

# JOURNAL

FOR IRRIGATION PROFESSIONALS



**FEATURE**  
Control systems

**URBAN**  
Saving water and improving turf condition at Kingsway Regional Open Space

**Irrigation Australia** applauds first qualified Irrigation Technician graduates

**RURAL**  
Pipe and riser irrigation system saves time and water

**IN THIS ISSUE:**

- CSIRO CALLS FOR IRRIGATORS TO TRIAL WATER BANKING
- CONTRACTORS' CORNER: IRRIGATION SOLUTIONS MADE IN MOREE FOR AUSTRALIA
- IRRIGATION DESIGN FOR A GREEN ROOF
- FERTIGATION INJECTION METHODS AND EQUIPMENT

ISSN 0818-9447

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# CONTENTS



## FEATURES

### CONTROL SYSTEMS FEATURE

- Landscape irrigation controllers get a smart upgrade 12
- Go wireless: battery-powered controllers solve irrigation challenges at power-restricted sites 14
- Remote water quality monitoring: an easier way to watch every drop 18

### URBAN DESIGN FEATURE

- Irrigation design for a green roof 22
- A new irrigation booster pump system for Thoroughbred Park, Canberra 24

### FEATURE ARTICLES

- Pipeline to Prosperity: building infrastructure for Tasmania's irrigation future 26
- Irrigation and pump upgrade for soccer field 38
- Fertigation injection methods and equipment – advantages and disadvantages 42
- CSIRO calls for irrigators to trial underground water banking 44

## REGULAR ITEMS

- Chair and CEO Message 3
- Technology: Rural 4
- Technology: Urban 8
- Research 10
- The Big Issue 20
- IAL News 30
- Professional Development 35
- Contractors' Corner 40
- State Roundup 48
- Smart Watermark 50
- ICID Insights 51
- Business Feature 52
- Bookshelf 53



**ON THE FRONT COVER:**  
 These suction pipes are part of a system installed by Irritek at Belyando in Queensland for a customer growing fodder for a cattle operation. The water, which is harvested and pumped into storage dams, is used to run centre pivots to grow feed.



# WELCOME



## JOINT MESSAGE FROM THE CHAIR AND CEO

It is very important that any member-based organisation listen to their members to ensure that its strategic direction aligns with the expectations and objectives of the membership.

For this reason, since 2016, Irrigation Australia has conducted a membership survey to seek feedback that can assist our organisation on the path of continuous improvement. The results of the 2021 survey have provided some excellent insights and will be very useful to both the Board and the management team in planning for the future.

Importantly, survey respondents represented a good cross-section of our membership base, with 28 per cent being employees and 27 per cent, business owners. The balance were certified professionals, and government and council staff. We received responses from every state and territory except the ACT.

We thought it would be valuable to share the key findings with you, so we have summarised them below.

### General feedback about Irrigation Australia services

**Performance.** Respondents were asked about their perception of the **performance** of Irrigation Australia, and their responses were:

- Excellent: 29 per cent
- Very good: 46 per cent
- Average: 20 per cent
- Below average: 4 per cent
- Poor: 1 per cent

**Importance of services.** When asked to rank the services that Irrigation Australia provides in terms of **importance**, respondents listed the following as their top five:

- Training
- Access to information
- Website
- Certification
- Advocacy

**Effectiveness of services.** When asked to rate the services that Irrigation Australia provides in terms of **effectiveness**, the following were the top five in order of preference:

- Training
- *Irrigation Australia Journal*
- Certification

- Website
- The *Overflow* magazine

**To be improved.** The following services were identified as areas requiring **improvement**:

- Social media
- Regional committees
- Irrigation Directory
- Job board
- Regional events

### Feedback about training

If respondents indicated they had attended our online training courses, they were asked to rate the effectiveness of this method of training delivery, and the following responses were received:

- Positive: 75 per cent
- Average: 19 per cent
- Negative: 6 per cent

One interesting insight from the training questions was that 19 per cent of respondents were not aware of the new Irrigation Technician trade qualification; however, 70 per cent of respondents indicated that they were interested in completing this qualification.

When asked what other courses Irrigation Australia should offer, the overwhelming response was for a Diploma in Irrigation.

The Certified Irrigation Designer was considered the most important certification we offer, followed by the Certified Meter Installer and Validator. A total of 44 per cent of respondents indicated a wish to become certified.

### Regional committees and communications

When asked if they were involved with a regional committee, 81 per cent of respondents said no; however, 44 per cent said that they would like to be involved.

All three of our communication products (*Irrigation Australia Journal*, *Overflow* and *IrriNews*) rated well for effectiveness and interest with the journal receiving the highest positive response.

Eighty-eight per cent of respondents thought that the frequency of our communications was 'about right' and 59 per cent thought that the quality of our communications was excellent.

A total of 64 per cent of respondents thought that the service they received from Irrigation Australia was excellent and 43 per cent said that we were very responsive.

### Valuable feedback for planning

The Irrigation Australia Board and management are very encouraged by the results of the 2021 member survey, which was undertaken during a period of uncertainty because of the COVID pandemic. The Board and management review the strategic plan annually, and feedback from members through the survey, as well as through other means such as regional committees, is very helpful in ensuring that the services delivered are relevant and appropriate for the organisation and our members.

Members have made a number of very positive suggestions in the survey, and these will all be considered in our forward planning.

We would like to take this opportunity to thank all respondents for taking the time to complete the survey and we congratulate Chris King from Albany Western Australia on being the lucky winner of the RAIN BIRD ESP-ME modular controller + LNK Wi-Fi. Thanks to Rain Bird for their generous donation.

### Irrigation Journal editor

After a long and successful period as editor of *Irrigation Australia Journal*, Anne Currey has advised of her intention to retire, and we now begin a transition to our new editor Eve White.

Dr Eve White is a freelance editor, based in Tasmania, with a professional background in science. Her career has spanned ecology, soil science, entomology and agricultural science. Eve is an Accredited Editor with qualifications in communications and has been writing and editing in the areas of science and technology since 2010.

For the next few editions of the journal, Anne and Eve will share the editorial responsibilities, with Eve taking full control in 2022.

We extend a warm welcome to Eve, and we will profile her in a future edition of the Journal.

At an appropriate time, we will also mark the significant contribution that Anne Currey has made, not only to *Irrigation Australia Journal* but to the irrigation industry, and we look forward to a profile story about Anne in a future issue.

**Andrew Ogden**, Chairman  
**Bryan Ward**, CEO



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For information go to the [Irrigation Australia website](#).



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## PIPE AND RISER IRRIGATION SYSTEM SAVES TIME AND WATER

### SNAPSHOT

- A new pipe and riser system, installed on Keiran Treacy's dairy farm near Cohuna in Victoria under the Connections program, has resulted in time and water savings for him
- Benefits include being able to manage pastures better, being able to stop and start water when needed, and not having to maintain channels anymore
- The Connections Program across northern Victoria has resulted in annual water savings of 429 GL and water use efficiency has improved from around 70 to 85 per cent.

Keiran Treacy milks 280 cows on his dairy farm near Cohuna in northern Victoria. When Goulburn-Murray Water were removing a water supply channel across his property last year as part of the Connections program, Keiran jumped at the chance to install a new pipe and riser irrigation system.

While the system was installed in March 2020 and Keiran is still evaluating all the financial and production benefits, he is certain that the system saves water and time as all his allocation can now be irrigated with no waste of water or time in filling the channels.

The heart of the system is a new pump that delivers from 16 to 18 ML of water a day to 35 risers along 2,750 m of 400 and 450 mm pipe to irrigate the farm's annual pastures, which mainly comprise clover and ryegrass.

"Our management of the bays has become so much easier. With the new system we can begin watering immediately and get the water onto the pastures at a time when it is needed rather than having to wait, as we did with the old system, until we could deliver it through the old bay gates," he said.

### Pastures easier to manage

Under the old system, each bay was watered through a slide gate from the channel. Over time the gates had worn and started to leak, which meant Keiran had to wait a day or two after the cows were removed from the bay to begin watering.



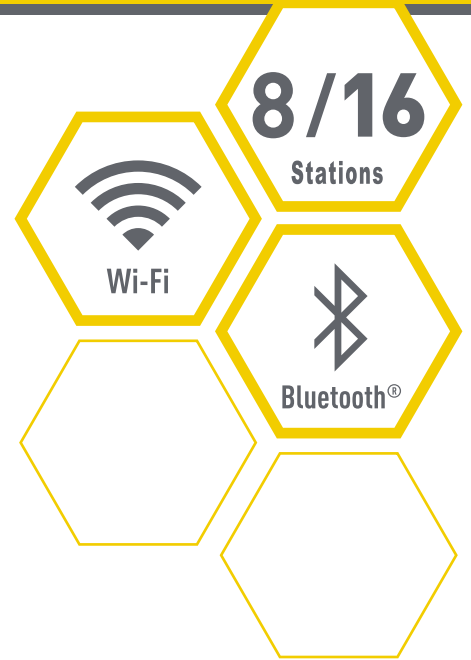
A new pump installed as part of the upgrade delivers water to 35 risers along 2,750 m of pipe to irrigate dairy pastures.



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PRO

# PRO SMART CONTROLLER

The Pro Smart Controller is so easy to program and simple to use including an oversized LCD display and weatherproof case. The mobile app allows users to control watering from anywhere. Available in 8 or 16 stations, the controller will adjust watering based on local weather and site conditions to reduce water waste.



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# TECHNOLOGY: RURAL



Cohuna dairy farmer Keiran Treacy and Luke Fulton from Nutrien check out the newly installed pipe and risers system.

Now there is a time saving as he does not have to wait for the channels to fill before irrigating, he has no more channel maintenance for the section he replaced, he can stop and start watering exactly when he wants, and he has eliminated any work, health and safety risks associated with lifting bay gates.

“We can manage our pastures better, and there is no channel to maintain and keep weed free anymore because our water now comes directly from a larger, lined structure. As well as water and time savings for us, there are water savings for Goulburn-Murray,” he said.

The new system was designed by Luke Fulton of the Cohuna Nutrien Water branch with an eye to the future and can be expanded to water more area when Keiran is ready. It has been designed to fit with two existing re-use pumps on the farm so that any run-off from the bays can be recirculated.

## Water savings across the board

Luke has seen benefits from pipe and riser systems across the district he services, and he believes they give farmers flexibility that is just not possible in a traditional border check setup.

“The amount of water saved does depend on soil type, but it is typically between 10 and 20 per cent. Of course, these savings are there for all the years the system is operating. The key is working with our clients to understand their individual soil and landscape so that we can come up with a design that will meet their management requirements,” he said.

According to Goulburn-Broken Catchment Management Authority, pipe and riser systems were installed on more than 15,500 ha of the area it services, contributing to 81 GL in water savings. It seems likely that more farmers will join Keiran in installing pipe and riser systems, not only for their own benefit but also for production and water efficiencies across the region.

## BACKGROUND: CONNECTIONS PROJECT

In 2010, Victoria’s state government submitted a business case to the Commonwealth to modernise irrigation infrastructure as a way of improving water use efficiency and transferring water savings to the environment. The approved project was to do this by recovering water lost from system inefficiencies through automating and remediating channels, upgrading meters and realigning the historical layout of the irrigation channels.

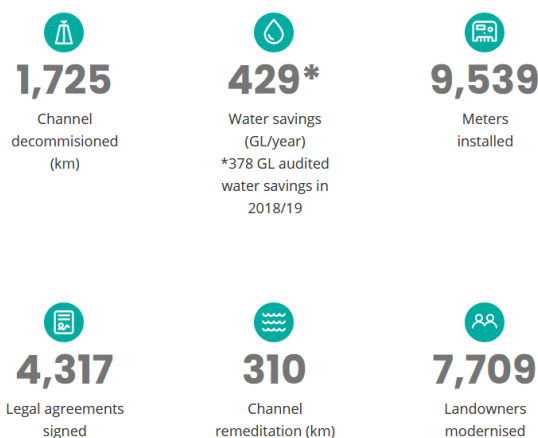
The water savings generated from the project, centred in northern Victoria, were transferred by Victoria to the Commonwealth to assist in meeting environmental water recovery targets under the Murray-Darling Basin Plan.

Management of the program, initially known as the Northern Victoria Irrigation Renewal Project, was transferred to Goulburn-Murray Water after a review in 2012 and the name changed to the Connections Program.

In October 2020, the state government announced that the \$2 billion+ Connections Program, the largest irrigation modernisation project in Australia, was complete. Connections is estimated to achieve an average annual water savings of 429 GL and to improve irrigation water use efficiency from about 70 per cent to at least 85 per cent.

Source: Connections Project [website](#) accessed 2 August 2021

## Project Snapshot



**Acknowledgment.** Thanks to Nutrien Water for providing information for this article.



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## SAVING WATER AND IMPROVING TURF CONDITION AT KINGSWAY REGIONAL OPEN SPACE

### SNAPSHOT

- Kingsway Regional Open Space in the City of Wanneroo covers 50 ha, of which 35 ha is irrigated
- A 2015 review of the irrigation system recommended that water could be saved by improving turf maintenance and irrigation efficiency, and by installing a weather station and dosing unit to inject wetting agents into the mainline
- These changes resulted in a 10 to 15 per cent reduction in water use and improved condition of the sports fields
- The city is currently investigating new smart technologies to replace the existing control system with the aim of further improving irrigation efficiency

The City of Wanneroo is a rapidly growing and thriving local government area on the northern fringe of Perth. Kingsway Regional Open Space is the city council's only regional open space, covering 50 ha, of which 35 ha is irrigated. It comprises passive turf and gardens, and sports fields catering for a range of activities.

### Kingsway's irrigation system

Kingsway's irrigation system, including the pump system, central control, mainline, lateral and sprinklers, was upgraded between 2008 and 2014.

The system is managed through a Rain Bird SiteControl central control system. Six bores pump up to 90 L/sec of groundwater into a lake system consisting of two dams. Here, the iron bacteria are dropped out of the water before the water enters the irrigation system. The system operates at 120 L/sec.

In 2015, the city conducted a review of irrigation practices at Kingsway. The review identified that water could be saved by improving turf maintenance practices and irrigation efficiency and by installing a weather station and dosing unit to inject wetting agent products directly into the mainline during normal cyclical irrigation applications.

*Irrigation Australia* spoke to Chris Langsford about what changes have been made since 2016, and the benefits that Kingsway has seen from these changes.



Kingsway Rugby Field in good shape.  
Image provided by Chris Langsford.



Turf condition noticeably improved at Kingsway Open Space between April 2016 (left) and April 2020 (right). Images provided by Chris Langford.

### Turf maintenance

Since 2015, the Parks and Conservation Management team has adjusted their turf management practices, resulting in improved turf and soil conditions, allowing more efficient use of groundwater.

“We’ve been adding the nutrients that the plants need, rather than a generic NPK mix. Each field (there are 17 of them) has a tailored fertiliser program based on the results of soil and leaf analysis, their use, and other variables. We have also increased our renovation practices. These practices reduce organic matter, relieve compaction and allow the water to penetrate,” Chris explains.

### Irrigation efficiency

As part of the upgrade five years ago, a Rain Bird WS-PRO2 weather station was installed to enable real-time ET rates to be integrated with the central control software. The weather station allows ET rates to be downloaded daily at 6 pm to the central computer. These ET rates are then used to automatically update nightly runtimes on individual stations, based on each station’s individual precipitation rate.

The irrigation rate varies between fields, depending on their needs, ranging from around 70 to 90 per cent of ET. Chris says that while the weather station makes irrigation management easier, it still needs monitoring closely. Staff on the ground make decisions, and can change the irrigation percentage up or down, based on soil type, wear and historical data of each field and their daily observations.

One issue that staff have encountered is damage to root structure by nematodes. This means that on some fields, light, frequent watering is needed, which is not typically considered best practice.

Chris estimates that the use of daily ET data has resulted in a 10 to 15 per cent reduction in water use across Kingsway Reserve since 2016.

### Dosing units

Chris says that the installation of dosing units was straightforward, and benefits have been seen: “The wetting agent has made watering more efficient, allowing more water to infiltrate the soil. We also use the system for fertigation – adding soil amendments, including kelp and humic acids, to the soil. We’ve seen noticeable improvements in the condition of the sports fields.”

### What does the future hold?

The city is currently investigating new smart technologies that will be rolled out in the next few years, with the view to replace the current control system. It is hoped these technologies will aid in the application and monitoring of the city’s groundwater resources and will also allow greater monitoring of turf conditions in real time.

It is also undertaking hydro-zoning and eco-zoning across public open space and incorporating learnings from their partnership with the Department of Water and Environmental Regulation in the North-West Corridor Water Supply Strategy. This strategy supports water-sensitive urban designed communities that minimise water use on non-active open space areas, such as verges and streetscapes, and maximise water use on active turf areas needed for sport and recreation.

This is being done in the context that all indications are that the pressures on water availability and using water efficiently will only increase in the future, as indicated by policy changes around groundwater use and open space irrigation.

