# Review point 3 Summary report: Water distribution network

## 1. Introduction

Investigations of possible water distribution systems for the Wairarapa Water Use Project were conducted between July and September 2014. This report summarises the key findings to help inform decisions for the project and confirms those schemes suitable for further investigation during the project's pre-feasibility phase.

## 2. Investigation tasks

Assessment of command area distribution systems comprised the following tasks:

a) Engineering assumptions review
b) Supply-demand modelling
c) Initial distribution arrangements
d) Site visit and geotechnical assessment of distribution arrangements
e) Distribution arrangements refinement, cost estimates and risk identification

The review of the assumptions resulted in some significant 'tweaking' of them to reflect the increased knowledge of the schemes through the investigations undertaken so far.

For the purposes of this investigation, each scheme investigated continued to use the same set of 'global' assumptions; in future, different assumptions will be applied to each of the schemes to help determine the optimal scheme arrangement.

A feature of this Workstream was the field inspections of the potential distribution route options and the possible pumping water extraction sites; this was the first occasion that any ground-truthing had been conducted on distribution systems.

It should be noted that command areas have generally been located with the aim of minimising construction costs, resulting in overlaps for some schemes especially in the part of the valley where several schemes would logically irrigate certain areas.

These command area overlaps have been 'permitted' at this stage of the investigations as the schemes are initially being assessed independently of each other. If more than one scheme appears viable based on this first stage assessment, it may prove advantageous for some areas to have water provided by two schemes. Alternatively, the boundary between neighbouring command area boundaries could be rationalised.

It should be noted that:

a. The possible distribution routes (where pipelines etc could be routed) are not displayed on maps as they are likely to change as investigations continue; as well, those routes potentially pertain to land holders who have not yet been approached by the project

b. The command areas are only indicative and therefore subject to change while the balance between technical and economic feasibility is determined, along with environmental, cultural and social effects.

## 3. Common risks & opportunities

A number opportunities, risks and exclusions were identified as having direct relevance to the command areas. In many cases they could have significant effect on the viability of the schemes or their relative rankings.

The following summarises the key opportunities potentially common to all schemes:

a. 35m head supplied at offtake point
b. Supply reliability standard
c. Annual volume requirements per hectare:
d. Land use mix factor of 85%
e. Allowance for distribution losses
f. Opportunity to reduce peak supply rate of 4.5mm/day at offtake points
g. Incorporate seasonal volume cap as resource consent conditions would likely impose
h. Uncertainty and risk of the electricity costs associated with pumping
i. Higher design velocities in pipes for schemes where excess head is available, such as Te Mara, in order to minimise pipe sizes and thus cost
j. Pressure rating of pipes may be minimised for some schemes by inclusion of over pressure protection measures resulting in significant cost savings for some schemes.

## 4. Individual scheme risks & opportunities

The following summarises the high-priority issues that could be addressed for each of the schemes. It is noted however, that much of this work won't be possible to conduct until the full-feasibility phase of the project:

a) **Tividale**

- Buffer storage as currently included at the main river intake and pump station
- Managing flows to ensure water is able to get into the buffer pond when flows are naturally low
- Potential to eliminate buffer pond
- Consider alternative in-river buffer pond

**b) White Rock Road**

- Reconsider direct offtake option to minimise pumping costs
- Use of river conveyance; if this is not viable, additional costs could be incurred

**c) Te Mara**

- Increase the design velocities to take advantage of excess head and minimise pipe sizes
- Use of a buffer pond at river intake
- Use of on-plains storage filled from Ruamāhanga river near middle of command area

**d) Black Creek**

- Use of a buffer pond
- Supplement harvesting from Waingawa with harvesting from Mikimiki Stream or the Waipoua River
- Alternative gravity harvesting to fill storages
- Consider the viability of an alternative smaller scheme that does not cross the 'no demand'/'low demand' zones

**e) Black Creek Variant (Wakamoekau)**

- Use of a buffer pond
- Supplement harvesting from Waingawa with harvesting from Mikimiki Stream or the Waipoua River
- Using a portion of the distribution network
- Alternative gravity harvesting to fill storages
- Consider whether an alternative smaller scheme that does not cross the 'no demand'/'low demand' zones northeast and west of Masterton would be more economically favourable

**f) Mangatarere**

- Extend the scheme command area, possibly toward the Te Ore Ore area.
- Potential to supplement supply from storage with direct supply from Waipoua River, utilising an on-plain storage

## 5. Key Outcomes

The key points to emerge from the distribution investigations conducted are as follows:

a. A number of the design criteria and assumptions used have the potential to significantly impact construction costs. Initial indications are that some of these design criteria and assumptions could be modified, resulting in significant cost savings but with only relatively minor reductions in farm productivity.

b. Changes to scheme arrangements may result in significant changes to scheme costs, though in most cases further work is required to determine whether the changes are technically viable and to determine the magnitude of saving.

c. At this stage no schemes could justifiably be dropped from further consideration i.e. all 5 schemes and the Black Creek variation should continue to be investigated during pre-feasibility. This will allow for significant potential opportunities surrounding costs to be assessed prior to non-economic factors being integrated into the assessments.