the Resource Consents and the requirements of any statutory body;
- b) utilise a system and equipment, and apply and use methodologies as may be prescribed by the Company as being Good Management Practice from time to time;
- c) comply with any Farm Environment Plan approved by the Company under Clause 8 and any Scheme Management Plan;
- d) comply with the **policy** notified to Shareholders under clause 5.1;
- e) comply with the requirements in clauses 8.1 and 8.2.

8.8 Shareholder must comply with good management practice

The Shareholder shall ensure that all irrigation on the Property to which Water is distributed shall be carried out in accordance with Good Management Practice and also in accordance with any Farm Environment Plan and related environmental requirements from time to time applicable to the distribution of Water. Those matters shall include and traverse all terms and provisions of Resource Consents, Statutory Requirements, Good Management Practice and **company policies** that may be applicable from time to time including any Scheme Management Plan.

11 RESPONSIBILITY OF SHAREHOLDER

11.8 Notice to comply with Company policies

The Company may require the Shareholder to comply with **policies and rules** relating to the use of the Water. The **policies** may be posted on the website of the Company and, if so posted, shall be complied with at all times by the Shareholder. The Company may **replace those policies** and rules at any time by giving notice to the Shareholder and placing the new rules and policies on the website of the Company.

17 RIGHT OF ENTRY

17.1 Company right to enter property

The Company and its servants, agents, employees, contractors and workmen, shall have the right at any time and from time to time without being deemed to commit a trespass, taking due care and attention to minimise any loss or damage for the Shareholder and without payment of compensation for damages to enter upon the land of the Shareholder or any land connected or

associated with the Shareholder for all or any of the following purposes without thereby restricting those purposes:

- a) to gauge or otherwise determine the quantity of Water used by the Shareholder;
- b) to view the condition of races, canals, structures, pipes, works telemetry, and Metering Equipment at the Connection Points;
- c) to enter the Property to carry out inspections, maintenance and replacement of any Company infrastructure;
- d) to construct any electricity connections or other easement works as permitted by easements to which the Company is entitled under these Terms;
- e) to repair and replace any works carried out on the Property necessary for the operations of the Distribution System;
- f) to determine if the policies of the Company or the provisions of a Farm Environmental Plan are being met.

Regulatory Policies means any policies, guidelines, or requirements introduced or imposed by any statutory authority having jurisdiction that is applicable to the taking, storing, use and distribution of water for irrigation;

Attachment 2

Letter from A MacFarlane supporting the development of an on-farm pond

29th April 2015

Mr Tony McCormick
Chief Executive
Opuha Water Ltd

By email tony@opuha.co.nz

Dear Tony

“The Kowhais” buffer pond

Tom Macfarlane has forwarded me his advice letter to you and your response. I have subsequently after leaving a message for you, also spoken briefly with Tom Lambie, who advised me to put in writing more detail around the rationale for the irrigation design settled on.

1. The buffer pond system was designed by Tim O’Sullivan, of Sustainable Water, and peer reviewed by Macfarlane Rural Business Ltd. We are also using similar design principles for new irrigation in areas such as Central Plains (CPW).
2. The key characteristics of properties where such systems work include:
 - a. Higher rainfall areas
 - b. Significant lifts from the supply canal
 - c. Potential peak takes well in excess of average flow (either due to the make-up of the irrigation application system, or crops requiring high short term peak water use)
 - d. A need to manage labour requirements of multiple irrigation movements where continuous flow pivots are not an answer due to property contour or shape
3. Despite Tom Macfarlane and others using the term “storage dam”, they are anything but. They are a “buffer pond” to even out water flows over a week. Used correctly, they enable less water to be ordered, and hence more water to be left in the prime (and lowest cost) source of water and typically (as in this case) store around one week of water.
4. They are not an economic form of “storage” relative to larger scale facilities. For example, the interest and capital cost alone is over double the 8c/m³ cost of stored water from Lake Coleridge supplied to BCI/CPW.
5. Hence the goal (in no particular order) is firstly, water use efficiency, secondly, water application efficiency, thirdly, electricity use efficiency, fourthly, labour use efficiency, fifthly capital use efficiency.
6. Water use efficiency
As we have discovered over the last decade in the RDR schemes, total water used decreases, as water orders can be delayed till weather forecasts are realised. Typically, if dry weather prevails, up to two days of buffer pond storage is drawn down, if rain occurs, the buffer pond is not used. Such optionality is much more efficient than ordering scheme water in advance, then not using it, or applying it when not required.