Perth is already being affected by the impacts of climate change, which are being seen on water storages. Groundwater is also being affected and a 10 per cent reduction in its use will be mandated by 2030.

The city has also updated its irrigation specifications to reflect industry best practice and consistent approach to water use.



## FINANCES AND INFORMATION THE MAIN BARRIERS TO IMPROVING IRRIGATION EFFICIENCY

### SNAPSHOT

- Researchers at Central Queensland University investigated farmers' attitudes to irrigation technology and the barriers to them adopting more efficient technology
- Most respondents said their irrigation systems were efficient, but acknowledged that improvements could be made, particularly through automation
- Cost was cited as the main barrier to adoption of new technologies, but availability of useful information was also a factor
- Farm-specific cost-benefit analyses of new technologies could help farmers with decision making.

A new study by researchers at Central Queensland University looked at farmers' perceptions of their irrigation systems and the barriers they face when it comes to improving irrigation efficiency.

The research team, led by Dr Richard Koech, surveyed 52 farmers and 15 agricultural professionals in the Bundaberg region – an area where farmers rely on irrigation since there is insufficient rainfall to grow crops all year round.

The main agricultural enterprises in this region are vegetables, macadamias, avocados, bananas, pineapples, herbs and sugar cane.

About one-third of farmers surveyed used trickle or drip (above ground) as their main method of irrigation, while others used micro-sprinklers, trickle/drip subsurface and overhead, permanent or portable sprinklers.

### Farmers' thoughts on irrigation efficiency

The farmer respondents said that, to them, an efficient irrigation system means: uniform water distribution; less labour-intensive; robust and easy to repair; low power consumption; and a scheduling regime based on monitoring (e.g., using soil moisture probes).

Farmers were generally satisfied with the performance of their irrigation systems: 40 per cent described their system as being 'very efficient' and only 2 per cent considered their systems inefficient.

But according to Dr Koech, "Although most irrigators perceive their irrigation systems to be efficient, they recognise that there is room for improvement. Increased water use efficiency will be achieved through increased adoption of proven irrigation technologies."

### Planned changes

In fact, more than half of the respondents believed that their systems and practices could be improved through automation – and automation was the most frequently reported change that farmers planned to make or had recently made to their systems. This includes the use of smart phones, CCTV and other sensors. Participants saw the main benefits of automation as being reduced labour and increased efficiency.

Other changes that farmers had recently made, or planned to make, included: improving and maintaining their irrigation system by, for example, replacing old infrastructure and worn components; upgrading to a more efficient irrigation system; and improving water management strategies through techniques like better monitoring of sap flow and soil moisture, and adopting practices that improve efficiency, e.g. matching water application to soil type and block-by-block irrigation management.

### Barriers to adoption

Although many respondents could see the value of making changes to their irrigation systems, three-quarters of them said that there are barriers to adopting new irrigation technologies and/or management practices.



Lead researcher Dr Richard Koech says that most irrigators recognise there is room for improving the efficiency of their systems.

## EXPERTS REFUTE RIVER MURRAY ESTUARY CLAIMS

A team of scientists led by the University of Adelaide's Associate Professor John Tibby has confirmed that the lower River Murray was not an estuary in the mid-Holocene period (more than 7,000 years ago) – reinforcing scientific evidence likely to influence important river management policy decisions.

Their new paper, published in the Nature journal *Scientific Reports* refutes claims made in a 2020 paper that the lower River Murray was an estuarine environment. The authors say there is much evidence that it was fresh water.

The 2020 paper argued that the silt and clay depositions show that the environment was estuarine, but Tibby's team say these clays could equally have been deposited by river flow.

He said: "Importantly, lower sea level made it physically impossible for an estuary to form in the lower River Murray as has been suggested."

In addition, archaeological investigations led by Flinders University archaeologist, and Kaurna and Ngarrindjeri man, Dr Christopher Wilson, show that Indigenous people relied on freshwater resources, such as freshwater mussels, in this region during this period. This largely negates the possibility of the river being estuarine. Further, there are no records of marine or estuarine organisms from the clays.

"Lakes Alexandrina and Albert are currently managed to keep them fresh. This approach is consistent with their predominantly fresh history," said Tibby.

**Information.** The open-access research paper is available [here](#)

Perhaps unsurprisingly, most respondents (94 per cent of farmers and 86 per cent of agricultural professionals) said that financial constraints were the main barrier. The initial outlay for new technologies may be too high for farmers, particularly given the low profitability of many farms, which is partly caused by low commodity prices. The high cost of power also increases the cost of irrigation in this region, where most farmers rely on electricity to pump irrigation water.

But the issue is more complex than this: the survey showed that it is not just a question of a lack of funds. Farmers need to be confident that an investment in new technologies will be recouped within a reasonable period.

On the one hand, a major barrier cited is the lack of information or evidence showing the benefits of the technology. On the other hand, irrigators reported that they faced 'information overload' in the form of conflicting or irrelevant information, too much choice of brands and products, and aggressive marketing strategies by businesses.

So, while being bombarded with too much information might deter irrigators from making changes, having access to targeted information from a trusted source might help them make the decision to adopt more efficient technology.

Specifically, respondents said that they consider cost-benefit analysis of irrigation technologies to be an important research and extension activity. Public or grower-funded extension services may have a role to play here, as they are less likely to be biased in their messaging.

### The take-home message

According to Dr Koech, "New irrigation technologies come at a cost to irrigators. Irrigators are more likely to adopt new technologies when they are convinced that they are worthwhile investments. A major barrier to adoption is insufficient evidence of the benefits of adoption of these innovations. Governments and irrigation professionals can help by facilitating farm-specific cost-benefit analyses of new technologies to aid farmers in their decision-making processes."

**Information.** The abstract of the paper can be read [online](#).

Eve White, Irrigation Australia



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DELIVERING PUMPING SOLUTIONS

## Landscape irrigation controllers get a smart upgrade

### SNAPSHOT

- Green Options are in the process of upgrading irrigation controllers to smart systems at a number of sites owned by global industrial property group, Goodman
- The new controllers are web-based and connect through the mobile phone network. These controllers are then connected to a smart wireless control system that has an input module, point-to-point transmitter and a receiver

With a view to achieving better environmental outcomes, Goodman Group contracted landscape construction company Green Options to upgrade existing controllers to smart irrigation systems on several of their Sydney sites. Goodman is a global property group, specialising in essential infrastructure for the digital economy. The group has a vast portfolio of industrial and commercial assets with landscaped areas, and irrigation underpins these green spaces being maintained in top condition. Goodman is also committed to being a leader in environmental social governance with progressive sustainability goals.

We spoke with Pat Haydon, irrigation technician from Green Options, about the project, equipment they are installing and some of its challenges.

### AUDIT FIRST, THEN UPGRADE

The first step at every site is to complete an initial audit of the existing system to determine what is needed to upgrade to the smart system.

The controller that Goodman is using to replace all existing controllers is the Galcon GSI, a web-based irrigation controller that connects through the mobile phone network using a SIM card. The GSI allows for control of both irrigation and fertigation.

According to Pat, some of the sites had old controllers that were battery powered.

“Where this is the case, we are replacing them with the new controller and an IrriGator system,” he explained.

The reason for this is that with a battery-operated solenoid valve, the only option for connecting a central 24 V controller would have been to run cable from the controller to each solenoid valve. This was not feasible at many locations.

They chose, instead, to use an IrriGator wireless control system comprising an input module, a point-to-point transmitter and a receiver at each site.



The input module, installed next to the controller, is wired in and connected to the point-to-point transmitter mounted in open air space.

“By installing the IrriGator components, which connect to any smart irrigation controller, you can control these solenoid valves remotely instead of going to each battery-operated controller and manually changing or turning on or off.

“The input module is installed next to the Galcon GSI and is the link between the irrigation controller and the solenoid valves,” said Pat.

Irrigation wires (24 V) are wired from the controller into the input module, which is connected to the point-to-point transmitter that is mounted in open air space. The transmitter is programmed to output licence-free ISM radio bands that are used in various regions around the world.

Each transmitter has an adjustable ID that is linked to each receiver out in the field. The receiver is installed in the valve box where the solenoids are housed, and each one can be wired into 1-4 DC latching coils. The receiver is powered by a long-life lithium battery.

“This gives sites that have solenoids that can’t be connected to an irrigation controller the ability to be connected to one central 24 V irrigation controller,” said Pat.

### **WEAK SIGNAL A CHALLENGE**

According to Pat, one of the biggest challenges is one that many mobile phone users can identify with – a signal that is too weak.

This is usually because of the locations of controllers, e.g. some were installed in basements or areas with signal issues. In these locations, booster aerials were installed by running cabling from the controller to an area that received an adequate signal.

### **TEST ON COMPLETION**

As should be the case with all installations, the equipment at each site is tested after completion to ensure all components are working and the system is online.

### **THE RESULT?**

As a result of the upgrades and technology-led solution, Green Options and Goodman were able to reduce water use at some Goodman properties by 62 per cent.

*Anne Currey, Irrigation Australia*

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## Go wireless: battery-powered controllers solve irrigation challenges at power-restricted sites

### SNAPSHOT

- With some irrigation projects, it is not possible to use controllers that are plugged into the mains, so battery-powered options are chosen
- This article goes through equipment features and questions to ask before choosing a battery-powered controller to ensure you install the most appropriate model for the job
- Key things to consider include: durability, ability to back up programs, ability to cycle and suspend irrigation scheduling, Bluetooth and weather sensor compatibility and controller mapping

How do you safely set up irrigation on a power-deprived median without cutting up the surrounding asphalt or dealing with a plethora of permits? What's the best way to establish temporary irrigation in a newly built housing development or set up an automatic watering solution for a homeowner's hydroponic garden? How can you manage a specialty irrigation project like a green roof or wall? In this article, Hunter Industries outlines important controller features to look for and provides questions to ask before making that important decision.

When locations are difficult to access, lack electrical power, or demand cost-prohibitive wire runs, battery-powered controllers can make irrigation safe, effective and affordable. Unlike traditional irrigation systems, they save time and money because there's no need to run wire, obtain construction permits or lease equipment to tunnel under concrete or other hardscape elements. Since these systems are less intrusive, they can also help you win bids where specifications are strict about AC power requirements.

For projects that require a green solution, some battery-powered controllers can be converted to solar energy using a built-in or add-on solar panel, eliminating the need for electricity and minimising environmental impacts. Solar-powered systems also require less upkeep. This means you can schedule maintenance visits further apart, saving time and money.

Some models offer all three power options in one unit, allowing you to choose between AC, battery or solar power for ultimate installation flexibility. Installation is easier too since battery-powered controllers don't require wiring and there's less trenching involved. This also makes it possible to place controllers in a variety of locations for greater impact.

### HOW BATTERY-POWERED CONTROLLERS WORK

A battery-powered controller operates an irrigation system by sending a pulse of energy to the solenoid, which causes it to unlatch. This opens the valve and allows water to flow through. When the station run time ends, the controller sends another pulse that latches the solenoid and stops the flow of water. Using the control panel, you can set watering schedules, check station status, view the next start time, and more.

Next-generation models include Bluetooth® technology for quick, easy connection and remote site management. Battery-powered controllers are often installed in roadway medians and areas with high vehicular traffic. Bluetooth connection allows total irrigation management from a safe distance without crossing the road or impeding traffic with a service vehicle. You can even manage multiple sites without having to manually check each individual valve.

Battery-powered controllers run on disposable batteries that must be replaced about once a year. Solar-powered controllers function using energy from the sun.

### TIPS FOR CHOOSING A BATTERY-POWERED CONTROLLER

**Durable, weatherproof construction.** Battery-powered controllers are usually installed outdoors, so it's important to buy a durable model designed to withstand the harshest conditions. Choose one that's IP68 certified, which means it's dust-tight and water-resistant in 3 m of fresh water.

Controllers used in arid regions, for example, must be able to withstand extreme heat up to 60°C without melting or breaking. Conversely, they must also be able to handle subzero conditions in cold-weather climates. High-quality controllers can accommodate both extremes.

**Non-volatile memory and program backups.** To prevent the loss of vital programming data, non-volatile memory is a must. Without it, you'll lose all your programming if the batteries run out. Non-volatile memory retains your



Battery-powered controllers come in all shapes and sizes from a Bluetooth, wireless tap timer like this right through to controllers suited to commercial applications.



programming, so you won't have to waste your precious time re-entering water schedules or date and time data after battery replacement.

When considering conventional battery-powered controllers that don't use an app, look for a model that offers easily retrievable program backups. This allows you to restore the full irrigation program in case someone alters the original programming without your consent.

**TOP TIP:** When establishing a temporary irrigation schedule, set the long-term schedule as a backup. Then create a temporary schedule for the seed germination period, which usually requires frequent watering to promote plant growth. Once the seeds have sprouted, restore the settings to the long-term schedule. By setting up both schedules on the front end, it will save you programming time when the germination period is over.

**TOP TIP:** After a temporary irrigation project is completed, reuse your battery-powered controller for another temporary project or as a demo unit. It's a great way to save money and extend the life of your controller.

**Bluetooth control.** For maximum flexibility and convenience, a battery-powered controller with Bluetooth capability is essential. This powerful, wireless technology allows you to manage sites remotely with your smartphone.

Through an easy-to-use app, you can map controllers by location, get battery change reminders, access controller logs, and more.

**Copy-and-paste programming.** Some Bluetooth controller models allow you to take a preconfigured schedule from one controller and apply it to another using a simple copy-and-paste process. Just create the original schedule manually by selecting start times, run times and water days. Then send it to multiple controllers with your smartphone using a repeating 'connect and send' command for each subsequent device. This process saves a huge amount of time by shortening the setup to two steps. It also prevents mistakes, which are likely to occur if you have to program numerous controllers manually using a multistep approach.

**TOP TIP:** Save hours of setup time by using the copy-and-paste method for medians or other landscapes that require identical watering parameters.

**Cycled scheduling.** Sloped landscapes and hard-packed soils require a special approach to watering. If a system delivers too much water too quickly in these types of applications, it can lead to runoff and water waste. Setting up a cycled schedule breaks up irrigation run times, giving the soil enough time to absorb the water and prevent runoff. Systems that offer this feature allow you to enter a mist time followed by a wait time, allowing the water to soak in.

# CONTROL SYSTEMS

**Station delay.** Some controllers allow you to insert a gap between the end time of the current station and the start time of the next one. This is useful when you have slow-closing valves or a pump that needs extra time to recharge.

**Suspended irrigation.** During long periods of rainy weather, controllers with a suspended irrigation feature can pause watering for a user-specified number of days. This keeps the controller in off mode temporarily, conserving water during rain events when irrigation isn't needed. Once the designated period ends, the system resumes its normal watering schedule – no return site visit required.

**Monthly and seasonal adjustments.** Rainfall varies depending on geographic location and the time of year. To eliminate site visits for reprogramming controllers when the seasons change, many battery-powered controllers allow for quick adjustments to irrigation run times using a percentage scale. Set the system to 100 per cent during warm weather months and reduce the percentage as needed to shorten run times during cooler months. By modifying the entire system at once, you won't have to adjust each individual station in the program. This allows you to conserve water and keep plants from getting saturated.

**Weather sensor compatibility.** To deliver maximum water savings, consider a battery-powered controller that's compatible with weather sensors. These devices promote efficient water use by triggering a system to halt irrigation when soil moisture is adequate or during wet weather. Sensors that detect rain, wind, and freezing temperatures are an excellent way to double-check when you should and shouldn't be watering.

**Controller mapping.** Another valuable feature to seek out is controller mapping. After installation, you can use your smartphone to drop a pin on a map to identify and save the location of each controller. If you do not visit a site often, the landscape can become overgrown or look different depending on the season. This can make it hard to remember exactly where a controller is located, especially on large properties or sites where leaves have covered the valve box. The mapping tool makes it easy to find the locations on your next visit because your phone can show you exactly where they are. You can even share locations with new crewmembers who may be unfamiliar with a site.

**Event logs.** Even when programs are scheduled, weather sensors and system issues can alter what a controller actually does. Event logs track the controller's performance for months at a time, so you can see exactly what actions occurred. You can also tell if someone ran a manual cycle or changed the schedule. By accessing your controller's

history, you gain important diagnostic insights about manual activations and changes to sensor status, programs, or schedules.

**Variable mounting options.** When it comes to installing the controller, make sure it's possible to do so in a variety of ways. Newer applications like green walls and green roofs may require you to be creative, so being able to mount the controller in various orientations will make installation easier.

**Extended power and battery-change reminders.** Some battery-powered controllers may not last an entire season on just one battery. That's why it's important to look for a unit that has the capacity for a second battery. This extends the power cycle and saves you time by reducing site visits.

Be sure the controller you choose also provides battery change reminders. Alerts are usually delivered through a smartphone app. While they may not be able to tell you the remaining battery percentage, they do serve as a helpful reminder to return to the site after a designated period.

