



Application to amend Licence W-31

Water Treatment

www.harveywater.com.au



South West Irrigation Management Cooperative t/a Harvey Water

PO Box 456 Harvey WA 6220

ABN: 54498176490

Contact person for this application:

Stephen Cook Operations Manager scook@harveywater.com.au

Aled Lewis Project Engineer alewis@harveywater.com.au

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APPLICATION SUMMARY

South West Irrigation Management Cooperative t/a Harvey Water will provide the following services in addition to the provision of non-potable water as specified in the current license WL-31:

Customer – MARBL Lithium

- Treatment of ground water (Leederville aquifer) to potable water (167m³/ day) for drinking, ablutions, irrigation, safety showers and wash down to a standard as defined by the Australian Drinking Water Guidelines (ADWG) 2018 –health guideline values. Monitoring and reporting of performance inline with ADWG requirements will comply with requirements.

Harvey Water will build (with MAK Water as the technology designer and supplier) install, maintain, and operate the infrastructure as a service to MARBL Lithium.

This includes maintaining efficient daily operation, scheduled and emergency maintenance, and managing the monitoring and reporting of water quality criteria in accordance with:

- Australian Drinking Water Guidelines 2018 (ADWG), The National Health and Medical research Council (NHMRC);
- Mine Sites and Exploration Camps Drinking Water Quality Monitoring Requirements (WA Department of Health (DoH) 2008);
- System compliance and routine reporting requirements for small community water providers (DoH) 2008;
- The conditions of the ERA and Harvey Water's operating license;
- Guidelines for the non-potable uses of recycled water in Western Australia (DoH) 2011.

The supply and treatment of water to MARBL Lithium (MARBL) is for use within the boundaries of the lithium plant in Kemerton and is not for delivery or consumption outside of these boundaries.

Whilst the water quality is of high interest to employees and other site-specific stakeholders the nature of this service will not be contrary to public interest.

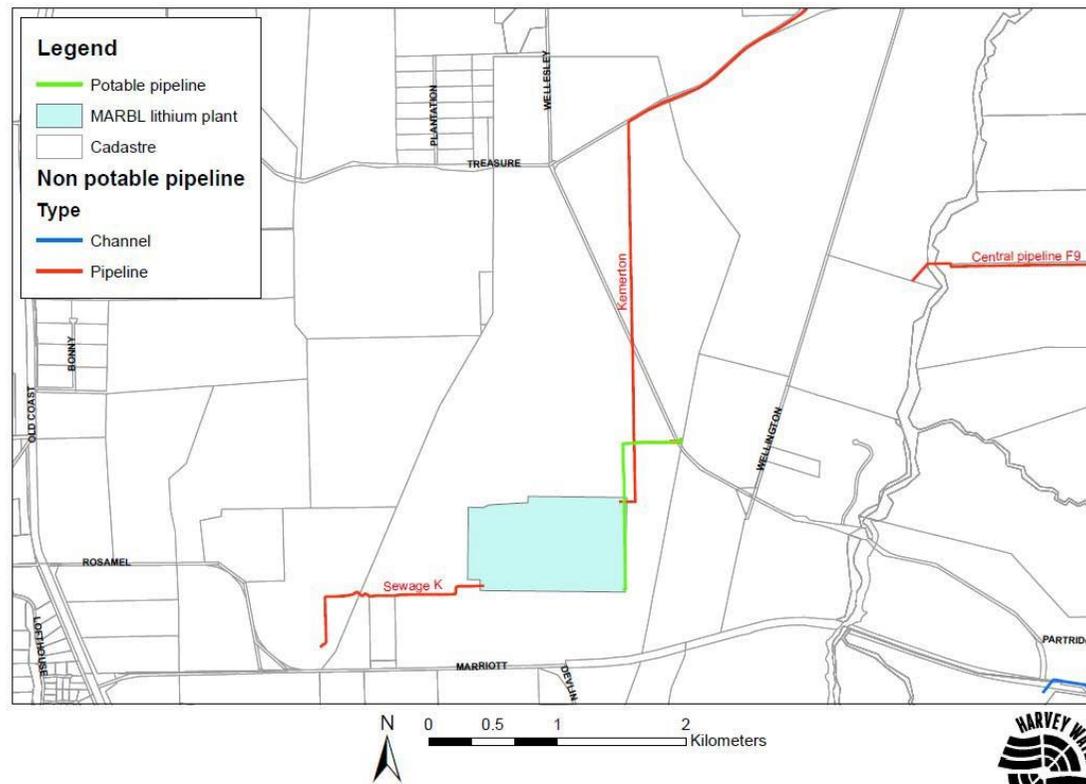
Harvey Water is currently sponsoring four employees to be trained in Water Treatment Operations to Certificate level III. The first phase of training was completed in May 2019 and a second week takes place July 2021. The course will be completed in 2021. The training organisation is Simmonds & Bristow from Queensland.

