5 MINUTE GUIDE

The new frontiers in water efficiency and conservation

This 5 Minute Guide provides an insight into the new frontiers in water efficiency and conservation. In the last decade drought and climate change impacts have created an increase in rainwater harvesting and onsite efficiencies with pumps, pipes, cooling systems, and sensibly, an improved competency in handling these opportunities.

The new frontier is beyond these site efficiencies and augmentation systems. It is beyond the plant gate. It is in the sharing of water across boundaries and in the supply chain of products. The current handful of examples are likely to grow and in another decade integrated water supply and treatment systems (local and centralised), and integration within supply chains will become more widespread.

1. Sharing water across boundaries

There are a small and growing number of instances where water is being shared across industrial, manufacturing, residential and recreational neighbour's boundaries in Australia. Water sharing can be complicated because water is generally a public asset not private, and governments control the price of water at a minimum level irrespective of scarcity, demand and supply.

It is now possible to trade water between sites and parties, in a formal way as one can trade company shares through a stock exchange or informally through bartering. Water trading can be common in farming catchments, for example the Murray Darling Basin. Currently, in urban and industrial areas, trading water is most commonly a direct exchange of rain or stormwater from a site which does not need the water, to a neighbour that does. Trading can also occur with waste water from Site A going to Site B to fulfil a fit for purpose need, however, such instances are still rare.

The complexity of moving water depends on state and local laws, and local water authority. In some cases water cannot be sold by parties that are not water authorities. There are instances where infrastructure costs, e.g. pipes, pumps and tanks, are recovered through agreements and the water is provided free.

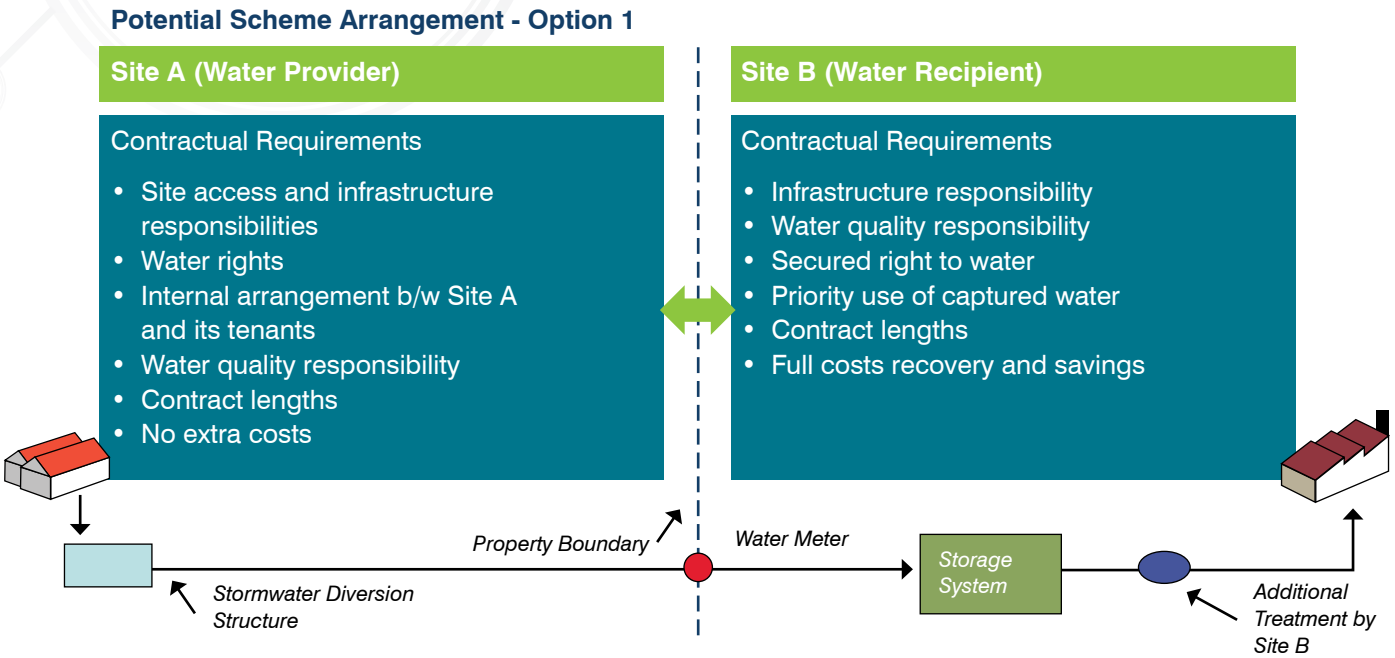
The negotiated arrangements vary according to infrastructure and operating costs, volume of water, level of treatment and security of supply.