## CHOOSING THE IDEAL CONTROLLER

With so many models and features to choose from, it can be difficult to decide on the one that's right for your project. Working with a certified irrigation designer professional to design an efficient system that complies with regulatory and municipal requirements is a good place to start.

It's also helpful if you understand the differences between DC and AC systems. For example, DC-latching solenoids work differently than solenoids in AC systems. Also, wiring distances between battery-powered controllers and valves are much shorter than wiring distances used with AC solenoids.

As you plan the project, answering the following questions may help you choose the best option for the job:

- What is the project application?
- What kind of weather occurs at the location throughout the year?
- Is automated watering a requirement?
- What type of power is available?
- Is the site hard or dangerous to access?
- Are there any special watering considerations?
- How often will maintenance be needed?
- Is vandalism a concern?
- Is running wire cost-prohibitive?

If you're struggling to automate your irrigation in remote, power-restricted locations, or if you need a temporary irrigation solution, battery-powered controllers offer a simple, cost-effective way to deliver power without the plug.

**Acknowledgment.** Thanks to Hunter Industries for supplying this article.

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## Remote water quality monitoring: an easier way to watch every drop

### SNAPSHOT

- The Greenlife Industry Australia Smart Farming Project is creating a system to remotely monitor irrigation line pressure, leaching fraction and other water parameters in nurseries
- The system will help nursery managers make real-time decisions about irrigation and achieve best management practice as outlined by the EcoHort guidelines

The nursery industry has invested decades of research and development into irrigation best management practice (BMP) to help nursery managers maintain water quality and supply. However, there is always room for improvement when it comes to managing water more efficiently, smoothing out the water cycle, and improving environmental sustainability. Remote monitoring can help the nursery industry in these areas.

As part of the Smart Farming Partnerships project, funded under the National Landcare Program and Hort Innovation, Greenlife Industry Australia (GIA) is installing new remote monitoring technologies that help nursery managers get a real-time overview of their water storage and quality and make informed decisions about irrigation.

The project targets the parameters within EcoHort, the industry's environmental BMP program.

### ECOHORT GUIDELINES

The EcoHort guidelines include irrigation monitoring criteria and checklists for irrigation managers to ensure the system and water quality meet industry BMP standards. For example, the guidelines recommend that water be applied at a mean rate of less than 25 mm per hour, a coefficient of uniformity of above 85 per cent, and a scheduling coefficient of less than 1.5.

In a nutshell, it is about applying water at a rate that the growing medium can absorb; having the sprinklers laid out in an appropriate grid pattern to enable uniform coverage; and ensuring that the system efficiently applies water to avoid wasting fertiliser inputs by overwatering and flushing nutrients into drains, dams, or local waterways.

If we assume that an irrigation system meets the BMP standards, what else can be done to ensure the best growth and plant health outcome? EcoHort provides other vital criteria that can help to meet and surpass BMP requirements. Two important criteria are irrigation line pressure and leaching fraction.

**Irrigation line pressure.** Assuming that sprinklers are laid out in a grid pattern that is appropriate for their type and model, the sprinkler specification sheet provides the optimum operating pressure (usually in kPa) to ensure that they meet their performance target. Too much or too little pressure will change the sprinklers' application efficiency and negate much of what was gained by installing a system

Installing water quality sensors in runoff drain.





Example of the operations dashboard, showing wastewater parameters.

to industry best practice. Installing pressure transducers in the irrigation line will monitor line pressure to allow the pump operation to be adjusted to sprinkler requirements, increasing pump and application efficiency.

**Leaching fraction.** A second criteria that is often overlooked or misunderstood is the 'leaching fraction'. In theory, irrigation is applied at a rate to replace water lost to evapotranspiration. EcoHort guidelines suggest a target of about 12 per cent, i.e., the application rate should be such that 12 per cent of the irrigation water is leached from the container. This keeps fertiliser in the root zone where it is needed for maximum growth and allows for a modest flush of salts, which reduces any potential environmental impact from excessive leaching of nutrients.

### OPERATIONS DASHBOARD

The GIA Smart Farming project is implementing a system to remotely monitor both irrigation line pressure and leachate volume, as well as basic water parameters such as pH, electrical conductivity, nitrate and phosphate, for each irrigation event. This data is displayed and recorded on an 'operations dashboard' to show the historical fluctuations in irrigation and runoff water quality while providing a real-time alert mechanism if any parameter drifts outside of the EcoHort guidelines.

**Acknowledgment.** This article was written by David Hunt, Smart Farming Project Officer, and originally published on Greenlife Industry Australia [website](#).

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## CLIMATE CHANGE AND AUSTRALIA

In this article from The Conversation [website](#), the authors look at the latest Intergovernmental Panel on Climate Change (IPCC) report predictions for the world and for Australia. The message from the IPCC is unless we act now, a hotter, drier and more dangerous future awaits.

Australia is experiencing widespread, rapid climate change not seen for thousands of years and may warm by 4°C or more this century, according to a highly anticipated [report](#) by the IPCC.

The assessment, released 9 August 2021, also warns of unprecedented increases in climate extremes such as bushfires, floods and drought. But it says deep, rapid emissions cuts could spare Australia, and the world, from the most severe warming and associated harms.

The report is the sixth produced by the IPCC since it was founded in 1988 and provides more regional information than any previous version. This gives us a clearer picture of how climate change will play out in Australia specifically.

It confirms the effects of human-caused climate change have well and truly arrived in Australia. This includes in the region of the East Australia Current, where the ocean is warming at a rate more than four times the global average.

We are climate scientists with expertise across historical climate change, climate projections, climate impacts and the carbon budget. We have been part of the international effort to produce the IPCC report over the past three years.

The report finds even under a moderate emissions scenario, the global effects of climate change will worsen significantly over the coming years and decades. Every fraction of a degree of global warming increases the likelihood and severity of many extremes. That means every effort to reduce greenhouse gas emissions matters.

### Australia is, without question, warming

Australia has warmed by about 1.4°C since 1910. The IPCC assessment concludes the extent of warming in both Australia and globally are impossible to explain without accounting for the extra greenhouse gases in the atmosphere from human activities.

The report introduces the concept of Climate Impact-Drivers (CIDs): 30 climate averages, extremes and events that create climate impacts. These include heat, cold, drought and flood.

It confirms global warming is driving a significant increase in the intensity and frequency of extremely hot temperatures in Australia, as well as a decrease in almost all cold extremes. The IPCC noted with high confidence that recent extreme

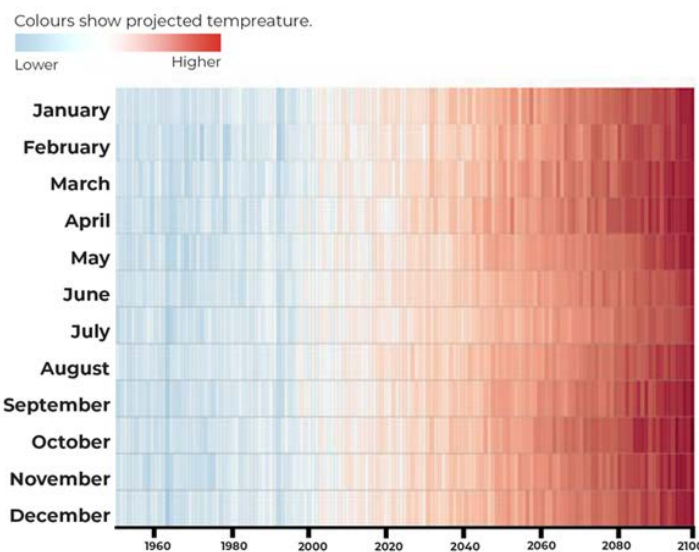
heat events in Australia were made more likely or more severe due to human influence. These events include the extreme heat preceding the 2018 Queensland fires and the heat leading into the Black Summer bushfires of 2019-20.

The IPCC report notes very high confidence in further warming and heat extremes through the 21st century – the extent of which depends on global efforts to reduce greenhouse gas emissions.

If global average warming is limited to 1.5°C this century, Australia would warm to between 1.4°C to 1.8°C. If global average warming reaches 4°C this century, Australia would warm to between 3.9°C and 4.8°C .

### Projected temperature rise in Australia

Seasonal stripes graphic showing projected temperature rise in Australia under a high emissions pathway made using the IPCC Interactive Atlas.



Source: IPCC

### IPCC

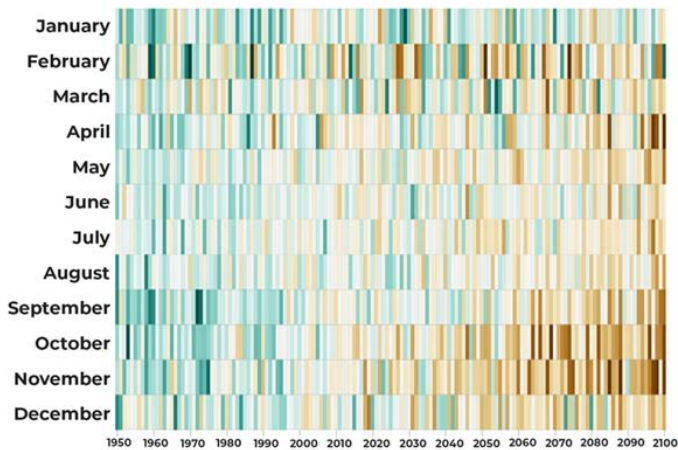
The IPCC says as the planet warms, future heatwaves in Australia – and globally – will be hotter and last longer. Conversely, cold extremes will be both less intense and frequent.

Hotter temperatures, combined with reduced rainfall, will make parts of Australia more arid. A drying climate can lead to reduced river flows, drier soils, mass tree deaths, crop damage, bushfires and drought.

The southwest of Western Australia remains a globally notable [hotspot for drying](#) attributable to human influence. The IPCC says this drying is projected to continue as emissions rise and the climate warms. In southern and eastern Australia, drying in winter and spring is also likely to continue. This phenomenon is depicted in the graphic over page.

## Rainfall change in Southern Australia under a high emissions pathway

Seasonal stripes graphic showing projected rainfall change in Southern Australia under a high emissions pathway (green is wetter, brown is drier) made using the IPCC Interactive Atlas.



Source: IPCC

## Climate extremes on the rise

Heat and drying are not the only climate extremes set to hit Australia in the coming decades. The report also notes:

- observed and projected increases in Australia's dangerous fire weather
- a projected increase in heavy and extreme rainfall in most places in Australia, particularly in the north
- a projected increase in river flood risk almost everywhere in Australia.

Under a warmer climate, extreme rainfall in a single hour or day can become more intense or more frequent, even in areas where the average rainfall declines.

For the first time, the IPCC report provides regional projections of coastal hazards due to sea level rise, changing coastal storms and coastal erosion – changes highly relevant to beach-loving Australia.

This century, for example, sandy shorelines in places such as eastern Australia are projected to retreat by more than 100 metres, under moderate or high emissions pathways.

## Where to from here?

Like all regions of the world, Australia is already feeling the effects of a changing climate.

The IPCC confirms there is no going back from some changes in the climate system. However, the consequences can be slowed, and some effects stopped, through strong, rapid and sustained reductions in global greenhouse gas emissions.

And now is the time to start adapting to climate change at a large scale, through serious planning and on-ground action.

To find out more about how climate change will affect Australia, the latest IPCC report includes an [Interactive Atlas](#). Use it to explore past trends and future projections for different emissions scenarios, and for the world at different levels of global warming.

**Acknowledgment:** This article is from [The Conversation](#). Accessed 11 August 2021.



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## Irrigation design for a green roof

### SNAPSHOT

- A new university campus in north-west Tasmania has been built with a green roof with more than 10,000 plants
- Green roofs can help cool building interiors, improve stormwater management, reduce noise, and increase aesthetic appeal and biodiversity
- The 2,000 m<sup>2</sup> roof has 16 irrigation zones and is fitted with an irrigation system designed and installed by Fytogreen

A new coastal university campus building in north-west Tasmania has been built with a 2,000 m<sup>2</sup> green roof, planted with 10,000 native plants.

Green roofs are growing in popularity due to their environmental benefits, aesthetic appeal and ability to cool buildings. They can extend roof life, reduce heat-island effects, improve stormwater management, reduce noise, and increase biodiversity. However, they come with some unique architectural challenges and design needs when it comes to irrigation.

Geoff Heard, director of Fytogreen, designed the green roof for the new Cradle Coast campus of the University of Tasmania in Burnie. Geoff explains that while green roofs have many benefits, they need to hold far more weight than a traditional roof design, and a waterproof membrane is required.

“The green roof we designed for the university has a 170 mm deep profile. Of this, 120 mm is growth medium, then there’s a geofabric layer below this. Beneath the geofabric layer, there’s a 30 mm deep drainage cell, topped off by a 20 mm stone mulch layer made of basalt,” Geoff explains.

The roof is irrigated with a subsurface drip system using AS-XR dripline from Netafim, and Geoff says that in terms of drip irrigation function, there is not much difference between irrigation of a green roof and traditional garden irrigation.

“The main difference is that we use a special dripline, made for us by Netafim, with closer emitter spacing (15 cm) and a lower flow rate (1 L per emitter per hour) to provide a more uniform wetting up pattern compared to the typical 300 mm spacing and a flow rate of 1.6 L per emitter per hour”.

The roof is divided into 16 irrigation zones, each covering about 130 m<sup>2</sup>, and each of which is flow-monitored through a pulse flow meter. The flow rate is typically 44 L a minute (or 720 L per irrigation event) for each zone.

The system is controlled by Galcon GSI web-based irrigation controller that is alarmed and can be monitored remotely.

Owing to the porous nature of the lightweight growth medium, roof gardens lose more water to drainage than traditional gardens – typically, 25 per cent drops out to drainage, according to Geoff. But sustainable design ensures that the water is reused via the irrigation tank, which collects all roof runoff. The roof slope ranges from 1.5 to 7 degrees, allowing the water to flow into recycling water tanks via box gutter collection points, from which it is reused for irrigation. The tank is topped up as needed from a potable water supply.



The university campus's green roof under construction. *Image supplied by Fytogreen.*

Twenty-six Australian coastal shrub and grass species were planted as tube stock, with an emphasis on Tasmanian species. Weed control is the focus over the first 12 months as the plants become established, and Fytogreen plans five maintenance visits annually, to manage fertiliser application, weed management and general plant health.

*Eve White, Irrigation Australia*





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## A new irrigation booster pump system for Thoroughbred Park, Canberra

### SNAPSHOT

- The irrigation system at Thoroughbred Park, the main horse racing and training facility in Canberra, recently needed replacing
- Waterland Pty Ltd replaced the old booster pumps with a new system that included pumps, control panel and the capacity for remote access
- The removal and replacement of the pumps was straightforward, and the racecourse is now benefiting from the greater operating efficiency of the new pump, its ease of use, and the ability to monitor it remotely

Thoroughbred Park, located in Lyneham, North Canberra, is the main horse racing and training facility in the ACT. The track is 1,800 m long and has an irrigated turf area of 64,000 m<sup>2</sup>, requiring an efficient and reliable irrigation system. The irrigation booster pumps, which were recently upgraded by Waterland Pty Ltd, form the heart of the system.

The existing irrigation booster pump system was installed during course construction in 2007 and was showing signs of a long service life. Over the last five years, several running repairs were carried out, including replacing several

mechanical seals, rewinding of electric motors and replacing the original Techsys control panel interface.

In light of the increasing maintenance requirements of the booster pumps, the staff from Waterland helped the racetrack managers formulate a plan and budget to replace and upgrade the infrastructure to a new Wilo COR-4 Helix V3606 booster pump system with an Inca control panel with touchscreen V700 interface and PVREM remote access modem. Replacement and upgrade seemed a better option than ongoing rebuilds, enabling the racetrack to benefit from the more modern control system and the greater operating efficiency of the vertical multistage booster pumps.

### STRAIGHTFORWARD REPLACEMENT

Joel Munro from Waterland explains that horse racing tracks have similar irrigation requirements to golf courses: "Thoroughbred Park needed a system that could handle both hand watering and full duty application. The system we installed can deliver between 2 and 50 L per second and is suitable for moveable sprinklers, hand watering and fixed course irrigation".

Removing and replacing the irrigation booster pump set was relatively straightforward. A tilt tray crane-equipped truck made it easy to access the pumps, facilitating their



Thoroughbred Park's new booster pump system is easy to use and can be monitored remotely.

safe removal with a minimum of manual lifting by service staff. When the new booster pump system was installed, a new buttwelded poly suction line was fabricated to suit the revised location of the suction connection, while the discharge connection lined up with the original pipework and reconnection was easy. Shepherd Electrical, who have a long standing and very positive working relationship with Waterland, was responsible for the electrical reconnection and commissioning, including an electrical upgrade of the pump shed with new lighting for better nighttime access.

The specific requirements outlined by Adam Ayre, Racecourse Facilities Manager, were that the system be simple and straightforward to use and understand by facilities staff, be of equal or greater operating duty compared to the original pump station and have easy spare parts availability and back up service. The easy remote access to the Inca control panel via the PVREM modem and software was seen as a very handy bonus.

