

Turning water losses into water savings

Background

Water savings is the main goal of the GMW Connections Project.

By modernising the irrigation delivery system, existing water losses are converted into savings. The upgraded infrastructure will provide significantly improved system operation that will ensure the sustainability of the entire region for future generations.

Prior to modernisation it was estimated up to 900GL of water each year was lost in the GMID network through seepage, leakage, evaporation and other inefficiencies. Losses increase as annual customer deliveries increase.

When the Project is complete, a Long Term Average Annual (LTAA) water savings of 429GL will be achieved and irrigation water delivery efficiency will be increased from about 70 per cent to at least 85 per cent.

Stage one of the Project will achieve 225GL (LTAA) of water savings and 204GL (LTAA) will be saved during stage two.

These water savings are an important part of Victoria's water recovery target of 1075 GL to meet its obligations for the Murray Darling Basin Plan.

How are we generating water savings?

We're achieving water savings by decommissioning spur channels, upgrading backbone channels with plastic lining and clay remodelling, automating meters to provide significantly better accuracy and automating the operation of irrigation channels.

These upgrades are reducing water being lost to leakage, seepage and evaporation. By creating an automated delivery network, rather than the previously manually operated system, channel outfall losses are also significantly reduced while improving customer service levels through reduced ordering times and more consistent flow rates.

This table outlines the type of intervention and how they're working to generate water savings.

Intervention	Loss category reduction
Channel decommissioning	Leakage, seepage, evaporation, system filling, outfall, unauthorised use.
Channel automation	Outfalls, bank leakage, unauthorised use.
Meter replacement	Measurement error, leakage through and around service points, unmetered service point losses, unauthorised use.
Meter rationalisation	Measurement error, leakage through and around service points, unmetered service point losses, outfall (spur channels), unauthorised use.
Channel pipelining	Leakage, seepage, evaporation, unauthorised use
Channel lining	Bank leakage, seepage
Channel bank remodelling	Bank leakage
Bulk inflow/outflow measurements	Inflow/Outflow Measurement Error

Measurement of the amount of water required to run modernised systems and deliver water to customers shows that less water is needed in modernised systems. These are called operational water savings.

The Reset Delivery Plan, endorsed by the Victorian and Australian governments in September 2016, included operational water savings of 21.6GL.

What happens to the water savings the Connections Project generates?

Of the 429GL of water recovered – 225GL (LTAA) will be achieved during stage one of the Project. This water will be shared equally between irrigators, Melbourne urban water uses and the Victorian Environmental Water Holder.

The 204GL (LTAA) of water savings achieved in stage two will be provided to the Commonwealth Environmental Water Holder.

What we've achieved so far

The most recent audit – conducted by the Department of Environment, Land, Water and Planning (DELWP) utilising an independent auditor (Cardno Pty Ltd) – found water savings of 282.7GL (LTAA) had been achieved.

Further to this, the Project has generated an additional 13.5GL from special projects in the Swan Hill region which are expected to be included in future audits, as footnoted by DELWP in the water recovery report to 30 June 2017.

The independent audit confirmed water savings estimated were accurate and in-line with the Minister-approved Water Savings Protocol.

Water savings audits are conducted annually with results released by DELWP.

How are water savings calculated?

GMW's bulk water entitlements include an annual allowance to cover system losses.

The funding agreement with the Commonwealth requires water savings to be converted into a mix of high and low reliability water shares and transferred to the Commonwealth. This requires the amount of annual allowance to cover system losses in GMW's bulk water entitlements to be reduced and new water shares to be issued. The *Water Act, 1989* sets out the rules for amending bulk entitlements and issuing new water shares.

The Minister for Water issued a Water Savings Protocol in 2009. The Protocol is designed to ensure the requirements of the *Water Act* are met and that the creation of new water shares does not adversely affect existing entitlements. It sets out roles and responsibilities, technical requirements and an independent audit process.

The Protocol contains a technical manual on how to calculate water savings. The Water Savings Protocol can be found on DELWP's website at www.delwp.vic.gov.au

The Protocol establishes a four-phase process for calculating water savings. The Phases are:

1. Project business case estimate of Project savings
2. Annual pre-work estimates of interim savings based on works to be delivered
3. Annual post-work verification of works delivered and independent audit

4. Assessment of long term average savings

The technical manual also provides for a whole of system water balance to be undertaken at the end of each project and at interim points for long projects.

The Technical Manual uses the following general approach to calculate water savings:

$$\text{Water savings} = \text{Losses (pre-intervention baseline)} - \text{Losses (post-interventions)}$$

The baseline year for the Project is 2004/05. This is the key reference point for water savings estimates for the Project.

The Technical Manual provides complex formula to make these calculations for the various types of works implemented by water savings projects in irrigation systems.

It also sets out how to convert annual savings to long term average annual savings as required by Phase 4.

The Technical Manual also enables operational water savings to be recognised by doing a system water balance calculation at the completion of a project, and at interim points for longer term projects.

This permanent reduction in operational loss is included as operational water savings.

The Protocol enables the technical manual to be updated as required to better reflect improved knowledge and technical advances in the understanding of losses and the effectiveness of works interventions. The manual is in its fourth edition with the fifth edition due in early 2018.

Savings are independently audited

The Protocol requires water savings to be independently audited to verify works have been completed and the water savings estimates have been calculated consistent with the calculations methods described in the Protocol.

The Independent auditor is appointed by and reports to DELWP.

The independent auditor assesses a proponents water savings estimates based on completed works and ensures compliance with the technical manual.

For more information on how the independent auditor confirms water savings visit DELWP's website at www.water.vic.gov.au

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