The MARBL plant is located within the Kemerton the Industrial Area. As part of this application Harvey Water requests to extend our licensed area to encompass the whole of the Kemerton area for both potable and non-potable water provision; see the attached maps.

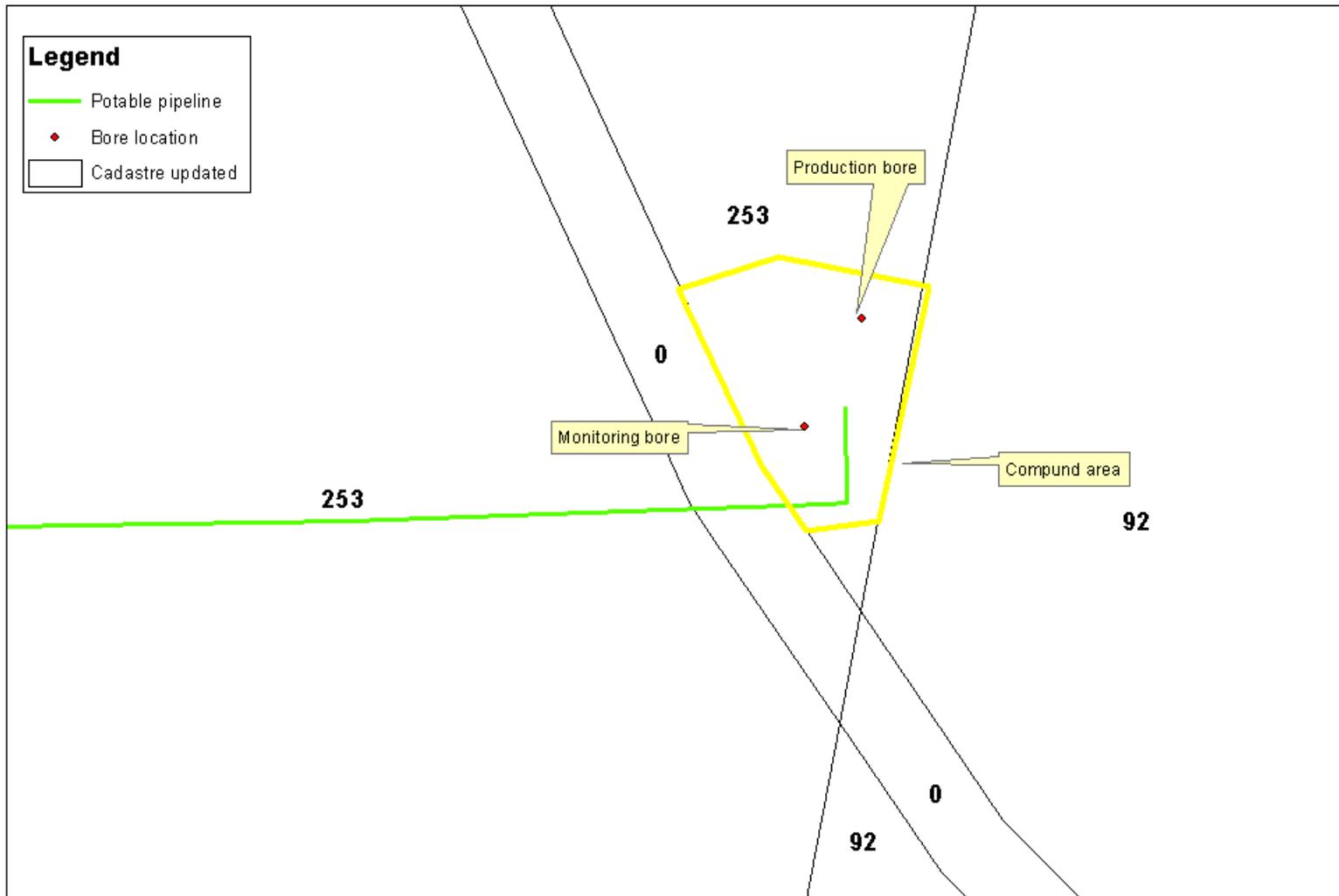
TECHNICAL INFORMATION

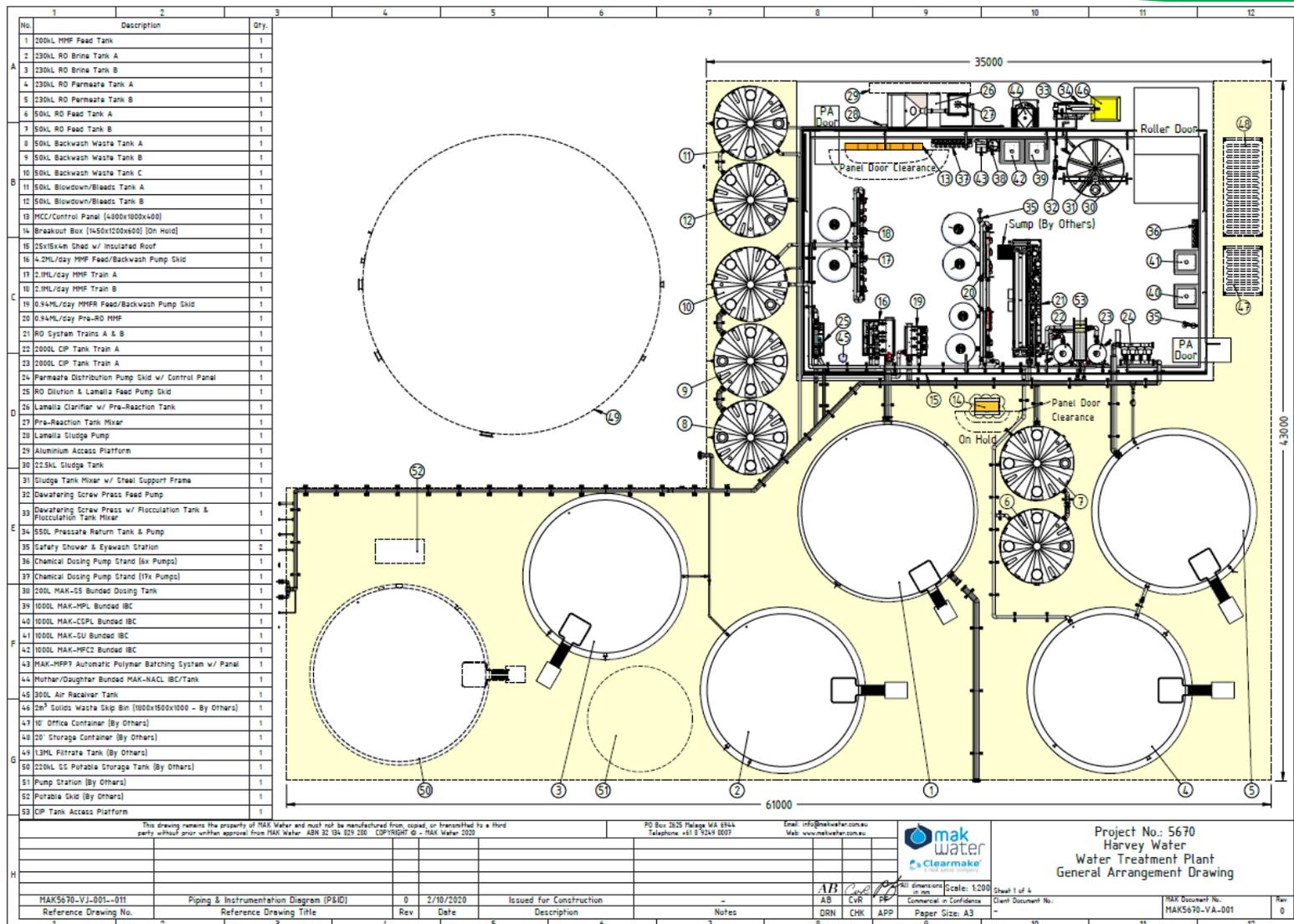
Harvey Water will produce two separate water treatment plants one to produce high quality industrial water and one for potable uses. The water treatment plants and equipment will operate within the boundaries of the MARBL plant at Kemerton Industrial Area off Marriot Rd in Bengar near Harvey. The site is controlled access with no public access.

Ground water is delivered from the Leederville bore site (Potable source) via an independent HDPE pipeline to the site for drinking water. The water is then filtered and treated to meet the requirements of the ADWG.