#### **MINIMISING DOWNTIME A PRIORITY**

Owing to the quality of the build and the relatively easy access to the site, few challenges were encountered during installation. The biggest consideration during the

upgrade process was minimising the downtime of the track irrigation system, as this is a critical piece of infrastructure in maintaining the track quality and its turnaround time between race meets. The accurate plans of the booster pump, its skid and manifold pipework, provided before construction, allowed for the fabrication of the suction pipe pieces necessary for installation and facilitated a smooth and trouble-free install.

Thoroughbred Park is benefiting from the greater operating efficiency of the new booster pump system, its ease of use, and the ability for remote monitoring, which allows more 'hands-off' operation.

#### **WORK IN THE PIPELINE**

Further work is planned for the future, namely the installation of a tank level transducer in the irrigation storage tanks and the integration of this, via the control panel, into the town's water top-up system. This will provide an emergency backup water supply to the storage tanks in times of low yield from the storage dams and recycled water mains available on site.

**Acknowledgment.** This article was supplied by Waterland Irrigation.



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## PIPELINE TO PROSPERITY: BUILDING INFRASTRUCTURE FOR TASMANIA'S IRRIGATION FUTURE

### SNAPSHOT

- Tasmania's Pipeline to Prosperity program is the third tranche in a series of irrigation schemes being delivered by Tasmanian Irrigation
- The program will deliver up to 78,000 ML of water to irrigators at a capital cost of \$496 million
- The program is divided into two phases, during which eight new schemes and two augmentation projects are being considered
- Here, we outline the details and progress of the proposed schemes

Irrigated agriculture contributes more than 50 per cent of the value of Tasmania's agricultural production. The state government is aiming to further grow the farm gate value of the agricultural sector through investment in irrigation. The Pipeline to Prosperity program, supported by the federal government, Tasmanian Government and Tasmanian farmers, is the third tranche of a series of irrigation schemes being delivered by Tasmanian Irrigation.

The program will deliver up to 78,000 ML of water at an estimated capital cost of \$496 million.

**Phase one** includes four new schemes: Don, Fingal, Northern Midlands and Tamar, and one project to augment the existing Sassafras–Wesley Vale scheme.

**Phase two** will consider new schemes in the Detention, Flowerdale, Harcus and Southern Midlands areas, and augmentation of the South East Irrigation Scheme.

Here, we look at the scope and progress of these projects.

### Don Irrigation Scheme

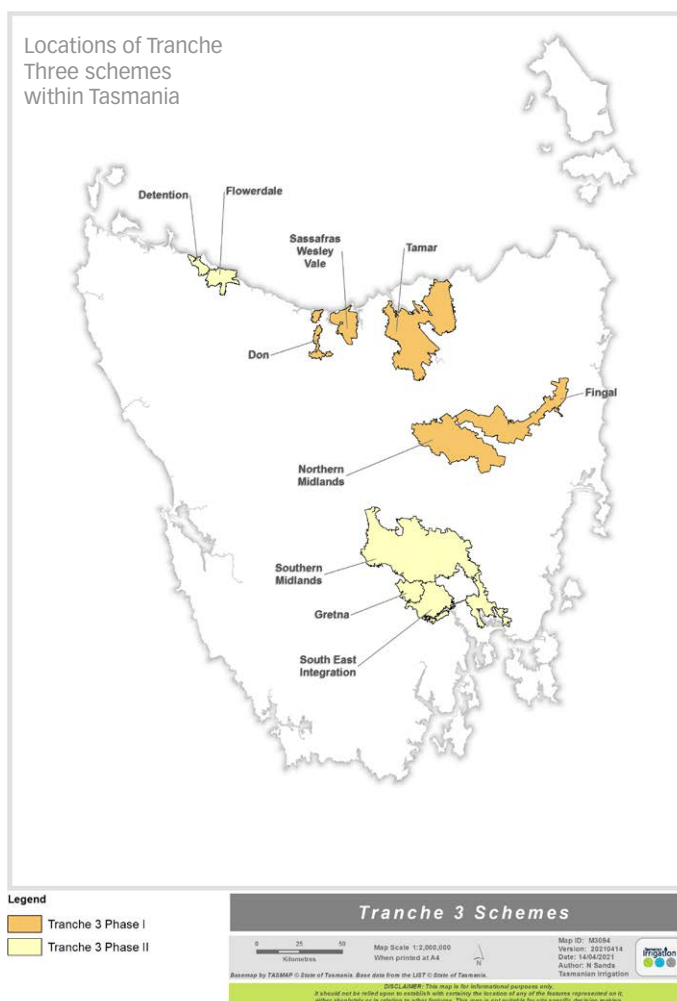
**Location.** Tasmania's north-west – a cropping and dairy region.

**Capacity.** The preferred option is for a 4,750 ML a year scheme to provide high reliability water to the area.

**Infrastructure.** Two pump stations, which will pump water to balance tanks before distributing it via a 67 km pipeline. The peak flow rate is 41.7 ML/day for a 180-day summer irrigation season, with a future winter delivery option available if required.

**Progress.** This is the most progressed scheme in tranche three. Water sales have closed, and 3,225 ML worth of contracts have been issued. The scheme is in the approvals phase and construction should commence this year, with water available to irrigators by summer 2022–23.

Locations of Tranche Three schemes within Tasmania



### Detention Irrigation Scheme (DEIS)

**Location.** The Waratah–Wynyard Council region, which is dominated by dairying.

**Capacity.** An additional 3,000 ML of water, delivered by natural water courses.

**Infrastructure.** About 12 to 15 km of distribution pipeline and a pump station with a 0.4 km rising main from the Detention River, pumping winter flows to a dam to be constructed on the Alarm River.

**Progress.** The scheme assumes a minimum of 3,000 ML of water sales. So far, there has been insufficient demand expressed to develop a detailed engineering concept design report. Further, a preliminary water assessment indicated that there may not be enough water available to deliver this volume. Further monitoring will be conducted.

## Fingal Irrigation Scheme

**Location.** The South Esk River area – one of the state’s drier areas, where the main agricultural enterprises are fodder crops, potatoes, seed and poppy production.

**Capacity.** The preferred design option is a 12,600 ML riparian delivery scheme that services only the South Esk region. It will have a 150-day summer irrigation season, with water being able to be taken over a 120-day delivery period within this.

**Infrastructure.** A 14,000 ML dam, about 12 km north of Fingal, a pump station on the South Esk River and 2.3 km of dual supply pipeline. It could be augmented to include piped sections to other areas in the future.

**Progress.** Water sales will commence once transmission losses in the South Esk River are more clearly defined.

## Flowerdale Irrigation Scheme

**Location.** The Waratah–Wynyard Council region, which is dominated by dairying, pasture, cereal crops for stock, and boutique agricultural services, including nurseries and flower farms.

**Capacity.** Initial expressions of interest demonstrated demand for 1,865 ML/season. A 3,000 ML/season scheme has been proposed, allowing for further development in the region.

**Infrastructure.** A pump station with a 0.3 km rising main from the Flowerdale River to pump winter flows to a 4,000 ML dam to be constructed on a tributary of the river, and about 25 km of distribution pipelines.

**Progress.** At formative stage. Upfront investment will be required from irrigators, which may impact its viability.

## Harcus Irrigation Scheme

**Location.** The Circular Head Council region, where there are large land holdings that provide products to support the dairy industry.

**Capacity.** Demand for 8,020 ML/season was indicated from initial expressions of interest.

**Infrastructure.** A pump station with a 5.6 km rising main from the Welcome River to pump winter flows to a 9,000 ML dam to be constructed at Jims Plains, and about 28.4 km of distribution pipelines.

## Northern Midlands Irrigation Scheme

**Location.** The lower Isis Valley and Macquarie River region, where livestock, vegetables, cereal are produced.

**Capacity.** 25,500 ML of high-reliability water for cropping, underpinned by large Hydro Tasmania storages.

**Infrastructure.** Three pump stations, two balance tanks, approximately 30 property outlets and 157.3 km of pipeline to deliver 76 ML/day. The scheme will use outflows from the Poatina Power Station during the summer months, providing water from October to March.

**Progress.** Construction is expected to begin in 2022, with water available in early 2024.



Tasmanian Irrigation is committed to engaging local contractors as much as possible to design and construct the Tranche Three Irrigation projects

## Sassafras–Wesley Vale Irrigation Scheme Augmentation

**Location.** The Sassafras–Wesley Vale Irrigation Scheme Augmentation (SWISA) will expand the existing Sassafras–Wesley Vale Irrigation Scheme (SWIS). Poppies, cereals, pyrethrum and vegetables are grown in this area.

**Capacity.** SWIS currently supplies 5,660 ML to irrigators during summer. New and existing irrigators have expressed interest in an additional 5,785 ML. The proposed SWISA will deliver 11,445 ML at 76.3 ML/day.

**Infrastructure.** Assessments have been conducted to determine which existing assets, including the Great Bend pump station and reservoir, and the Wesley Vale rising main and main pipeline, need repairing or replacing.

The SWISA has been split into two distinct interrelated projects: one to rectify and replace the degraded assets, and one to expand the current scheme.

**Progress.** The preferred design option is expected to be approved in 2021, with water sales to follow soon after. Construction is expected to begin in July 2022 and the first full irrigation season in 2024.



Pipes ready to be installed in South East Tasmania

## South East Integration Project (SEIP)

**Location.** The Coal River Valley region, which is currently serviced by three schemes, South East 1, 2, 3, that rely on riparian delivery of dam water and potable water sources. The current schemes cannot support the continuing growth and demand in the region, which produces high-value agricultural products, such as wine, fruit and vegetables.

**Capacity.** Expressions of interest indicate demand for about 33,500 ML of water.

**Infrastructure.** SEIP is looking at ways to increase water availability in the area, including new raw water supplies and the potential to source water from the Derwent and Jordan River Valleys. The project also includes a 7.5 km pipeline that will connect two of the existing irrigation schemes: South East 2 and South East 3.

Concept designs suggest that a standalone scheme for the Greta area may be the best option to deliver around 7,000 ML. The design for the main South East area is progressing, with the preferred water source being the lower River Derwent catchment and a new trunk main extending east to Forcett. It also includes connections to the existing South East 2 and 3 schemes, and possibly new pipelines in the South East 1 area. Up to 200 km of pipelines may be installed.

**Progress.** Engineering assessments are under way and the preferred design option is expected to be released for public comment in mid-2021 with water sales following in December.

## Southern Midlands Irrigation Scheme (SMIS)

**Location.** The Central Highlands and Southern Midlands council regions. The main agricultural enterprises are livestock, broadacre cropping, wool, dairy, fruit and vineyards.

**Capacity.** Expressions of interest have shown that there is demand for 31,500 ML during summer. The concept design is based on 30,000 ML for a 180-day summer irrigation season.

**Infrastructure.** A low lift pump station will source water from Hydro Tasmania's upper Derwent catchment, supplying the Bothwell region with a lift pump station near Shiners Hill to Jericho and Kempton. There is also potential to supply the Hollow Tree, Elderslie and Broadmarsh areas with additional branch lines. The scheme will be connected with the existing Southern Highlands Irrigation Scheme and possibly with the South East Irrigation schemes.

**Progress.** More than 200 km of pipeline would be required to service this demand, so multiple pipeline routes are being investigated.

## Tamar Irrigation Scheme

**Location.** The area east and west of the Tamar River, which is dominated by pasture and cereal crops for stock, fruit and wine production, and boutique agricultural services, including nurseries and flower farms.

**Capacity.** Piped delivery of 12,000 ML over a 180-day irrigation season.

**Infrastructure.** Approximately 240 km of pipe will deliver water from Lake Trevallyn. East Tamar irrigators will be supplied via booster pumps; West Tamar irrigators will be supplied under gravity pressure from a balance tank; and irrigators on Pipers River will be supplied by riparian deliveries.

**Progress.** Construction is expected to start in September 2022.

**Acknowledgment.** This is a condensed version of an article written by Lauren Cella and published in the winter 2021 edition of [Pump Industry Magazine](#).

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## SNAPSHOT

- In UP CLOSE we talk to Mark McIntosh, an irrigation consultant, designer and installer based in Rye in Victoria about his work and how the industry has changed
- Tracy Martin updates us on what is happening around the regions
- Irrigation Australia's Rainwater Harvesting Committee is modifying information about rainwater harvesting to make it easier to understand and more accessible for industry members and end users
- Check out your Irrigation Australia Board directors

## UP CLOSE



We get up close to Mark McIntosh from Rye in Victoria and talk to him about his work and perspectives on the industry.

**IA. Can you tell us a bit about the main areas you work in and how long you have been in the industry?**

I work in consultancy, design, supply and installation in golf, commercial turf, agricultural crops (vineyards, orchards, olives, vegetables), pump stations, and pipeline construction in irrigation, recycled water and potable water markets.

I've been in the industry for 38 years. I started in 1981, at age 18, with Humes Plastics as a cadet sales rep, selling plastic UPVC/polyethylene pipes, fittings, NAAN sprinklers, valves and inline drip tube. I owned Just Irrigation until 2007, and now I own Irrigation Management.

**IA. How long have you been a CID (sprinkler and drip micro) and what have been the advantages in having this certification?**

I obtained a Certificate of Irrigation System Installation, awarded by the Irrigation Association of Australia, in 1985. I then later obtained my CID accreditation during the early days of the program – the early 1990s, I think.

I eventually obtained ADM, LTC and LTG along with Certified Irrigation Auditor. I also studied at Charles Sturt University to gain a Graduate Certificate in Irrigation as well as an RTE 50203 of Diploma of Irrigation. During the journey of learning

through the industry I also obtained a Victorian Building Authority Plumbing Licence in Irrigation (non-agricultural).

This training and CID status has helped in the sales and marketing of my businesses and has been a point of difference with competitors who lacked the accreditations. It has also opened doors into pure consultancy work, direct to developers, water authorities, councils and engineering firms.

**IA. What are the key concerns of your clients as far as irrigation and water are concerned and have you noticed any trends as far as irrigation technology is concerned?**

By far the biggest change in the industry in the past 20 years is the difficulty in selecting the best water source option for an irrigation project. Years ago, we just selected the best option from many, but now we need to decide on which multiple water sources are best. In general terms, the choices include recycled water, potable water, stormwater harvesting, groundwater, surface water, wells, dams and creeks.

I should note the cost and complexity of dealing with statutory authorities to obtain water rights is now the most difficult part of irrigation design. I am working with a vegetable farmer at the moment, and we have the situation that if I can't get approval for recycled water they will have to sell the farm. Frustratingly, the traditional water sources of a healthy creek and run-off are available on site, but licences are not available to access this water. To get Class A recycled water to the site, I need to gain approvals/signoffs/licences from two separate water authorities and four separate departments within the local shire and the EPA.

**IA. What do you think will be the biggest challenge for the irrigation industry in your area in the next couple of years?**

Besides water source selection, as mentioned above, the biggest limiting factor to growth in the irrigation industry has been training of staff; however, now with the great work of Irrigation Australia this is changing, and my son is perhaps having an easier, quicker, and more productive road through the industry than my generation had.

**IA. What was the last book you read and where will your next holiday be?**

The last book I read was *Legacy of War* by Wilbur Smith.

We had to cancel our next planned holiday but hope to reschedule it sometime. The plan is to fly with my wife in our small plane to Western Australia, Northern Territory and South Australia, camping under the wing, fishing, diving, bike riding and surfing.



## REGIONAL ROUNDUP

What's going on in the regions and with membership by Tracy Martin, Irrigation Australia's National Membership and Regions Manager.



**The situation with COVID lockdowns in several states in July and August has put a damper on some committee activities, with face-to-face meetings and activities unable to go ahead.**

**Queensland.** The committee had organised an industry event at Redland Bay Nursery in July, but

due to a Covid breakout this has been re-scheduled for 15 September 2021.



Azalea Grove Nursery/Greenlife Solutions is a family-owned wholesale nursery that has been growing plants in Redlands Bay for the past 50 years. The nursery is known for its quality, diversity and the innovative nature of its products

and has a proud record of introducing a wide range of new, vibrant plant varieties to the gardens of Australia.

Topics that will be discussed include:

- Lowara Hydrovar set
- recycling dam pump upgrades
- drainage and water harvesting upgrades (no town water available onsite)
- new production facility
- Nelson Irrigation R 2000 sprinklers
- heat pump technology for propagation house
- trials comparing drip and mini sprinklers for inground stock.

Why not bring along an irrigation industry colleague! Catch up with industry friends and acquaintances and share a laugh in a social atmosphere. Register [here](#).

**Western Australia.** The committee has been busy organising the 2021 Waterwise Irrigation Expo which will be held 25 August. While this event has taken much member time and effort, the committee has also been planning events for the rest of the year, one at Curtin University (in September or October) and one in November at Fruitco in Pinjarra, where participants will be visiting table grape operations. More information on these activities will follow in September.