The two diagrams overleaf detail the potential models for sharing water across boundaries and the different contractual requirements. Option 1 involves a direct arrangement between two neighbouring industrial sites, while Option 2 includes the local water authority as the intermediary in funding the infrastructure and recovering costs through water bills. ➲

An alternative and less complicated option can be **community water gifting**

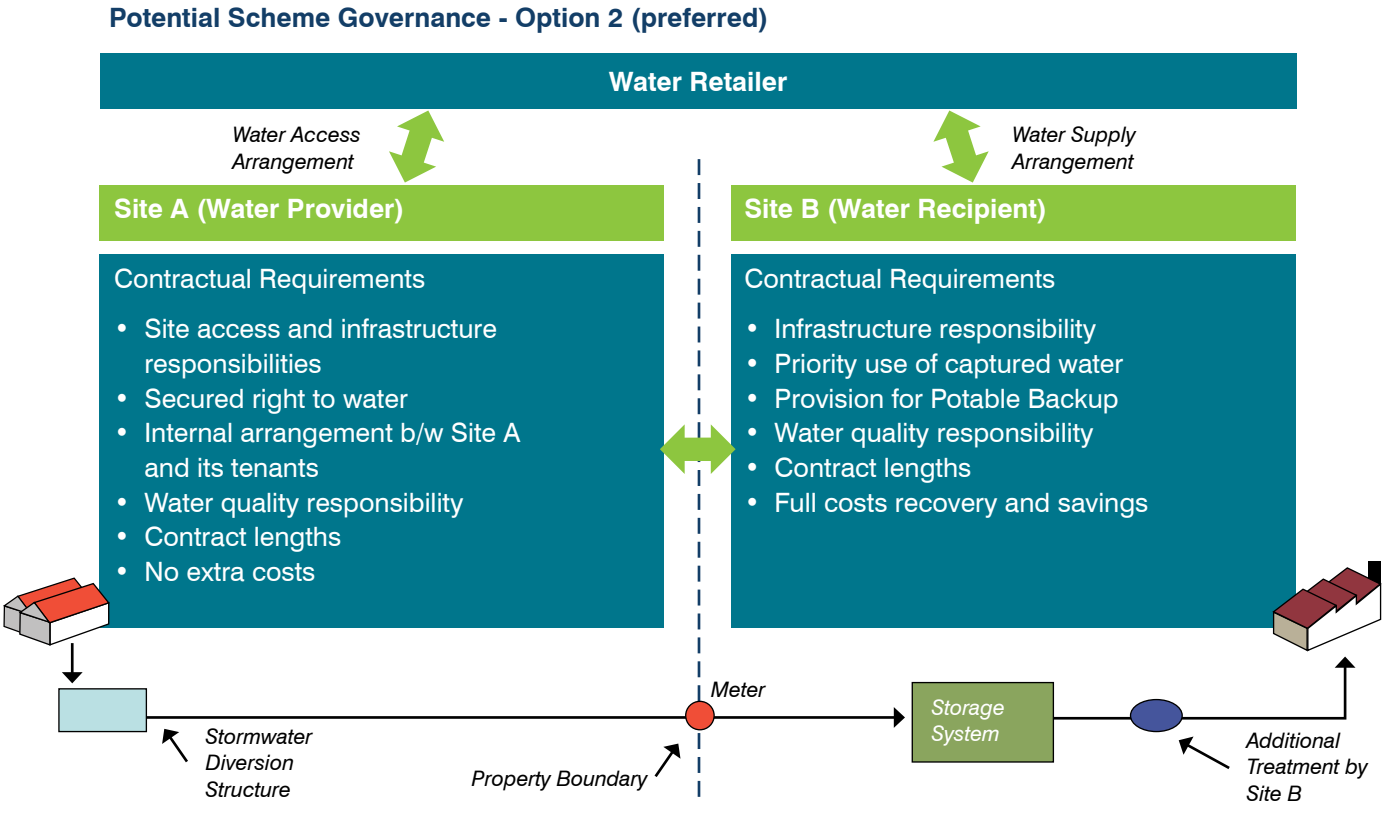
PACIA

Fig.1 Sharing Water



Governance arrangement option 1: direct contractual arrangement between 2 sites

Fig.2 Sharing Water (Preferred)



Governance arrangement option 2: tri-party agreement involving the water retailer

An alternative and less complicated option can be "community water gifting" which is being rolled out at several facilities across Australia. Under these arrangements an industrial owner will capture rainwater or stormwater and gift this to neighbours for community benefit. These include nearby sporting grounds and for council use. Matters to consider for these types of arrangements include:

- funding arrangements for infrastructure
- water quality: treatment requirements, monitoring responsibility and liability
- length of arrangement e.g 5-10-20 years
- site access, if trucking water
- ongoing communication between parties.