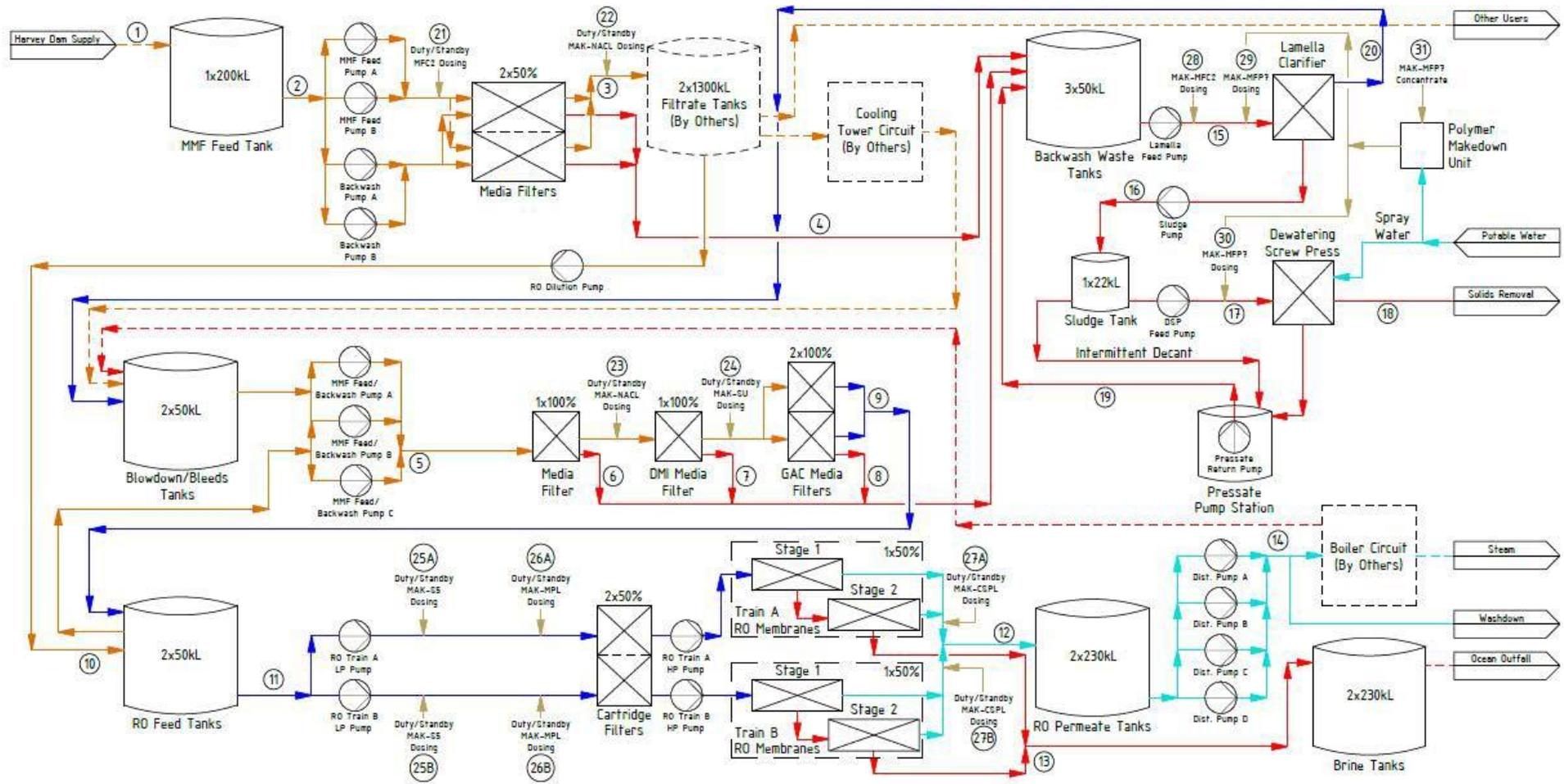




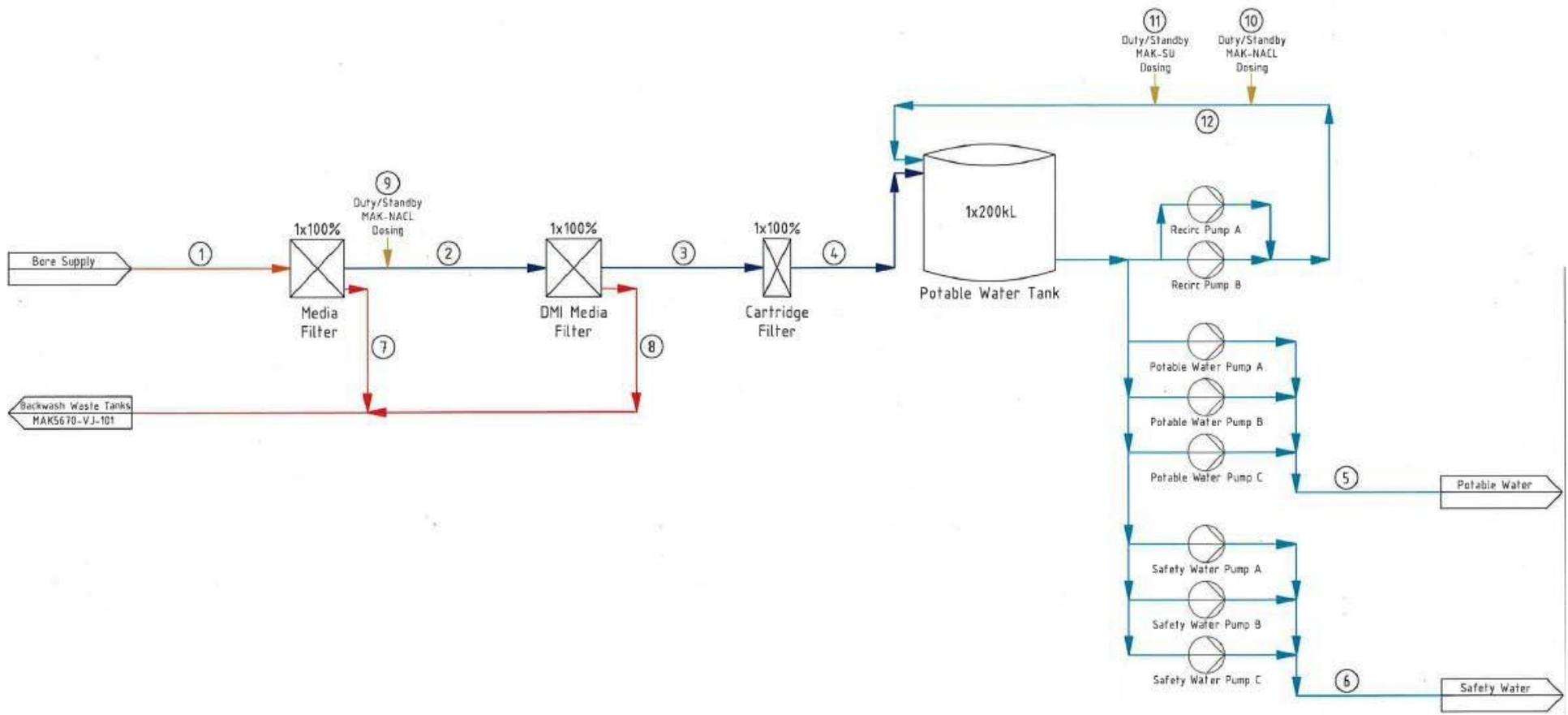


MAK Water treatment container

Application to amend license WP-31 Harvey Water – March 2021



PFD of non-potable treatment system



PFD of potable treatment system

Raw Water Supply (MMF delivered dam water)

Produced from a **filtration** plant at a rate of **2.5ML/day** initially and then ramping up to **4.2ML/day** at full demand capacity. This plant will provide the initial reduction of total suspended solids (TSS), turbidity and the **removal of E.coli** in raw water and provide a chlorine residual for disinfection of the dam water. The water produced will be split in to two streams one to be used in the Cooling tower circuit using the quality following the MMF and the other stream to be treated further through RO filtration.



Reverse Osmosis Water Supply

Produced as the product of additional processing of a blend of treated water from the MMF treatment and captured streams generated from within the cooling towers and boiler processes. This water is further treated through an RO plant to produce 1144m³/day of permeate, further reducing the total dissolved solids (TDS). This water will be used by MARBL for process water, wash down, hoses and steam production.



Potable Water Supply

The water sourced from the Leederville aquifer is treated through a series of media filters including multimedia, DMI and cartridge filtration.

This filtered water is stored in sealed water tanks with use of a chlorine recirculation system for disinfection.

This Water will be treated to a standard in line with the ADWG quality objectives.



Potable Safety Water

Shares a common media filtration and disinfection as the aforementioned potable water supply to produce a safety shower water stream compliant with ADWG health guideline requirements.





TECHNOLOGICAL PARTNER

The water treatment plants will be supplied by **MAK Water**:

- Process water
- Potable water
- Reverse Osmosis (RO)

The construction of the industrial site commenced in January 2019. The watertreatment modules are to be installed in the first half of 2021.