Irrigation Australia was engaged to deliver irrigation efficiency training as part of a new initiative to encourage local governments to achieve or retain gold endorsement under the existing Waterwise Council Program in Western Australia. The Department of Water and Environmental Regulation (DWER) launched the Waterwise Council irrigation training project in May.



The project is open to current Gold Waterwise councils and aims to support local government staff with the skills and knowledge to tackle the

complexities of water efficiency by funding the course fees of up to three eligible staff to take part in the training. The training program will be run over three years, and the first year was fully subscribed with the first training session being held in early August 2021. Participating councils are acknowledged for being part of the on-the-ground solution to maintain public open spaces in a future with less available groundwater due to climate change.

**Victoria.** The regional committee was able to have a face-to-face meeting in May, but the recent lockdown in Melbourne has upset plans to continue monthly meetings in person.

The committee has been working with water businesses (Greater Western Water, South-East Water and Yarra Valley Water) to partner in delivering a workshop that will focus on driving efficiencies and improving the productivity of council green assets. The program, which includes a wide range of speakers, has had to be re-scheduled because of the current COVID lockdown. When a suitable date has been identified, we will promote this event and open registrations.



The recent rollout of **Waterwise Garden Irrigator** in Victoria has seen interest grow from businesses involved in domestic irrigation installation and maintenance. Businesses endorsed under the program are promoted on social media and the dedicated Waterwise programs website where

homeowners can easily identify the services provided by each endorsed business.

The **Waterwise Irrigation Design Shop** program has been operating in select locations in Melbourne and Shepperton for two years. These retail outlets are fully endorsed to improve water use efficiency in garden watering systems by raising the standard of design and advice offered by specialist irrigation retailers through education and compliance with the program's standards.



Waterwise-endorsed members are fully trained in water efficient practices and can design, install, repair and maintain irrigation system. Businesses interested in participating in these initiatives can simply apply, complete the self-study phase and sit online exams.

To learn how your business can become a Waterwise Professional, contact Irrigation Australia on (08) 6263 7774 or visit the Waterwise [website](#).

**South Australia.** The committee is investigating several activities to be held this year:

- a tour of the desal water treatment plant
- a super schools visit
- visit to North Adelaide Golf Course
- a soil moisture monitoring field day including satellite/ aerial drone photography.

The committee is helping the SA Sports Turf Association market their turf seminar and education day held at Adelaide Oval, 24 August 2021. Cricket legend Greg Chappell was the keynote presenter in a program packed with great speakers.



## RAINWATER HARVESTING AUSTRALIA TO UPGRADE INFORMATION RESOURCES FOR INDUSTRY AND USERS

It might surprise readers to know, but about one in four (26 per cent) is how many Australian households are equipped with a rainwater tank.

That is a lot of tanks representing a lot of potential for providing information and services to ensure they are used efficiently and effectively for supplying water for personal and garden use.

Rainwater Harvesting Australia (RHA), the peak national body representing rainwater harvesting in Australia and a membership category of Irrigation Australia, is looking to tap into this potential by enhancing its online offering for the benefit of all involved in the industry. Its mission is to:

*be the key source of information in Australia about rainwater harvesting, and to guide those involved in implementing rainwater harvesting solutions in urban and regional settings.*

Earlier this year RHA identified that an important way of supporting this mission was to reorganise and redesign its information resources so they are more accessible to installers, designers and the end-user. While the Residential Design Specification, which lays the groundwork for best practice, has been somewhat of a holy grail in the industry since 2017, RHA has decided that there is room for improvement.

In its 2021 Business Plan RHA is committed to refining and converted the specification to friendlier formats for the user by:

- updating the information portal on the RHA [website](#)
- developing and organising the training modules as an easy-to-view library.

Keep an eye on this space for updates on progress.

### Interested in knowing more?

Whether you call Queensland, New South Wales, Victoria or South Australia home, RHA's state sub-committees are active and primed for a dialogue. They convene bi-monthly to discuss local issues and provide a means of informing and influencing suppliers, designers, regulators, and state governments.

If you would like to join RHA or find out more, contact Irrigation Australia on 1300 949 891 or [email](#).

## WATERWISE IRRIGATION PROGRAMS ON FACEBOOK

Have you checked out Irrigation Australia's Waterwise irrigation programs on Facebook?

Waterwise-endorsed members are fully trained in water efficient practices and can design, install, repair and maintain domestic irrigation systems.



There are two categories:

- **Waterwise Garden Irrigator** - for professional installation and maintenance services
- **Waterwise Irrigation Design Shop** - for expert advice and quality parts

The Facebook page aims to provide the wider community with #waterwise tips and advice and promote members.

Use the QR code and jump on Facebook to find out more and keep up to date.

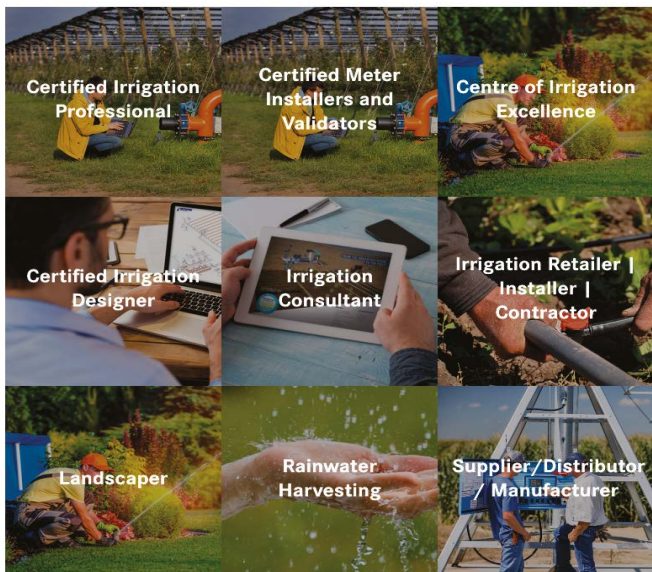


### Key activities

- International Commission for Irrigation and Drainage ICID [webinar presentation](#)
- NSW SEPP review and the campaign to retain BASIX
- Engaging with ABCB on the National Construction Code (NCC) 2022 draft submission
- [Campaign](#) to retain rainwater tanks in the new South Australian Planning and Design Code

## FIND AN IRRIGATION SPECIALIST

If you are looking for an irrigation specialist, then the Irrigation Australia website is your one-stop-shop. Just type in a postcode and irrigation professionals listed in the area will be shown, along with their contact details.



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# 24<sup>th</sup> ICID INTERNATIONAL CONGRESS 73<sup>rd</sup> IEC MEETING

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Irrigation Australia is proud to join with the International Commission on Irrigation & Drainage (ICID) for their 24th International Congress & 73rd IEC Meeting and we look forward to welcoming delegates from around the world to Australia in 2022 for this international conference on irrigation and drainage.

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- Visit the exhibition and meet with the industry leading suppliers of irrigation & water management technologies.
- Hear from the leading researchers and experts in the field of irrigated agriculture and drainage.
- Build strong relationships with industry suppliers and professionals.

## Why exhibit?

The combined 2022 Irrigation Australia and International Commission on Irrigation & Drainage (ICID) conference and exhibition will bring people from up to 78 countries representing 90% of all irrigated land, to Adelaide in 2022 – can you afford not to be there?

## ICID Conference Theme

**Innovative Research in Agriculture Water Management to Achieve Sustainable Development Goals**

## Irrigation Australia Conference Theme

**Irrigation for the Future – Challenges, Innovations and Opportunities**

- The Conference Organisers now invite speakers to submit an abstract for consideration at either the International Congress or the Irrigation Australia Conference. Visit the event website at [www.icid2022.com.au](http://www.icid2022.com.au) for further information.

Expected Participation

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## SNAPSHOT

- Geoff Harvey updates us on irrigation training plans and progress with training delivery
- Jarrod Noe from Dover and Sons in Queensland has just completed his Certificate III in Irrigation Technology
- Peter Smith provides the latest on meter policy and certification
- Irrigation Australia training courses

## IRRIGATION AUSTRALIA TRAINING



### IRRIGATION AUSTRALIA APPLAUDS THE FIRST QUALIFIED IRRIGATION TECHNICIAN GRADUATES

In November 2019, Australian Industry Skills Council (AICS) approved the new Certificate III in Irrigation Technology AHC32419 (Trade Level) qualification, which was a result of concerted and sustained industry support to obtain a recognised trade level qualification in the irrigation industry.

This qualification included eleven skill sets that would allow irrigation technician sub-roles to be recognised as 'real' jobs in the irrigation industry.

Once the new qualification was approved, Irrigation Australia set about adding it onto the scope of their registered training organisation Irrigation Training Australia and started delivering the first Certificate III in Irrigation Technology AHC32419 training course in January 2020.

There are now about 120 students going through various Certificate III in Irrigation Technology training courses across Australia, and we congratulate our first four students who have recently completed their training and became Qualified Irrigation Technicians in July 2021.

If you would like to know more about becoming a qualified irrigation technician, check out the Irrigation Australia [website](#) or contact the Irrigation Australia training team on 1300 949 891 or [email](#).



### JARROD NOE FIRST TO COMPLETE CERT III IN IRRIGATION TECHNOLOGY

Jarrod Noe is the first person to ever complete the Certificate III in Irrigation Technology AHC32419 through Irrigation Australia.

Jarrod Noe works as an irrigation technician with Dover and Sons in Boonah in Queensland. He recently completed his Certificate III in Irrigation Technology AHC32419 through Irrigation Australia. In fact, he has the distinction of being the first person to ever complete this new trade level qualification in Australia. We spoke with Jarrod about the course and his thoughts about training.

#### I.A. Can you tell us a bit about your role with Dover and Sons and how long you have worked there?

**Jarrod.** Over my three years with Dover and Sons I've been involved in the sale, installation and maintenance of a variety of travelling irrigators, pumps and underground main systems.

#### I.A. Why did you decide to enrol for the course?

**Jarrod.** I saw this course advertised in some of the previous issues of the Irrigation Australia Journal and approached management who were very supportive and encouraging. I was already involved in the industry so thought it would be a good opportunity to expand my knowledge and have a qualification to show for the work I'd been doing. The novelty of a trade level qualification in an industry that hasn't seen anything like it was also enticing.



# PROFESSIONAL DEVELOPMENT

## I.A. How was the course presented and had you done any similar training previously?

**Jarrold.** Initially it was planned to be delivered through four separate blocks of face-to-face training at Irrigation Australia's office in Brisbane, but COVID had other ideas. As a result, for the second block we transitioned to online learning which ran surprisingly smoothly. Thankfully, we were able to get back on site for our last couple of weeks of learning. I have completed a few courses in the past that focused primarily on theory. It was nice to investigate and develop a more practical understanding of irrigation practices throughout this course.

## I.A. What was it about the course content and the presentation that you found helped you or contributed to it being a positive experience?

**Jarrold.** It was delivered by a team with considerable experience and knowledge, with guest presenters making informative contributions. It was valuable to have a hands-on learning environment, including multiple visits to venues such as Golf Central and Sirromet Wines. The content presented is a great mix of sales enablers and technician aids. You can tell the team's been in the irrigation game because they understand the importance

of after-sales service, with plenty of support during and after the training.

## I.A. How much will you be able to use what you learned in the course in your job?

**Jarrold.** Having the input and guidance of industry professionals has allowed me to develop a deeper understanding of the systems I work on each day. Everything we learnt was industry specific. It was beneficial to touch on so many facets of the irrigation process, from soil structure and infiltration rates to installation and maintenance. I will certainly form more reliable recommendations of pumps and mains while knowing the signs of common issues and being able to troubleshoot as they arise.

## I.A. What advice would you give to someone who was tossing up whether to sign up for to doing the Cert III?

**Jarrold.** There is finally an industry-specific trade on offer that can only help your career – take advantage of it! It's certainly improved my knowledge around sales and as a technician, which is beneficial to my employer and myself. Qualifications are increasingly sought after, and upskilling is always a positive.

*Geoff Harvey, National Training, Certification and Marketing Manager*

## IRRIGATION TRAINING INFORMATION AT YOUR FINGERTIPS

Check out Irrigation Australia's [new training course booklet](#).

This comprehensive publication provides essential details on training courses offered by Irrigation Australia.



- Certificate III in Irrigation Technology
- Certificate IV in Irrigation Management
- Centre Pivot and Lateral Move
- Meter Installation and Validation
- Introduction to Irrigation | Agriculture
- Introduction to Irrigation | Urban
- Irrigation Pumps and Systems
- Irrigation Efficiency
- Urban Irrigation Design
- Commercial Irrigation Design
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- Irrigation Installer
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This qualification reflects the skills and knowledge required to become an irrigation installer, operator, retailer or technician for residential, commercial or agriculture industries. This is an in-depth irrigation training program which is assessed against nationally recognised Competencies towards Certificate III in Irrigation Technology AHC32419 (Trade Level). The program also uses subject matter experts for specialised topics such as hydraulics, troubleshooting and basic irrigation design.

Interested? Register [here](#).

### [Certificate IV in Irrigation Management AHC41119](#)

This qualification reflects the technical and supervisory skills and knowledge required to operate as supervisors and specialists in the irrigation industry. It applies to irrigation installation site managers and managers of irrigation systems in the irrigation servicing, horticulture and agriculture industries.

Interested? Register [here](#).

## PETER TALKS METERS



Installations of pattern approved water meters continue to grow, particularly in NSW where another roll-out date is looming and NRAR is increasing its activity in the field. Unfortunately, supply of both meters and Local Intelligence Devices (LIDs) has been limited, so it would be a good idea to

encourage your clients to get started as soon as possible to avoid long delays.

Audits of submitted meter validation certificates in the Murray-Darling Basin jurisdictions continue, with batches from NSW and South Australia recently completed. Most anomalies in these certificates are simple errors of recording or slight misunderstandings of what is required, and CMIs have been very responsive to constructive feedback.

An important component of installing and validating meters is to ensure that the parameters and requirements in the pattern approval certificate are complied with. CMIs are reminded to always download and check the relevant pattern approval certificate before undertaking an installation or validation. These are accessible at the Irrigation Australia [website](#).

### New South Wales update

Floodplain harvesting measurement. This policy has not progressed since the amendments to the Water Management (General) Regulation 2018 were disallowed. Demand for these services has stalled as a result, and the number of certified storage meter installers and validators (CSVs) has not increased.

The two key rollout dates have not been amended:

- 1 July 2021: 1,000 ML or greater and used more often than one year in seven, on average.
- 1 July 2022: Less than 1,000 ML or 1,000 ML or greater and used less often than one year in seven, on average.

However, the DPIE [website](#) reports that “due to the disallowance of the amendments to the Water Management (General) Regulation 2018 that relate to floodplain harvesting, implementation dates for the NSW Floodplain Harvesting Policy are uncertain. The dates specified in our reports and guidelines may therefore be superseded.”

### Telemetry and DQP Portal training

A training session to update CMIs working in NSW on telemetry suitable for the NSW metering requirements was delivered by Irrigation Australia on 29 July. Those who participated received one CPD point.

Much of the training centred on improvements to the DQP Portal where specifying and ordering of LIDs are facilitated. WaterNSW have produced updated videos which are available at the [portal link](#).

I encourage all CMIs who work in NSW to view these videos – doing so will help avoid difficulties with using the DQP Portal.

A list of the approved Local Intelligence Devices (LIDs) is available at the Industry NSW [website](#).

The Non-urban Water Meter Integration Guide for LIDs has been updated and is available at the Irrigation Australia [website](#).

### Information

For any information about metering or if you have any metering issues or have questions, contact Peter Smith at [email](#), or phone 0455 973 780.

## METERING FORUM

Have you checked out the new [Metering Forum](#) on the Irrigation Australia website? The forum contains a lot of information on metering, including for floodplain harvesting. Access is open to all and subscription is free.

Subscribers can also ask a question and we will find you the answer. If you subscribe you will also be notified when a new post is made. This site is recommended for all CMIs and CSVs (DQPs).