2. Supply chain management and improvement

'Supply chain management' refers to the way a company works with its suppliers and customers in the exchange of goods and services. Rather than being solely logistical, e.g. freight, supply chain refers to all the businesses, customers and suppliers contributing to a product or service.

Supply chains will vary in complexity according to the size of the company and what it buys and sells.

There is potential for cost and environmental footprint savings through supply chain mapping and management, including actions such as negotiating better logistics and scheduling, reducing volumes (but not quality or effectiveness), minimising required packaging and waste. Companies are now starting to map their water footprint in a similar way carbon footprinting is done.

The most successful supply chains are highly organised and woven into a company's sustainability strategy. Suppliers and customers who agree to similar standards of responsibility and care with environmental, economic and social targets and improvements may be helpful allies in improving supply chain efficiencies.

Fig.3 Laboratory testings

© Matt Cox

3. Water Footprint

The water footprint of products is one area of growing interest. Water footprinting measures the volume of potable water used to create and transport a unit of product. Researchers and corporations around the world are comparing the water footprint (just like the carbon footprint) of a range of items such as drinks, e.g. milk and food, e.g. beef, clothing materials and packaging. As water becomes scarcer there is likely to be increasing scrutiny on the water content and footprint of products.

As water becomes scarcer there is likely to be **increasing scrutiny** on the **water content and footprint of products.**

Success Story

Eka Chemicals Australia looked, found and negotiated opportunities to work with their customers and suppliers to produce chemicals with a dramatically lower water footprint and substantially better environmental and economic outcome.

In 2009 they designed and had built locally the manufacturing plant that enabled them to relocate manufacture of one particular product from their own site in Hallam to their customer's site in regional NSW. Here, they are able to use 'waste' water from the customer's paper plant in their product instead of potable water. They also dramatically changed a whole raft of financial and environmental costs. They reduced:

- potable water use
- trade waste discharge at both Melbourne and regional plant sites
- bulk handling and storage requirements
- safety requirements associated with large vessel handling
- freight movements
- fuel consumption and greenhouse gas emissions.

Other supply chain initiatives might include:

- reducing the amount of water used in the product (higher concentration in shipped product)
- switching to reusable packaging or reducing packaging required.

Checklist for changing the water footprint of products

The checklist below provides some of the tests that should take place before implementing changes to a product's supply chain, e.g. reducing the water content in produced chemicals or utilising alternative packaging materials.

- ✓ Confirm changes meet applicable standards including environmental, safety handling and transport.
- ✓ Process equipment requirements, e.g. can equipment perform with increased concentrations?
- ✓ Customer requirements – engage with the companies customers and find out if delivery side changes are required
- ✓ Pilot test – conduct batch testing to validate that the new product/concentration/packaging meets applicable standards and customer requirements
- ✓ Business case, be sure to include both costs and benefits. Costs may include capital, operating and regulatory. Benefits might be reduced freight and transportation, environmental, marketing, waste packaging, carbon and water savings.
- ✓ Implement change
- ✓ Monitor and communicate results and benefits, celebrate success.

5 MINUTE GUIDE SERIES

There are 9 titles in the 5 Minute Guide series. See also:

How to improve boilers and steam efficiencies

Establishing a water baseline and measuring success

Matching water and purpose

Top 10 water saving actions

Rainwater Harvesting

Reducing your trade waste impact

How to reduce the water use of Cooling Towers and Chillers

Understanding water, sewage and trade waste bills

Plastics and Chemicals Industries Association
Level 10, 10 Queen Street, Melbourne VIC 3000,
Phone: 03 9611 5400 Fax: 03 9611 5499
Email: info@pacia.org.au Website: pacia.org.au

PACIA acknowledges the contribution and work undertaken by Arup in compiling the 5 Minute Guide Series, and the Liquid Futures Steering Committee members for overseeing the program.