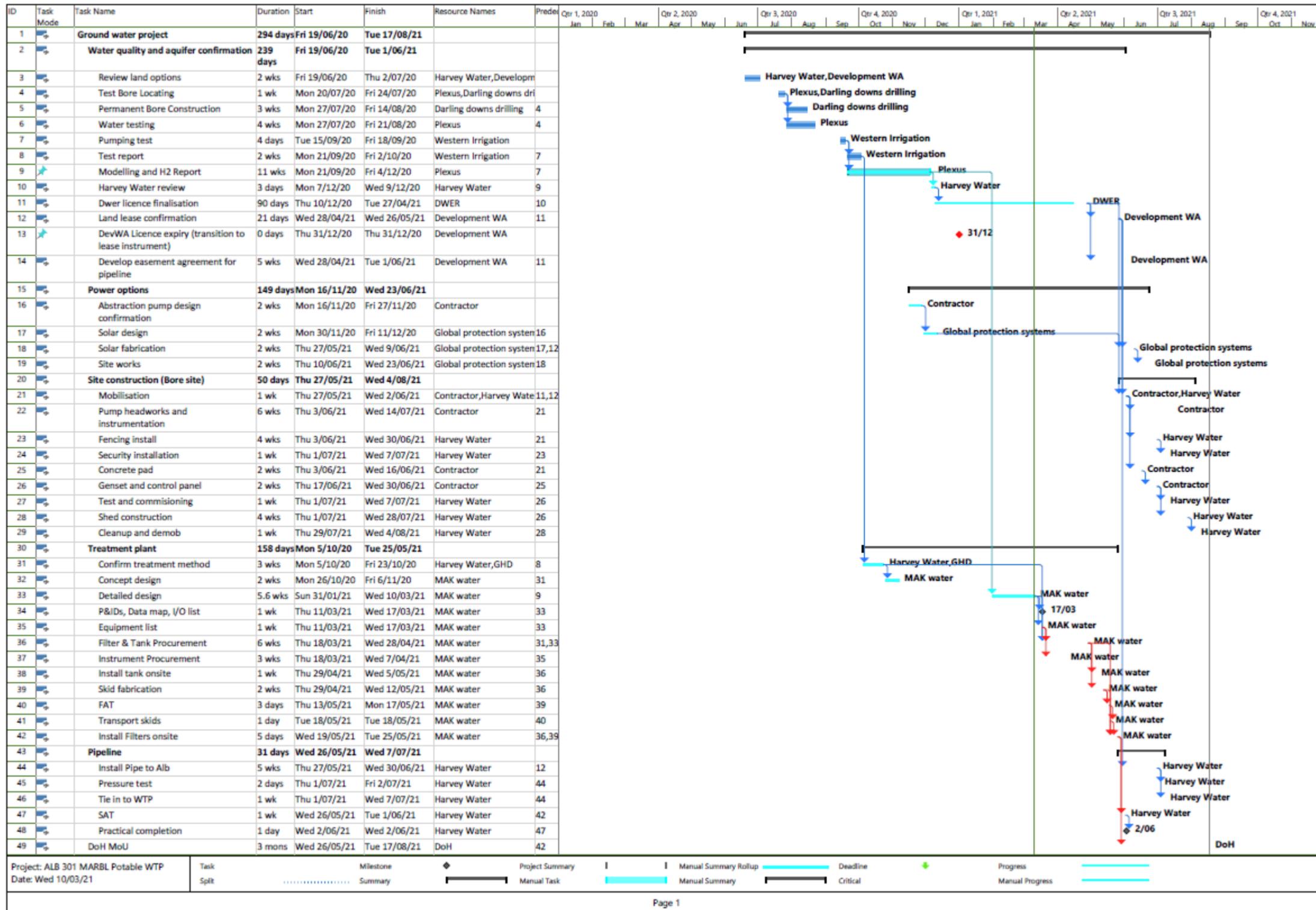
The water is metered through a magnetic flow meter Emflux i-500 by Aquamonix installed with a data-logger connecting back to our main office via an internet connection.

Our current Asset Management System (AMS) will be used to manage the plantmaintenance and record all maintenance events.

Harvey Water is training four people to a level of Certificate III in WaterTreatment Operations

<https://www.makwater.com.au/>

Program to installation



Reliable Mining Expertise

EXPERIENCED. From the extreme heat of remote Australia and Africa, to the cold climates of Mongolia and Kazakhstan, MAK Water has delivered solutions for mining projects in the most challenging environments around the world.

EQUIPMENT RELIABILITY. In mining, equipment reliability is paramount. MAK Water has an established track record of manufacturing fully automated, high quality equipment for maximum reliability and minimum operator intervention.

FLEXIBLE SOLUTIONS. Our wide range of standard designs can be fully customised to meet project specifications. For short term requirements, rapidly deployable hire plants are available. Where project funds are better employed in other areas, MAK Water can offer a build-own-operate, or lease-to-own solutions.

INNOVATIVE DESIGNS. Our award-winning, pre-tested modular designs save time, reduce risk, and minimise installation costs and environmental footprint.

Where installed, ClearAccess™ Remote Monitoring enables MAK Water's Operations Specialists to assist your site team to diagnose problems, preventing unnecessary service call-outs and improving reliability and plant uptime.

END TO END SOLUTIONS. From the supply of process technology only, to turnkey installations, we can design, build, install, operate and maintain all your project's water treatment plants.

Mine Site Applications

From drinking and process water, to sewage and wastewater treatment, MAK Water's wide range of plant designs means we can meet all your mine project's water and wastewater treatment plant requirements.