## TRAINING DIARY

DATE	COURSE	LOCATION
21 to 23 September	Meter installation and validation (3 days face to face)	Griffith NSW
27 to 29 September	Irrigation pumps and systems (3 half-day sessions)	Virtual classroom
28 and 29 September	Basics in wiring and troubleshooting (2 half-day sessions)	Virtual classroom
5 to 8 October	Urban irrigation design (4 half-day sessions)	Virtual classroom
11 October	Electrofusion welding (1 day face to face)	Perth WA
11 and 12 October	Electrofusion and butt welding (2 days face to face)	Perth WA
12 October	Butt welding (1 day face to face)	Perth WA
19 to 21 October	Meter installation and butt welding (3 half-day sessions)	Virtual classroom
19 to 22 October	Commercial irrigation design (4 half-day sessions)	Virtual classroom

Peter Smith, Metering Governance Officer, Irrigation Australia



## IRRIGATION AND PUMP UPGRADE FOR SOCCER FIELD

### SNAPSHOT

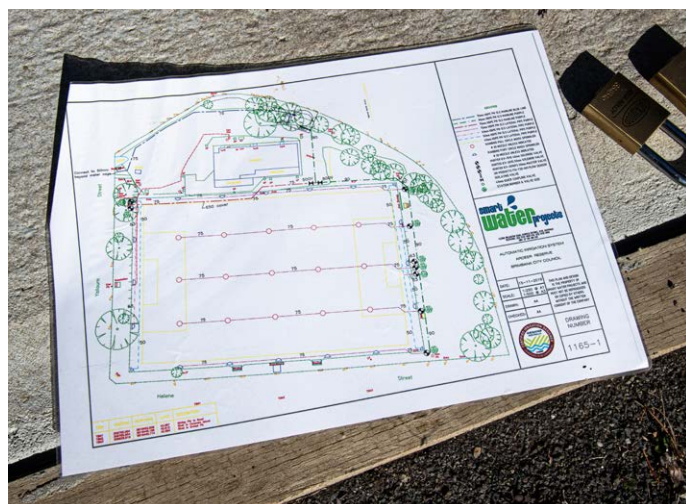
- A recent upgrade to the irrigation and pump systems at Ardeer Soccer Club in Melbourne has resulted in a more playable, durable and safe pitch
- Low water pressure and proximity to houses were issues to be considered in the design of the irrigation system and the selection of the pump

The home ground of Ardeer Soccer Club is Ardeer Reserve, located in Brimbank City Council in Melbourne. On most weekends in the soccer season, it hosts a range of teams, from junior through to seniors, so maintaining a safe playing surface is a priority for the club and ground management. Having an irrigation system that supplies water to ensure good quality turf is important to ensure the pitch surface remains playable, durable and safe.

Recently, the club and Brimbank City Council decided it was time to upgrade the existing irrigation system as part of a makeover to the ageing pitch, which was requiring more maintenance. This was done as part of an overall site upgrade, including building a new clubhouse and facilities.

### The solution

According to irrigation designer Anne Andersen from Smart Water, who is a long-time Irrigation Australia member and certified irrigation designer, the irrigation system and pump setup were designed after careful attention to client requirements and based on similar designs for upgrades to parks and ovals in the Brimbank City Council area.



A new pump and tank system was specified in the new design.

One of the issues with most, if not all, soccer pitches and AFL ovals is that a 'wear corridor' develops in the middle of the playing areas. This was a consideration for Anne when designing the placement of irrigation laterals.

"Often, laterals are placed across the field, but for this job, they were run lengthways. This allows ground staff to isolate and give extra attention to the wear corridor by controlling individual sprinklers," she explained.

Also, HDPE poly was specified for the pipework. According to Anne this was the result of finding that during the Millennium drought in Victoria, poly pipe was much more durable than the PVC, which tended to pull apart in the severe conditions.

A feature of mains water pressure across the Brimbank area is that it is relatively low, and this affected the performance of the old irrigation system, which fed directly off mains water. To try and overcome this, the system had twenty valves, but they took too long to provide adequate coverage of the playing surface.

Because the system suffered from pressure reductions, a new pump and tank system was needed to supply irrigation water efficiently and at pressures that were higher and more even. Another important consideration was that, with the reserve being in a residential area, the specified system would have to operate quietly.

The solution was to connect the cold-water mains feed from the existing 50 mm potable water meter used to service the old irrigation system to a new 100 kL steel tank. To ensure that there was enough downstream pressure and flow for the new irrigation system, a booster system was specified, which allowed the pitch to be irrigated by nine valves. This greatly reduced the irrigation window.

The booster system chosen to meet the duty of 7.5 L/sec at 800 kPa was a Lowara model 33SV05/1A-HPS Hydro Pac complete with Hydrovar controller and 65 mm stainless steel manifold mounted on a stainless-steel base. This custom booster system was installed in a steel cabinet, which satisfied the criteria of having a quiet system in the residential area.

One of the reasons that Brimbank City Council went with this system was based on their previous experience with installing Hydrovar systems for other parks and sports.

The pump unit and irrigation system were installed by Century Rain Team Leader Craig Tooze, and they are managed through a Hunter ACC controller, which is monitored remotely at council headquarters.





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Century Rain Team Leader Craig Tooze checks on the newly installed pump system

### The result?

The result is that irrigation water is delivered to the system much more efficiently and that it is applied more evenly and at rates to ensure surface playability and safety. As can be seen from the before and after satellite photos, the proof of the effectiveness of the makeover can be seen in the difference in turf quality.



The difference made by the makeover to the irrigation system and pumping set up is obvious in these before (left) and after (right) photos. The after photo shows a playing field that is evenly covered by high quality turf, ensuring a surface that is playable and safe.

**Acknowledgment:** Thanks to Brown Brothers Engineers Australia for supplying material for this article.

Anne Currey, Irrigation Australia



# CONTRACTORS' CORNER

## IRRIGATION SOLUTIONS MADE IN MOREE FOR AUSTRALIA

IRRITEK is a family-owned business based in Moree in north-west New South Wales that specialises in providing a complete package of water and irrigation services – from survey and design through to installation and service – to its clients all around Australia.

*Irrigation Australia* spoke with Jim Spain, managing director at Irritek, about the challenges of running an irrigation business, and the opportunities.

### **IA. Can you tell us a bit about the business, Jim.**

**Jim.** Irritek serves the broadacre irrigation industry and prides itself on provided fit-for-purpose solutions that are durable and maximise water and energy efficiency. Twenty staff are currently employed by Irritek who contribute to providing concept and manufacture through to compliant water infrastructure installation services.

### **IA. You are also able to manufacture products. How long have you had this facility and why did you establish it?**

**Jim.** Irritek was established in March 1995 by myself and my wife Helen. Irritek's office and factory premises are the old OTC satellite station that was used to transmit photos of the moon landing. Helen's father, Clive Corderoy, who was a pioneer Gwydir Valley irrigator, bought the premises in 1987 and Helen inherited them from her father.

We established the business to fulfil a need for a professional approach to irrigation infrastructure. I had recently relocated to Moree from the Northern Territory and in the 1970s and 1980s Clive had traded as Corderoy Irrigation and was a Davies Shephard Water Meter Sales, installation and repair business. Irritek was born from the opportunity to convert the old OTC premises into a factory and to buy plate rollers for large diameter steel pipe.

From the start, Irritek's point of difference was the ability to turn our customers' concepts and requirements into manufactured product that was installed and ready to operate. We have produced hundreds of pump stations for locations from the Kimberley in Western Australia to Richmond, Hughenden, Bowen and Goondiwindi, in Queensland, to Mungindi, Moree, Bourke, Boggabri, Forbes, Hay and Griffith in New South Wales, as well as places in between. Water meters have been supplied and installed in those projects and as standalone jobs and have evolved from Davies Shephard, through to Mace and now Aquamonix and ABB.

### **IA. What importance do you place on having qualified staff and do you have in-house training or encourage your staff to complete Irrigation Australia certifications?**

**Jim.** The need for qualified staff has evolved alongside the increasing professionalism of the industry and the



Irritek Managing Director Jim Spain believes that the need for qualified staff has evolved with the increasing professionalism in the industry and the growing complexity of the regulatory environment.



Showing that no job is too large, this pumpstation at Moree comprising three 26" pumps was completed recently.

increasingly complex regulatory environment. Qualified and experienced staff are now essential for the conduct of Irritek's business. I believe our experience is what sets Irritek apart. I have over 30 years water meter experience and have mentored Irritek's operations manager Jono Spain. Jono has a Bachelor of Business in Agriculture from UQ and has completed IAL certifications and has benefited from my mentoring for his 25 years (he is my son as well!).

Irritek's soon-to-be-third DQP (duly qualified person) after he completes his Irrigation Australia course this month, Jack O'Shannessy, is also a UQ graduate in business management and is now being mentored by Jono in water meter installation and validation.

Irritek encourages staff to undertake external training like that provided by Irrigation Australia to expand their knowledge base and networks rather than just doing internal training. It is important that Irritek people have a broad understanding of the current challenges in the water metering space as well as sound technical knowledge and practical experience on the ground to enable fit-for-purpose water meter solutions.

**IA. Why has the company focused on supporting sporting clubs and associations in the area?**

**Jim.** Irritek values its role as a regional employer and seeks to contribute to the communities it serves. Traditionally we have sponsored race, golf and football clubs, and school P & F and preschool associations as well as a variety of community activities. These activities and organisations are the heart and soul of country towns and are vitally important for the physical and mental wellbeing of the communities.

**IA. Other than dealing with Covid, what have been the key challenges for the business in the last year or two?**

**Jim.** Covid has certainly been challenging in navigating cross-border work and managing employees and contractors.

One thing that doesn't seem to change is the never-ending challenge of recruitment of staff. The skills shortage is real, particularly in production and manufacturing trades. While Irritek has always sought to recruit locally where possible and develop local people to train and work in their community, this is a continual challenge with a finite resource, and we have in the past sponsored skilled people from overseas.

The most challenging and frustrating issue for Irritek over the past year or two has been with the rollout of the National Water Metering Framework. It is frustrating that the NSW government, in particular, has prioritised the optics of a strong compliance response and narrative over functionality and the ability to procure and install fit-for-purpose meters. It has been disappointing to see the demonisation of large-scale water users when they have been unable to become compliant due to shortages in supply of the appropriate water meters.

**IA. Have you noticed any changes or new trends as far as rural irrigation is concerned in the last year or two?**

**Jim.** Clients are continuing their evolution in being extremely energy and water efficient. This, coupled with the external pressures on compliance, has placed real operational pressure on both our clients and the industry. There is also a greater emphasis on risk management. As an industry there is a greater need for clients to understand the regulatory environment and to manage the risks involved.

Having said that, I am always energised by the enthusiasm and innovation of our clients. They drive Irritek to always improve.



## FERTIGATION INJECTION METHODS AND EQUIPMENT – ADVANTAGES AND DISADVANTAGES

### SNAPSHOT

- When setting up a fertigation system, it is important to choose the right injection equipment
- The three main methods of injection are suction injection, pressure differential injection and pump injection
- This article outlines the advantages and disadvantages of each of these methods.

When setting up a fertigation system, choosing the correct injection equipment is just as important as selecting the correct nutrients. Incorrect selection of injection equipment can damage parts of the irrigation equipment, affect the efficient operation of your irrigation system or reduce the effectiveness of the nutrients.

The three usual methods of injection are:

1. suction injection
2. pressure differential injection
3. pump injection.

### Suction injection

Suction of fertiliser through the intake of the pump is a common method of application and is the simplest method. The pumping unit develops a negative pressure in its suction pipe (unless the suction is flooded). This negative pressure can be used to draw fertiliser solutions into the pump. A pipe or hose delivers the fertiliser solution from an open supply tank to the suction pipe. The rate of delivery is controlled by a valve. This connection must be tight to prevent air entry into the pump.

Another hose or pipe connected to the discharge side of the pump can fill the supply tank with water. A high-pressure float valve can be used to regulate this inflow into the tank.

If necessary, the system can be automated with a direct-acting solenoid valve. For multiple block usage, two or more tanks can be set up in series and operated when required.

### Advantages

- Very simple to operate; a stock solution does not have to be premixed.
- Easy to install and requires little maintenance.
- Ideal for dry formulations.

### Disadvantages

- Concentration of solution decreases as fertiliser dissolves, placing most of the nutrients below the effective root zone if tank is operated when irrigation is commenced.
- Proportional fertigation is not possible unless several tanks are used.
- Limited capacity.
- Danger of suction air entering the pump unless all fittings are airtight.
- Risk of corrosion of pump bowl. Flushing the system is necessary.
- Risk of contamination of water supply if chemicals flow back down suction pipe when pumping unit stops. A check valve is necessary.



Netajet control and fertiliser injector system for berries – a solenoid-controlled venturi injection system. *Image by John Witherspoon.*

### Pressure differential injection

A pressure differential tank system relies on a pressure differential being created by a valve, pressure regulation, elbows, or pipe friction in the mainline, forcing water through a bypass pipe into a pressure tank and out again, carrying a varying amount of dissolved fertiliser.

### Advantages

- Very simple to operate; a stock solution does not have to be premixed.
- Easy to install and requires little maintenance. Changing fertiliser is easy.
- Ideal for dry formulations.

### Disadvantages

- Concentration of solution decreases as fertiliser dissolves, leading to poor placement of nutrients
- Requires pressure loss in main irrigation line.
- Tank must be able to withstand irrigation line pressure.
- Proportional fertigation not possible.
- Limited capacity.
- Accuracy of application is limited and determined by volume rather than by proportion.

A pressure differential venturi system can be installed as a bypass or inline. The venturi causes a rapid change in velocity, producing a reduced pressure (vacuum) which draws the fertiliser solution into the line.

### Advantages

- Simple in design with no moving parts.
- Easy to install, requiring little maintenance.
- Fertiliser rates can be controlled with some accuracy.
- Low labour, as a month's supply of stock can be mixed in an inexpensive tank.
- Low cost.

### Disadvantages

- Quantitative fertigation is difficult.
- Requires pressure loss in main irrigation line (can be 33%).
- Automation is difficult.



Netajet machine: The venturi requires a pressure differential to operate. The pressure differential is created on the machine, not the mainline. *Image supplied by Netafim.*

### Pump injection

This is the most common method of injection of fertiliser into irrigation systems. Injection energy is provided by electric motors, impeller-driven power units and water-driven hydraulic motors.

The pumps are usually rotary, gear, piston or diaphragm-type, which deliver fertiliser solution from the supply tank into the pressurised mainline. This method can be very accurate. Pumps are generally not simple in design and can include moving parts, so wear and breakdown are more likely.

The three systems available are electric injection pumps, piston-activated pumps and diaphragm-activated pumps. Piston-activated and diaphragm-activated pumps are both hydraulic injection pumps; these dominate the fertigation market at present.

**Electric injection pumps.** Electric injection pumps include single or multiple piston, diaphragm, gear and roller pumps. These can be regulated to achieve the desired rate by:

- adjusting the length of the stroke of piston pumps
- selecting the appropriate pulley diameter
- using a variable-speed motor
- semi-automation to adapt pump to receive electrical impulses from a water meter which can then be used to apply precise amounts of fertiliser.

### Advantages

- Simple and effective.
- Relatively easy to install and maintain.
- Either proportional or quantitative fertigation is possible.
- No pressure loss in the main irrigation line. Suitable for high head systems.
- Automation is relatively easy.

### Disadvantages

- Pumps must develop a minimum mainline pressure to operate.
- Need electric power source to operate.
- Injection rate not easily adjusted.

**Piston-activated pumps.** Piston-activated pumps rely on irrigation water to operate a hydraulic motor that pumps the fertiliser solution into the system. Since the pump's maximum rate of injection is proportional to the pressure in the mainline, the required injection rate is easily adjusted by throttling the injection line by means of a valve fitted to the water main, and as the injection rate per pulse is known, the exact application of nutrients can be readily calculated. For high injection rates, two or more units can be operated in parallel. Injection rates of up to 320 L per hour are possible.

**Diaphragm-activated pumps.** Diaphragm-activated pumps use water that is pumped into the lower chamber to activate a rubber diaphragm in the drive unit, which forces the diaphragm up, and in doing so via a drive rod, forces the fertiliser out of the injector into the irrigation system. On the return stroke, the spent drive water is discharged from the lower chamber of the drive unit while simultaneously fertiliser solution is drawn into the injector. The cycle is



automatically repeated. Injection rates from 3 to 1,200 L per hour are possible. There is an upper limit to the pressure available and they might not operate on high head systems.

## Advantages

- Very simple to operate, install and maintain. Either proportional or quantitative fertigation is possible.
- Rate of injection is easily adjustable.
- System is easily portable between paddocks.
- No pressure loss in main irrigation line.
- Automation is very easy.
- Not labour intensive.

## Disadvantages

- Large number of working components.
- Sensitive to air pockets and needs a continuous water discharge to operate the piston or diaphragm. Pumps require a minimum line pressure.
- Spent 'drive water' is lost and discharged from the system.

**Acknowledgment.** This is an extract from an article by Steven Falivene, NSW DPI citrus development officer, published on the NSW DPI [website](#).

## CSIRO CALLS FOR IRRIGATORS TO TRIAL UNDERGROUND WATER BANKING

### SNAPSHOT

- CSIRO is looking for irrigators to participate in a trial to test the potential of water banking technology in increasing water availability during drought
- Water banking is more commonly used in Australia in urban areas, but the trial is looking to extend this concept to agricultural irrigation
- Storing water underground avoids issues that occur with above-ground storage such as evaporation and drainage losses and algal blooms and is often cheaper than building dams
- CSIRO's initial investigations suggest there may be aquifers in Australia that could store tens to hundreds of gegalitres or more in some areas

The CSIRO is looking for groups of irrigators to trial water banking technology that will help increase water availability during droughts.

Water banking is not a totally new idea – various versions of it have been used in Australia since the 1960s and it is applied at large scale in the United States. However, the CSIRO says the practice is ready to be adopted more widely, especially in the agricultural sector, to increase regional water security.