It assists the “just in time” rather than “just in case” philosophy. In RDR, we have noticed that the buffer ponds are usually, at least partially filled in the short period between when water is no longer needed (typically a rainfall event) and when river water (or in Opuha or Coleridge cases, dam water) is turned off. That water previously went to waste.

7. Water application efficiency

In times of evapotranspiration or rainfall uncertainty, where buffer ponds exist, we run a larger soil moisture deficit (particularly on heavier soils) knowing we can catch up if rain does not occur and pond capacity exists. Hence application design might exceed average water use.

When considering nutrient management demands in future, the ability to run a controlled soil moisture deficit becomes critical to water drainage volumes, and hence to nitrogen leaching (and possibly phosphate losses in macropores). We have seen that in practice this year, where 300mm and 500mm aquaflex tapes are showing no drainage since 8th June 2014 (till last week) under excellent monitoring and application management, but Overseer predictions model significant drainage.

In the case of “The Kowhais” they have EM mapped their irrigated soils, and will apply water accordingly, using VRI, to match SMHC to application volumes. Water saved via VRI can be applied to peak demand or less total water used as rainfall and evapotranspiration permit.

8. Energy use efficiency

The best practice design by Tim O’Sullivan, has been implemented by Pivotal Irrigation, and is based on:

- a. Pumping to the highest point requiring no pressure (exit to pond) with continuous flow, hence minimising energy use per m³ of water (high volume x low pressure pump).
- b. Using the head of that pond to minimise energy use to each irrigator. In The Kowhais case, where a gun, Rotorainer, K lines, lateral and pivot are all required, the pumps are sized independently to each irrigator type to eliminate over use of electricity.
- c. Where night rates can be taken advantage of, more capacity can be used overnight, and less during the day. The outcome is typically a much reduced kw use per m³ water applied.

9. Labour use efficiency

Properties such as The Kowhais with four labour units are typical of partially irrigated farms in the area. While cows do not need to be milked every day, around 30 break fences are moved each day. Labour management for weekends and holidays are crucial. Pivots are low labour, laterals require up to 30 minutes per day, and guns, Rotorainers and K lines are very labour intensive.

This design allows for some weekend water to be “put” in the buffer pond and “taken” during the week to allow some of the applications at least, to be used five or six days per week. We see that option as critical to human resource management and sustainability.

10. Capital use efficiency

While the system installed at The Kowhais is more expensive per hectare, we believe it will result in significant savings in running cost (described above) total annual water use, and nutrient outcomes (resource use efficiency). Hence the interest cost per unit of those metrics should reduce.

We have yet to prove that the buffer pond is yet to be utilised, but hope to prove that over the next five years.

Tom has Farmax and Overseer models running on the property, and taking up precision agriculture opportunities to measure and model those outcomes.

The management and directors of The Kowhais are comfortable sharing our learnings from the development and the operation of it, and/or showing directors and management on site. We are confident the design is a win/win for both the scheme and The Kowhais, and are happy to meet to explore any opportunities this design may create.

Yours sincerely

A handwritten signature in black ink, reading "A. W. Macfarlane". The signature is written in a cursive style with a long horizontal flourish extending to the right.

Andy Macfarlane
Director, The Kowhais

Cc Tom Macfarlane
John Macfarlane
Tom Lambie