EXPLORATION, CONSTRUCTION AND PERMANENT ACCOMMODATION CAMPS

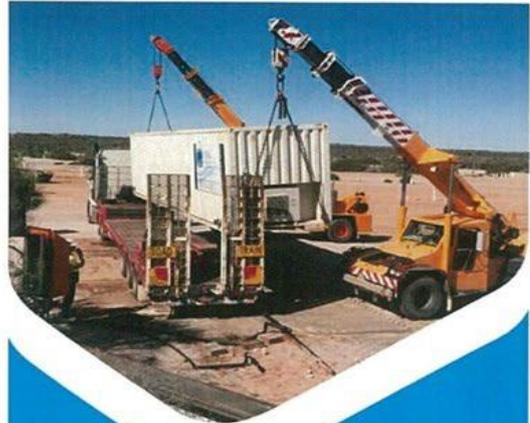
- ◆ Potable/drinking water treatment plants, treating ground, surface or sea water
- ◆ Sewage treatment plants, for compliant discharge, or onsite reuse
- ◆ Pumping, storage and sterilisation solutions for sewage, potable or fire water
- ◆ Hire filtration, reverse osmosis and sewage treatment plants for short-term construction requirements

NON-PROCESS INFRASTRUCTURE

- ◆ Potable/drinking water treatment plants, treating ground, surface or sea water
- ◆ Sewage treatment plants, for compliant discharge, or onsite reuse
- ◆ Pumping, storage and sterilisation solutions for sewage, potable or fire water
- ◆ Oily water treatment and recycling systems for vehicle wash bays and workshops
- ◆ Demineralised water for boilers and cooling towers

PROCESS INFRASTRUCTURE

- ◆ Process water treatment
- ◆ Process wastewater treatment for compliant discharge or recycling
- ◆ Mine site remediation and treatment of wastewater



HEALTH, SAFETY AND THE ENVIRONMENT

MAK Water places the Health and Safety of our people, clients and contractors, and care of the Environment as our highest priority.



Planning

It make sense to engage with MAK Water early in the planning phase. Understanding your water and wastewater treatment options reduces risk by preventing unnecessary delays and maximising the use of your valuable resources.

MAK Water works collaboratively with your environmental and engineering teams to develop solutions for every stage of the mining life cycle, to meet your project objectives.

Services provided to support the investigation and planning stage of the project include:

- ◆ Technology selection and expert process advice
- ◆ Budgeting and value engineering
- ◆ Assistance with obtaining environmental approvals
- ◆ Supply of trial plants and piloting equipment



Design and Construction

Products and services provided to support greenfield sites and expansion of mine infrastructure:

- ◆ Supply of hire plants for construction water and temporary camps
- ◆ Supply of permanent water and wastewater treatment plants
- ◆ Installation, commissioning, performance testing and training
- ◆ Development of water and wastewater quality management plans
- ◆ Remediation and treatment of wastewater
- ◆ Operation, service and maintenance of water and wastewater assets
- ◆ Supply of chemicals, consumables and spare parts



Operations

Products and services provided to support mine infrastructure include:

- ◆ Supply of water and wastewater treatment plants
- ◆ Operation, service and maintenance of water and wastewater assets
- ◆ Plant reviews, upgrades, modifications and refurbishments
- ◆ Implementation of water and wastewater quality management plans
- ◆ Regulatory compliance monitoring and reporting
- ◆ Supply of chemicals, consumables and spare parts
- ◆ Supply of hire plants for temporary plant outages, upgrades etc.



Closure

Post operational and rehabilitation services include:

- ◆ Contaminated wastewater treatment for compliant discharge
- ◆ Irrigation water for plant nurseries
- ◆ Decommissioning and demobilisation of plant and equipment
- ◆ Remediation and treatment of wastewater

Solutions

BRACKISH WATER REVERSE OSMOSIS

Treat brackish ground, surface or industrial water to achieve potable water quality. Standard process includes pre-treatment, RO desalination and a clean-in-place (CIP) system for membrane cleaning. Add additional treatment steps as required.



SEA WATER REVERSE OSMOSIS

Treat sea water or high salinity ground water to achieve potable water quality. Standard process includes pre-treatment, RO desalination, auto flushing and a clean-in-place (CIP) system for membrane cleaning. Add additional treatment steps as required.



DEMINERALISED WATER REVERSE OSMOSIS

Treat fresh water to achieve high purity demineralised water. Standard process includes pre-treatment, two-pass RO desalination, permeate polishing with ion exchange or continuous electro-deionisation (CEDI), and a clean-in-place (CIP) system for membrane cleaning. Add additional treatment steps as required.



WASTEWATER / SEWAGE MOVING BED BIOREACTOR

Treat sewage to achieve Class C effluent for reuse in "low risk" applications, or spray field disposal. Standard process includes screening, biological degradation, clarification and sterilisation. With the optional Class A module, reuse in "medium risk" applications is possible.



WASTEWATER / SEWAGE MEMBRANE BIOREACTOR

Treat sewage to achieve Class A+ effluent for reuse in "high risk" applications. Standard process includes screening, biological degradation, ultrafiltration and sterilisation. Add additional treatment steps, such as enhanced nutrient removal, as required.



WORKSHOPS / WASH BAYS OIL WATER SEPARATOR

Remove free floating hydrocarbons (diesel, hydraulic fluid, oil) and heavier solids from wastewater (prior to discharge) for any wash bay where hydrocarbons are present. Add additional treatment steps for reuse as required.