CSIRO Principal Research Scientist Dr Declan Page says the principles of an underground water bank are simple. "Basically, you take water in times of plenty and store it underground through managed aquifer recharge where it can be recovered again when needed during a drought. Instead of pumping into above-ground storages, water

is rapidly recharged into an aquifer through specialised infrastructure such as infiltration basins."

Storing water underground is often cheaper than building an equivalent surface water storage, avoids algal blooms and mosquito problems, and typically has much lower evaporative water losses.

"Evaporation losses from open air on-farm storage can be significant – if you look at storages in northern New South Wales and Queensland for example, this can be up to 40 per cent each year," Declan said.

"Drainage losses are large in some areas as well so there are potentially big savings if water can be stored more efficiently. Decreasing evaporation and drainage losses means that the cost of water banking may not be much greater than growers are currently paying for water."

Water that is banked can be extracted during dry spells when surface water is scarce and expensive to help maintain production when there is a drought.

### Industry partners needed

Currently the CSIRO is looking for irrigator groups interested to see whether the technology can be used in their district. While underground water banks will only work for places with a nearby, suitable aquifer, there are 'significant opportunities' across all of Australia.

"There is a staged approach to developing water banking projects through established Australian guidelines for managed aquifer recharge that outline the specific investigations needed to underpin investor confidence. CSIRO can provide the science and work with regulators but ultimately we won't be the ones to operate water banks, so we are looking for industry partners," Declan said.



Ridge Park Aquifer Storage Recovery scheme harvesting urban stormwater through a wetland.



Burdekin water banking scheme with a sand dam in the foreground.

CSIRO agronomist Dr Allan Peake is working with the water banking project and has had initial discussions with irrigators in Queensland and northern New South Wales.

“There’s a lot of enthusiasm for the technology. It could be used to help sustain cotton production during a drought cycle, but also to support expansion of high-value horticulture in districts where water supply is currently too variable, and the risk of losing perennial crops in a drought is too high,” he said.

CSIRO’s initial investigations suggest there may be aquifers in Australia that could store tens to hundreds of gegalitres or more in some areas. These are significant

amounts of water even to broadacre irrigation districts but assessments at specific locations are needed to determine the feasibility and viability of potential sites before implementation of pilot schemes, demonstration sites and full-scale systems.

### Information

To find out more or to register your interest, contact:

Dr Declan Page

P: 08 8303 8748

M: 0477 305 104

E: [declan.page@csiro.au](mailto:declan.page@csiro.au)



## APPS TO ASSESS PUMP EFFICIENCY

### SNAPSHOT

- Ensuring that irrigation pumps are working efficiently is an important part of ensuring water and energy use efficiency
- In this article Rob Welke takes us through two apps he has developed to help industry professionals assess pumping efficiency based on the measure of kWh/ML/m

Irrigation pump efficiency can be determined in several ways, the most common being kWh/ML/m. In this article, Rob Welke explains how this formula is used and describes two apps he has developed that can help with calculating pump efficiency.

Irrigation pump efficiency is often measured in kWh/ML/m (see article on page 39 in the Winter 2016 edition of Irrigation Australia journal). This measure was widely used in the Rural Water Use Efficiency Irrigation Futures (RWUE-IF) program, a partnership between rural industries and the Queensland Government, where the efficiencies of on-farm pumping systems were assessed. It was widely believed that kWh/ML/m measured pumping 'system' efficiency, where attempts were made to correlate kWh/ML/m with pumping system efficiency or pumped head (TDH).

So, what does kWh/ML/m tell us? To help irrigation professionals make sense of the data, I have developed two phone apps, described in this article. But first, let's look at the formulae.

### Formula for measuring kWh/ML

The [formula](#) to assess kWh/ML of a pumping system is:

$$\text{kWh/ML} = \frac{2.724 \times \text{metres TDH}}{\text{pump } \eta \times \text{motor } \eta \times \text{drive } \eta}$$

**Note:**  $\eta$  refers to efficiency % and TDH refers to total dynamic head, or the pressure head difference of the inlet and outlet of the pump.

If both sides of the equation are divided by metres TDH, we get:

$$\text{kWh/ML/m} = \frac{2.724}{\text{pump } \eta \times \text{motor } \eta \times \text{drive } \eta}$$

Transposing, we get:

$$\text{Pump } \eta = \frac{2.724}{[\text{motor } \eta \times \text{drive } \eta \times (\text{kWh/ML/m})]}$$

This formula will give us pump efficiency as a percentage.



Testing pumps for efficiency can be easier than you think; measuring pressure (TDH) is essential but measuring flow rate is optional.

The minimum kWh/ML/m value under the RWUE-IF program for an irrigation pumping system should be 4.0. If we substitute that into the formula above, given a motor efficiency of 93 per cent, drive efficiency of 1.0, then we know that the pump efficiency must be 73.2 per cent.

### An app to interpret kWh/ML/m

The first app helps users interpret kWh/ML/m. If you have a large database of kWh/ML/m data, you can work out your pump efficiency simply by entering the data into the app.

You will need to know the type of electric motor and drive being used, since these affect the net energy delivered to the pump. For the sake of simplicity, the app groups motor types into surface and submersible (nominally 93 per cent and 83 per cent efficient, respectively). Drives are categorised as belt, (nominally 93 per cent efficient), gear (nominally 95 per cent efficient) and VFD (nominally 95 per cent efficient).

### CASE STUDY: Dairy farm, Sale, Victoria.

In 2018, we completed a detailed energy efficiency audit on a dairy farm near Sale, Victoria.

A detailed pump test showed that the submersible bore pump driven with a variable frequency drive (VFD) had an operating efficiency of 57.1%. The farm's records showed that 179,460 kWh was consumed annually, the metered volume per year was 470 ML and pumped TDH was 63 m.

This equates to 6.06 kWh/ML/m.

When this data was entered into the kWh/ML/m app, it showed pump efficiency equated to 57.0%.

kWh/ML/m to Pump Efficiency ©		
ELECTRIC PUMPING		
Location: Dairy Farm, Sale Vic		
VARIABLES	Choice/Units	INPUTS
kWh/ML/m *	from your data base	6.06
Motor Type **	Surface or Submersible	Submersible
Drive type ##	Direct coupled, belt, gear, VFD	VFD
RESULTS (in green cells)		Calculate
Pump Efficiency		57.0%
Copyright WATER PUMPING INSTITUTE 2021		

The kWh/ML/m app display showing data for the Sale dairy farm.



## Pump testing app

The second, more elaborate, app called Irrigation Pump Efficiency Calculator (or IPEC), was developed for testing pump efficiency, based upon the kWh/ML/m principle.

It includes additional data on annual pumping cost and pump efficiency when new. The inputs are:

- metres, TDH
- pump efficiency when new (assume 75 per cent if unknown)
- motor efficiency (if surface or submersible)
- drive efficiency (if VFD or belt/gear)
- kWh per year
- ML per year
- existing electricity costs per year.

**Note:** It is not necessary to measure pumped flow rate to establish pump test efficiency. However, it is necessary to at least measure pumped volume.

To do its calculations, the app needs kWh and ML data for a full year's pumping. There are two ways we can get this number:

**Method 1.** Access the last 12 months of flowmeter and electricity readings, take the total kWh energy consumed for that period, then divide by the total ML pumped for the same period. It's best to take this over 12 months from July to June to ensure there is minimum pumping activity in the overlap zone.

**Method 2.** Run the pump for an hour at peak irrigation flow. Observe the volume pumped in that period from the flowmeter and simultaneously measure the power consumed from the electricity meter. To calculate total kWh for a year, multiply the kWh measured over an hour by the ratio of the ML pumped per year divided by the ML recorded over the hour.


### Here are some tips on using the app:

- Enter the motor type and drive type as you would for the kWh/ML/m app.
- Pumped head must be measured on site. If it's an end suction pump, take into account both suction and discharge heads. For vertical turbines, you need to include head at pump plus distance to water level plus column losses (use 5 m/100 m). For submersible pumps, include pumped head at the surface plus distance to drawn down water level plus a component for riser losses (use 5 m/100 m).
- Pump efficiency when new means just that; add as a decimal, e.g. for 75 per cent, add 0.75.
- Water pumped and energy consumed must be for a full year, in ML and kWh, respectively.
- Electricity cost may be taken from the grower's records. Alternatively, it can be estimated from a known average c/kWh, multiplied by the kWh per year.
- The accuracy of your calculated pump efficiency is

dependent on the accuracy of the data you enter.

The app assesses the achievable electricity cost and potential annual savings if the pump was overhauled.

While it calculates the amortised potential electricity savings over the system life entered in whole years, it will also work without the annual electricity cost: If left blank, the app calculates the pump efficiency only, without computing achievable cost and potential savings.

Irrigation Pump Efficiency Calculator		 <small>Overwrite raw data into cells highlighted YELLOW. Click CALCULATE.</small>
IPEC <sub>rev01</sub> <sup>®</sup>		
ELECTRIC PUMPING		
Location:	Dairy Farm, Sale Vic	
VARIABLES	Choice/Units	INPUTS
Motor Type	Surface or Submersible	Submersible
Drive type ##	Direct coupled, belt, gear, VFD	VFD
Pumped Head	metres TDH	63
Pump Effy when new	Input decimal, eg 75%=0.75	0.75
Water pumped ****	ML/yr	470
kWh consumed ***	kWh/yr	179,460
Electricity cost	\$\$/yr	35,892
Electricity tariff	cents/kWh (derived)	20.0
RESULTS (in green cells)		Calculate
SAVINGS achievable		Pumps only
Pump Efficiency		57.1%
Achievable Electricity Cost	\$\$/yr	\$27,338
Potential Electricity Savings ^	\$\$/yr	\$8,554
Potential Electricity Savings ^	%	24%
Scheme Life (Whole number only, 15 max)	yrs	15
Present Value #	PV	\$137,372
Copyright WATER PUMPING INSTITUTE 2021		

The IPEC app user interface.

## Pumping system efficiency

So, does kWh/ML/m measure pumping system efficiency?

No, it does not, but it does measure pump efficiency very well. This is because, by its very definition, kWh/ML is divided by the pumped head, thereby removing any reference to system head or hydraulic efficiency. It simply divides hydraulic efficiency right out of the equation.

## Information

For information about the apps and courses, go to WATER PUMPING INSTITUTE [website](http://www.waterpumpinginstitute.com.au)

Rob Welke, WATER PUMPING INSTITUTE, Adelaide

## SNAPSHOT

- Victoria's Mitiamo Pipeline, which will supply year-round water to 170 rural properties, is nearing completion
- The Murray–Darling Basin Authority has commissioned a study to investigate how water quality parameters change over time
- Northern Victorian irrigation allocations have been increased in response to wetter than average conditions
- A CSIRO review has found that the water modelling study on which Western Australia's Southern Forest Irrigation Scheme is based, is flawed
- The Northern Territory Government is investigating two infrastructure options to increase water security in the Darwin region
- Water utilities Yarra Valley Water and Water New South Wales are trialling a bottom-up approach to developing their submissions to the pricing regulator, by asking customers for input

## MITIAMO PIPELINE PROJECT NEARING COMPLETION

Victoria's Mitiamo Pipeline Project is due to be completed by August, giving irrigators a more reliable water supply with less evaporation.

The project includes over 300 km of new pipeline to supply a new district covering more than 58,000 ha of land north of Bendigo and southwest of Echuca. It will provide a year-round service to around 170 rural properties.

Historically, more than 80 per cent of water supplied via the channels in the region is lost before use and only two-thirds of the project area is currently serviced, with farmers incurring high water cartage costs.

Victoria's Acting Water Minister Richard Wynne said the project will reduce public and private water losses by more than 1,000 ML per year by replacing the old leaking channel with pipes, a pump station and 85 ML storage facility to provide a year-round water supply.

The aim is to give farmers water surety and allow expansion of agriculture in the region. It is also expected to improve the health of rivers and wetlands in line with Victoria's obligations under the Murray–Darling Basin Plan, with no socio-economic impacts.

The Mitiamo and District Water Supply Project received \$14.5 million from the federal government, \$10.2 million from the Victorian Government and \$4.3 million from Goulburn Murray Water.

**Source.** Pump Industry [website](#).

## MURRAY–DARLING WATER QUALITY STUDY

The Murray–Darling Basin Authority (MDBA) has commissioned La Trobe University to analyse water quality data from 28 monitoring sites along the River Murray and lower Darling.

This data has been collected by Basin states since 1978 and is routinely assessed to detect sudden changes in water quality that could indicate quickly emerging problems like pollution. This new study, however, will look for longer term trends that impact water quality.

MDBA's Senior Director of Environmental Management Dr Janet Pritchard says that being able to analyse such an extensive and continuous dataset will help show what drives water quality issues, including algal blooms, and highlight emerging risks and watchpoints.

The study will provide information about parameters like temperature, salinity, metals and nutrients and how they are changing over time. It is important to have this information in order to maintain appropriate water quality and salinity for a wide range of environmental, social, cultural and economic activities.

**Source.** Water Career [website](#).

## NORTHERN VICTORIAN IRRIGATION ALLOCATIONS INCREASED

Northern Victorian irrigation allocations increased on Thursday on the back of rainfall and good flows into storages.

Mark Bailey, Resource Manager for northern Victoria, announced increases in high-reliability water shares (HRWS) seasonal determinations across all irrigation systems:

- Murray system to 31 per cent (up from 21 per cent).
- Goulburn and Loddon systems to 37 per cent (up from 33 per cent)
- Campaspe system to 23 per cent (up from 14 per cent)
- Broken system to 8 per cent (up from 5 per cent)
- Bullarook system to the maximum available 100 per cent HRWS plus 100 per cent of low-reliability water shares (up from 40 per cent HRWS).

Lower than expected carryover volumes and better than assumed flows into the major storages contributed to the increases. Higher than average rainfall is expected to continue through winter and spring.

**Source.** Farm Online [website](#).

## SOUTHERN FOREST WATER MODELLING FLAWED

A CSIRO review has confirmed water modelling on which the proposed \$80 million Southern Forests Irrigation Scheme (SFIS), near Manjimup, Western Australia, is based, was flawed.

The original model, prepared for the Department of Water and Environmental Regulation in 2018, showed that enough water was available in the Donnelly River and Record Brook tributary for the SFIS to take up to 9.3 GL per year.

But the new review states that the model 'over-predicts' the volume of water from forest runoff. This is because the historical data used to create the model was taken from a particularly wet period.

Further, the 2018 model relied on a range of climate scenarios out to 2050. Some of these, however, assumed higher mean rainfall than has actually been seen in recent years – and declining rainfall results in drastic reductions in runoff, even in wetter years, due to increasing depth of groundwater.

The review recommends a more complex model be used that incorporates the latest climate data and a more representative baseline data period. It also recommends better monitoring of streamflow and groundwater, and a review of available stream flow data to help predict what might be expected in various future climate scenarios.

The state government will work with the Southern Forests Irrigation Co-operative and the local community to assess the impact of reduced water availability on the future of the SFIS.

**Source.** Farm Weekly [website](#).

## NEW INFRASTRUCTURE PROPOSED FOR DARWIN REGION

The Northern Territory Government has shortlisted two infrastructure options to increase water security in the Darwin Region, as part of the development of a Northern Territory Strategic Water Plan.

The Department of Industry, Tourism and Trade (DITT), in collaboration with the federal government and Power and Water Corporation, is currently assessing the two options to meet the Darwin region's future water supply needs.

The two shortlisted options were outlined in the Preliminary Assessment (Part A), released in February 2021:

- **Option 1:** Adelaide River Off-stream Water Storage (AROWS) and Manton Dam Return to Service (RTS), to provide water for a range of uses over the next 50+ years
- **Option 2:** Desalination and recycled water that can enable industry development in the short term (up to ten years) at the proposed Middle Arm Sustainable Development Precinct.

A detailed business use case is currently being prepared to evaluate the ability of these options to respond to the expected forecast urban, industrial and agricultural demand.

For more information on Darwin region future water supply, please visit the Northern Territory Government Water Security [website](#).

**Source.** Pump Industry [website](#).

## BOTTOM-UP APPROACH TO WATER PRICING

Water utilities Yarra Valley Water and Water New South Wales have been trialling a bottom-up approach to developing their submissions to the pricing regulator, by asking customers for input.

In 2025, Water NSW will make a submission on pricing to the Independent Pricing and Regulatory Tribunal (IPART). Previously, this has led to price rises, which has alarmed irrigators. But this time, consumers are being asked what they think. They will have access to information from Water NSW plus un-edited submissions from the Commonwealth Water Holder, the NSW Farmers Association and the Irrigators Association, and they will have two months to think about a response.

It is the beginning of a three-year process that will eventually set the price for farmers, big business, small towns and major cities throughout NSW.

A similar process by Yarra Valley Water showed that when asked open-ended questions and given time to think, some consumers prefer action on climate change and helping the vulnerable over cheaper bills. Despite customers playing a major role in developing the utility's submission to the pricing regulator, it didn't result in reduced costs for consumers.