MULTIMEDIA FILTRATION

Treat ground, surface, storm and waste water with suspended solids to achieve potable or process water. Standard process includes auto-backwashing multimedia filtration. Add additional filtration media and other treatment steps, such as sterilisation or pH correction, as required.



ULTRAFILTRATION

Treat ground, surface, storm and waste water to achieve ultra-clear filtrate that is free of viruses and bacteria. Standard process includes pre-filtration, ultrafiltration and automated membrane cleaning systems. Add additional treatment steps as required.



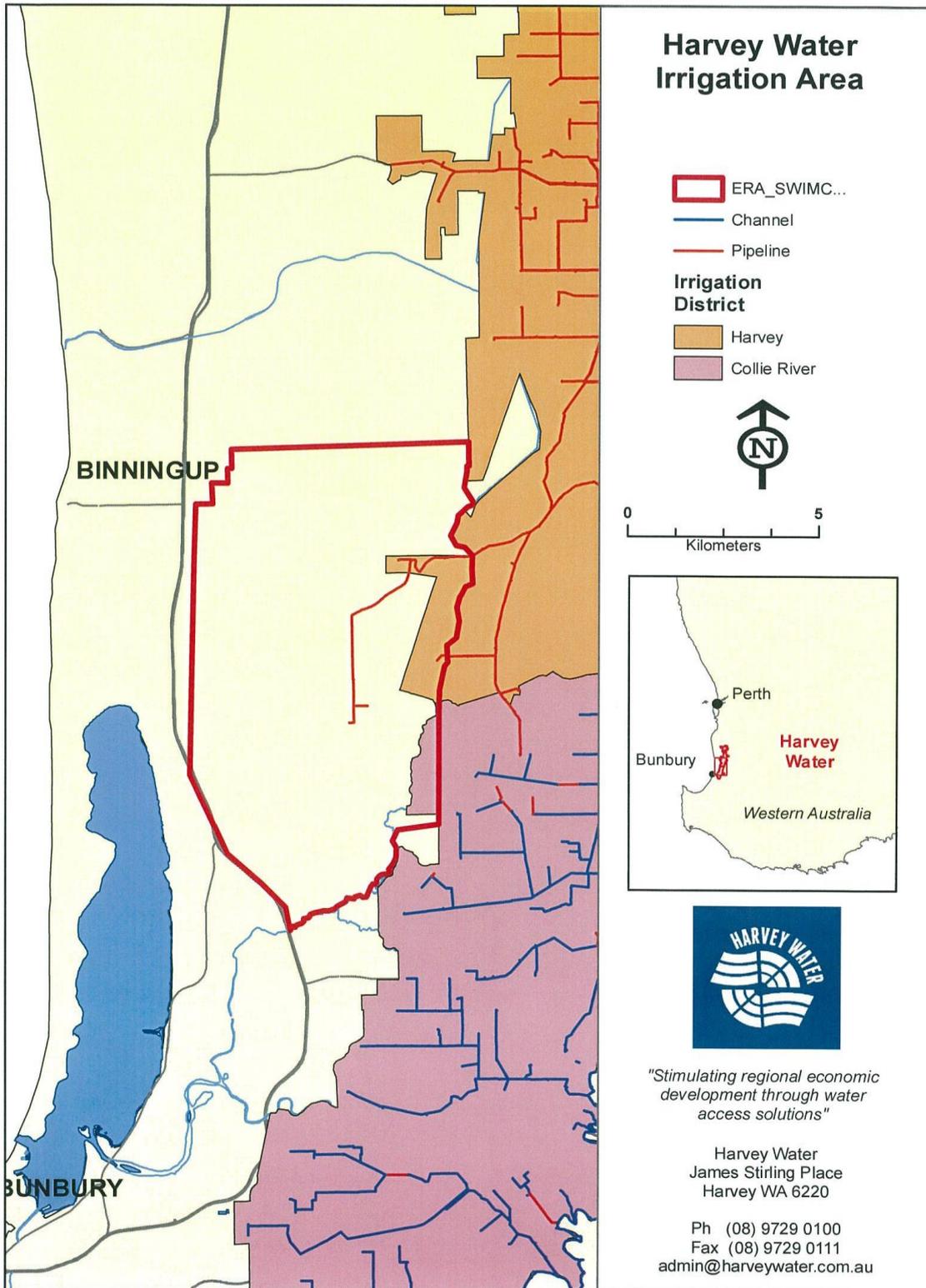
WATER STERILISATION

Automatically maintain the correct amount of free chlorine in a potable water storage tank, or use ultraviolet sterilisation to disinfect water, in accordance with Australian Drinking Water Guidelines.



AREA MAPS

Harvey Water application to amend license to incorporate potable water provision at industrial locations – proposed area map.



Harvey Water application to amend license to incorporate the complete Kemerton
 rda Area into the licensed area for the provision of non-potable water