**Source.** ABC News [website](#).

### BoM climate outlook – August to October

The latest update from the Bureau of Meteorology is predicting above-average rainfall from August to October for much of Australia.

- August to October rainfall is likely to be above median for most of Australia, however, parts of western WA are likely to see below median rainfall.
- Maximum temperatures for August to October are likely to be above median for the northern tropics and south-eastern parts of Australia. For some parts of central NSW, below-median daytime temperatures are more likely.
- Above-median minimum temperatures for August to October are very likely for all of Australia except in the south-west.
- A negative Indian Ocean Dipole is underway, and large parts of the eastern Indian Ocean are warmer than average. This can favour above average winter-spring rainfall for parts of Australia. The El Niño-Southern Oscillation is neutral, but three of seven models suggest La Niña thresholds may be reached during spring. La Niña increases the chances of above average spring rainfall for much of eastern and northern Australia.





## WATER NIGHT A HUGE PROMOTIONAL OPPORTUNITY FOR LICENSEES

Smart Approved WaterMark is offering our valued licensees additional exposure for their certified products as part of its annual Water Night initiative. The initiative is a huge social and media campaign held during Australian Water Association's National Water Week.

### What's Water Night?

We ask all Australians to go a night without using their taps, so that they can see for themselves just how reliant they are on them and how subconscious that use is.

### Proven success

Last year more than 3,400 households took part in the challenge (more than 6,000 adults and 2,000 children) to face their water-using 'auto pilot' and learn more about their water use and the merits of water efficiency. We saw a 10 per cent uplift in water literacy and an increase of 23 per cent about the amount of water used for everyday tasks. Ninety-three per cent of households said they would participate again this year.

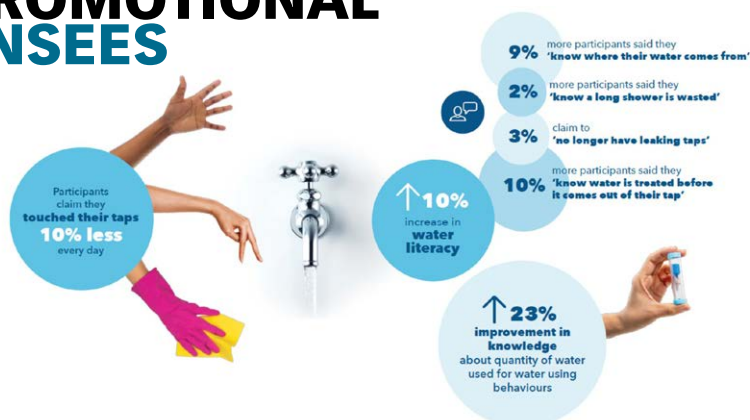
We also had more than 700,000 engagements on TikTok, thousands of emails went out and there were social media postings across the nation.

### Water efficiency products front and centre of campaign

Throughout National Water Week, we are planning to run several draws with water-efficient products as prizes, concluding with a bonanza draw on Water Night, Thursday 21 October.

Why not take advantage of this promotional opportunity and donate a product or products for the draws.

If you already have products certified with SAWM, you are in pole position to gain more awareness of your product and its water efficient features during the Water Night campaign.



If you do not have a product that is certified with SAWM and it saves water or uses water more efficiently than any other product or process, there is still time to get certified before Water Night. Why not join us?

### Confirmed supporters

We are proud to say we have financial sponsors and in-kind supporters from across the water industry, not-for-profit organisations, water associations, educators and retailers. Interest is still coming in thick and fast for this year's event. Supporters already on board include Water Services Association Australia, Power and Water, Taswater, Tamworth and Dubbo Regional Councils as well as Shoalhaven Shire Council, Bosch, Hoselink and Bunnings. You would be in great company if you were to support this event this year.

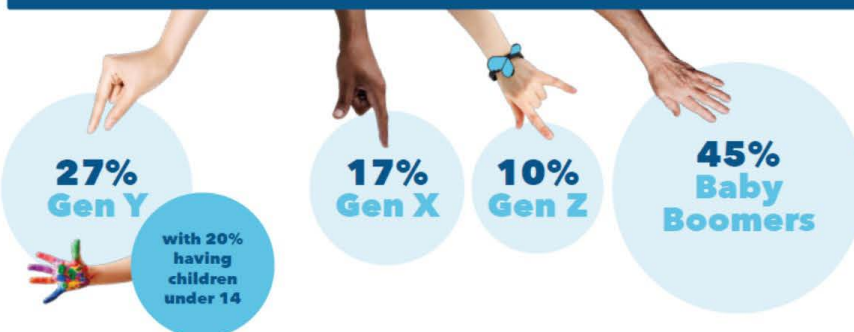
### Information

You can check out the results of last year's inaugural Water Night here at the SAWM [website](#)

To find out more about Water Night Sponsorship go to the SAWM [website](#)

For guidelines on how to apply for certification go to the SAWM [website](#)

Contact Chris Philpot at [email](#) or 0422 289 599 to find out how you can be part of Water Night 2021.





## IRRIGATION AUSTRALIA INTERNATIONAL CONFERENCE AND EXHIBITION

### Irrigation Australia International Conference and Exhibition, 24th ICID International Congress and 73rd IEC meeting

Dates: 3 to 10 October 2022

Venue: Adelaide Convention Centre

The ICID 24th International Congress and 73rd IEC meeting and Irrigation Australia Conference and Exhibition will be held next year at the Convention Centre in Adelaide.

### Interesting in presenting a paper to the Australia conference?

If you are interested in presenting a paper to the conference, then get cracking. The closing date for abstract submissions is 15 December 2021.

The theme for the Australian conference is *Irrigation for the future – challenges, innovations and opportunities*. The conference is an unparalleled platform for addressing key issues to do with irrigation and sharing your knowledge about opportunities and challenges for sustainable water use.

Conference topics are as follows:

- The Murray–Darling Basin – examines community investment packages, improving the implementation of the plan, environmental water, 450 GL efficiency projects, water trading and more.
- Energy and Resource Sustainability- encompasses affordability of energy, resource allocation, renewables and removing barriers to integration.
- Smarter Irrigation for Profit Program – identifies outcomes from this research program, and how the adoption of new irrigation technologies will benefit the industry.
- Business of Irrigation – covers irrigation in regional development, natural resource allocation, and managing the challenges and opportunities while mitigating risks of sustainability issues.
- Science, R&D, and Innovation – highlights new research from organisations such as CSIRO, BOM, universities, R&D companies and start-ups.
- Infrastructure and Investment – hear from the National Water Grid Authority and the North Queensland Water Infrastructure Authority about their long-term national approach to water infrastructure planning.
- ICT in irrigation – a forum to discuss, AI, IoT, big data, ownership of data, automation systems and platform.
- Rainwater Harvesting – learn about how harvested rainwater, the third largest source of water in Australia can reduce the cost of water infrastructure and ease the pressure on stormwater systems.

**Information.** For information about the international and Australian conferences and the exhibition, visit the [website](#)

## EVENT SCHEDULE

DATE	EVENT	LOCATION	CONTACT/ INFORMATION
22-29 September 2021	72nd IEC Meeting and 5th African Regional Conference (AFRC)	Marrakesh, Morocco	<a href="mailto:anafide.ma@gmail.com">anafide.ma@gmail.com</a> <a href="http://5arcid.ma/fr/">http://5arcid.ma/fr/</a>
3-10 October 2022	73rd IEC Meeting and 24th ICID Congress	Adelaide, Australia	<a href="mailto:bryan.ward@irrigation.org.au">bryan.ward@irrigation.org.au</a> <a href="http://www.irrigationaustralia.com.au/">http://www.irrigationaustralia.com.au/</a>
September 2022	10th International Micro Irrigation Conference (10MIC)	Agadir, Morocco	<a href="mailto:anafide.ma@gmail.com">anafide.ma@gmail.com</a>
16-22 April 2023	74th IEC Meeting and 4th World Irrigation Forum (WIF4)	Beijing, China	<a href="mailto:gaolh@iwhr.com">gaolh@iwhr.com</a>

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Momir Vranes, Irrigation Australia Board Director and ICID Australia National Chair

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### 1. Irrigation Journal Copies

Receive four copies of the only national Irrigation Journal per annum. Each journal contains valuable industry information about new projects, technologies and techniques for Agriculture, Landscape & Domestic Irrigation



### 2. National Irrigation Directory

Receive a digital copy of the only national and comprehensive Irrigation Directory. Find details about irrigation shops, manufacturers, installers, contractors, certified professionals and more.



### 3. Training Discounts

Receive significant member discounts on nationally accredited irrigation training and qualifications delivered by Irrigation Australia in major cities and regional towns.



### 4. Certification Discounts

Receive significant member discounts on the joining fee and renewal fee to the Certification Program administered by Irrigation Australia.

Certification is a voluntary, national program of industry recognition. Certification adds instant credibility with customers, increases job opportunities and demonstrates your commitment to efficient water management. Visit our website to learn more [www.irrigationaustralia.com.au](http://www.irrigationaustralia.com.au)

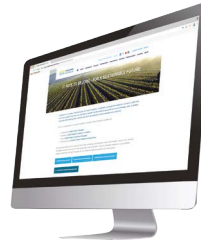
### 5. Conference & Tradeshow Discounts

Member discounts on attending and exhibiting at the Irrigation Australia Biennial International Conference & Exhibition.



### 6. Members Only Portal

Gain access to the members only portal on the Irrigation Australia website. Through the portal you can manage your Irrigation Australia membership, access members only documents, presentations and other materials.



## eKnowledge

### 7. Access to eKnowledge

Irrigation Australia eKnowledge repository has vast resources of technical papers, conference papers, Irrigation Journals and FAQ's available only for Members.

### 8. Discounts on Publications and Merchandise

Irrigation Australia offers a wide range of books, eBooks and other merchandise through its online store. Members receive significant discounts on materials.

### 9. Invitations to Regional Meetings & Events

Irrigation Australia hosts a number of regional meetings, events and site visits across Australia. This is a great opportunity for members and industry colleagues to come together to discuss new challenges, technologies and network.



### 10. Monthly Electronic IriNews Newsletter

Receive our monthly Irrigation Newsletter with the latest information on upcoming training, events as well as new products, information and industry news.



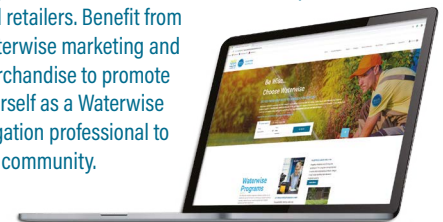
### 11. International Representation

Be part of the global irrigation community and gain access to international contacts via the Irrigation membership of the International Commission on Irrigation and Drainage (ICID).



### 12. Discounts on Waterwise endorsement

Receive significant member discounts on the Waterwise endorsement programs, relevant for domestic irrigation contractors, installers, landscapers and retailers. Benefit from Waterwise marketing and merchandise to promote yourself as a Waterwise irrigation professional to the community.



See [www.waterwiseprograms.com.au](http://www.waterwiseprograms.com.au) for more information.

## Additional Membership Benefits

(EXCLUDES PRIMARY PRODUCERS, INDIVIDUALS & RETIRED MEMBERSHIP CATEGORY)

### 13. Free Listing in the National Irrigation Directory

List your business or organisation for free in the digital National Irrigation Directory reaching the wider irrigation industry.



### 14. Free Online Job Listing

List your upcoming job vacancies on Irrigation Australia's online job board which attracts significant targeted views every month.



### 15. Free Listing on Irrigation Australia's Website

List your business on Irrigation Australia's Website Directory which attracts significant page views every month.



### 16. Journal Advertisement Discounts

Receive significant discounts on advertising in the Irrigation Journal. Circulation is more than 2000 copies per quarter.





## COVID-19 VACCINES AND THE WORKPLACE

### SNAPSHOT

- If there is one thing that the last 18 months have taught us, it is that we must always be vigilant where COVID-19 is concerned, including in the workplace
- Safe Work Australia is a great resource for employers that provides information about safety in the workplace, including about vaccination.

Australian small business owners have worked hard to manage the risk of exposure to COVID-19 in the workplace and meet their work health and safety (WHS) duties. With vaccines now rolling out across the country, Safe Work Australia has published a factsheet outlining what you need to know about WHS duties and the COVID-19 vaccines.

### Available in phases

A COVID-19 vaccine is voluntary and will be available in phases. Australia's COVID-19 vaccines will be available in phases starting with older Australians and high-risk industries. The [Department of Health](#) can provide you with more information about COVID-19 vaccines and the rollout.



### Precautions are still necessary

A vaccine is only one part of keeping the community safe. You must continue to do all that you have been doing in your workplace to stop the spread of COVID-19, including physical distancing, good hygiene, regular cleaning and maintenance and using personal protective equipment. Continue to make sure your workers do not attend work if they are unwell. You must also continue to comply with any public health orders that apply to you and your workplace.

### Vaccination is not compulsory

For most small businesses, it is unlikely that a requirement to be vaccinated will be reasonably practicable. You can talk to your WHS regulator, employer organisation or other legal service if you are unsure. Don't implement a mandatory vaccination policy without first talking to your workers and seeking advice.

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A vaccine is only one part of keeping the community safe. You must continue to do all that you have been doing in your workplace to stop the spread of COVID-19, including physical distancing, good hygiene, regular cleaning and maintenance and using personal protective equipment.

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### Talk to your workers

Official government sources such as the [Department of Health](#) are the best sources for accurate and up-to-date information about COVID-19 vaccines. Remember, you must also consult with your workers and their health and safety representatives before implementing any WHS changes in your workplace.

### Stay informed

You may have rights and responsibilities under other laws in relation to COVID-19 vaccines, including workplace relations, anti-discrimination and privacy laws. Seek advice if you are unsure. For example, for help about what to do if a worker is not vaccinated, talk to your WHS regulator, the [Fair Work Ombudsman](#), your employer organisation or other legal service.

**Acknowledgment.** This article was first published on the Safe Work Australia [website](#), where you can find more information about WHS and the COVID-19 vaccine.



## WEBSITE COLLATES DATA ABOUT WATER AND RISKS AROUND THE WORLD

In this edition of BOOKSHELF, we are not previewing a book or report; this time we delve into a website called [Aqueduct](#).

The website brings together information and tools for users who are interested in identifying and evaluating water and climate risks around the world.

The website and the research behind the tools and data are the result of a collaboration between Delft University of Technology, Deltares, Utrecht University, Institute for Environmental Studies (IVM), International Food Policy Research Institute (IFPRI), PBL Netherlands Environmental Agency, and RepRisk. The work is funded by an alliance of companies, governments and foundations interested in water stewardship.

### Aqueduct tools



#### Aqueduct Water Risk Atlas

Map and analyze current and future water risks across locations.

[Launch Tool](#)



#### Aqueduct Country Rankings

Understand and compare national and sub-national water risks.

[Launch Tool](#)



#### Aqueduct Food

Understand and identify current and future water risks to agriculture and food security.

[Launch Tool](#)



#### Aqueduct Floods

Identify coastal and riverine flood risks, and analyze the costs and benefits of investing in flood protection.

[Launch Tool](#)

The Tools page of the website is a treasure trove of information about risks to do with water, food availability, flooding and drought.

According to the website, the Aqueduct team “works one-on-one with companies, governments, and research partners to help advance best practices in water resources management and enable sustainable growth in a water-constrained world.”

Users can access a range of data, maps and information in pages devoted to tools, publications, a blog, data and user stories.

The **tools** page includes maps indicating water risks such as floods, droughts, and stress, using open-source, peer reviewed data.

The **publications**, which can be downloaded at no charge, tackle a range of water-related topics such as floods methodology and global water risk indicators. The **blog** page includes a wide range of subjects, one of which details water use over the last 50 years. According to this blog post, while irrigation and agricultural water use still uses most freshwater (70 per cent), the standout figure is for domestic water withdrawals, which grew 600 per cent from 1960 to 2014.

“Humanity’s thirst for freshwater has more than doubled since the 1960s, keeping pace with growing populations and economies. [One-quarter of the world](#) now faces extremely high water stress, where more than 80% of the available supply is withdrawn every year”.

The data page has a lot of facts and figures, much of it linked to maps, to do with water topics, e.g. projected water stress country rankings, global flood risk maps, flood hazards maps, drought risk country rankings and global indicators of water quality and variability and access to water.

### IN THE NEXT ISSUE

The **Summer 2021** issue of *Irrigation Australia Journal* will feature:

#### EDITORIAL

- > Pumps and pumping
- > Sensor-based irrigation and soil mapping for irrigation

#### ADVERTISING FEATURES

- > Annual pumps and pumping feature

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A global company designing and manufacturing fittings and valves, providing cost-effective solutions for the transfer & application of water.



A worldwide supplier of irrigation products to the landscape, agricultural, turf care and domestic garden markets.



A worldwide leader in precision irrigation. The Valley brand of Centre pivots provide solutions for meeting the growing demand for food.



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