



WATER QUALITY REPORT 2020





Aqwest is the trading name of the Bunbury Water Corporation.

As a public water utility Aqwest is owned by the people of Western Australia.

As “Your Local Water Supplier”, we have been providing safe and affordable drinking water to the Bunbury community since 1906.



PURPOSE

Maximise value to the owner and customer by providing locally managed water services



VISION

To work within a changing environment as an independent, viable and competitive water utility



VALUES

Accountability
Integrity
Transparency
Respect



GUIDING PRINCIPLES

Committed to customer service excellence
Customer, community and commercially focused
Striving for innovative solutions
An employer of choice

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OVERVIEW

Aqwest is the trading name of the Bunbury Water Corporation, which commenced supplying drinking water to Bunbury and surrounding areas in 1906.

The primary strategic priority for the organisation, as detailed in its Statement of Corporate Intent, is to *"focus on our core business of providing sustainable high-quality water services"*.

We acknowledge the Department of Health as the regulator of drinking water quality in Western Australia. Aqwest is represented on the Advisory Committee for the Purity of Water (ACPOW) as convened by the Department of Health.

Aqwest has in place a highly experienced Water Quality Committee and appreciates the external expertise brought to this forum by the WA Department of Health, GHD and the City of Bunbury.

A Memorandum of Understanding (MoU) for water quality is in place between Aqwest and the Department of Health.

Pursuant to section 11 of the MoU between Aqwest and the Department of Health, Aqwest submits an annual water quality report detailing water quality performance and performance under the Memorandum.

The 2019/20 financial year has been a year like no other with the outbreak of COVID-19 requiring changes to the way we work, coinciding with the commissioning of our new Ngoora Moolinap Water Treatment facility.

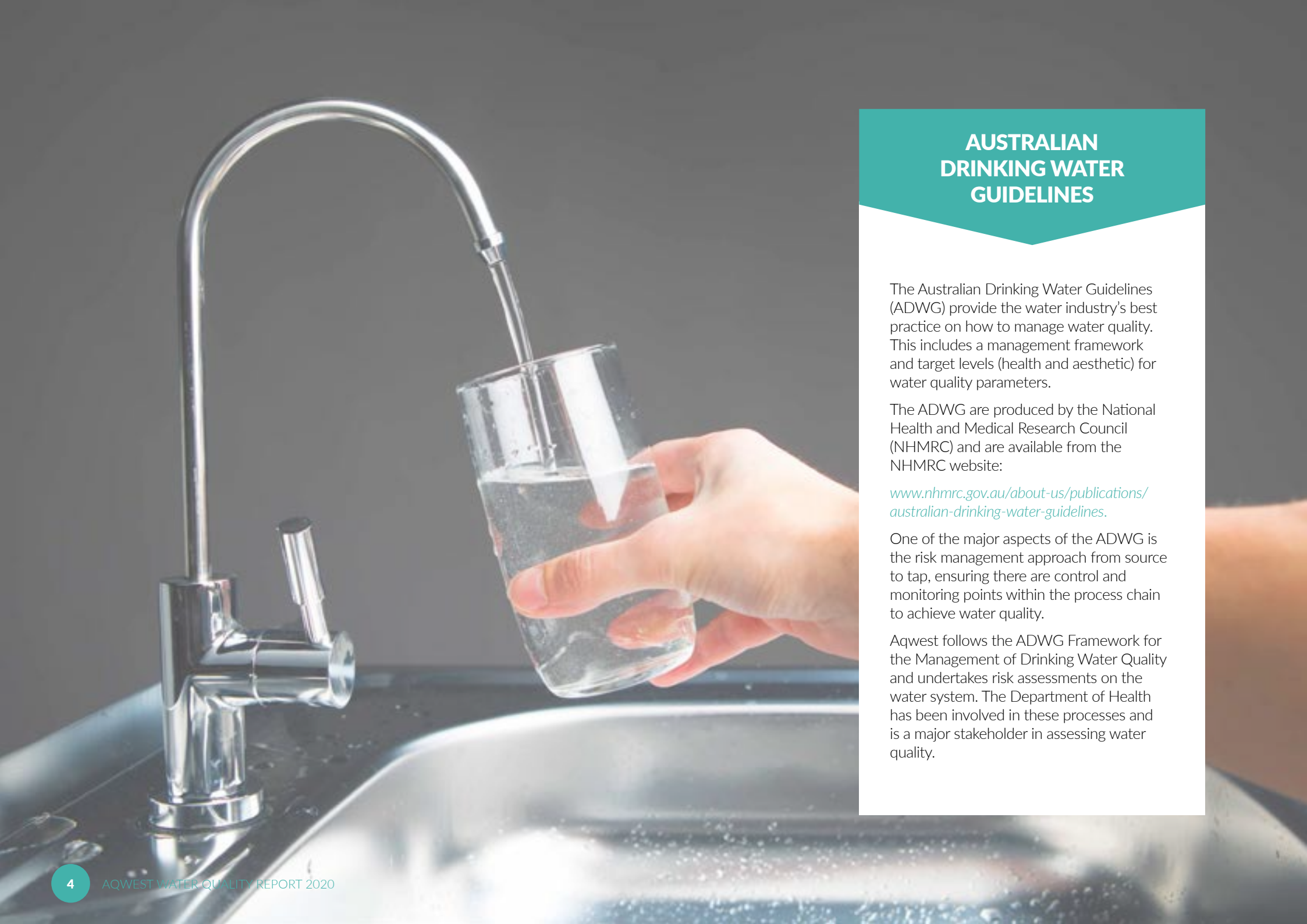
During this time, Aqwest has ensured the drinking water quality management plan continues to be implemented, water quality risks are appropriately assessed and that the organisation remains responsive to potential water quality events.

I would like to commend our employees for ensuring that Aqwest customers have access to high quality, safe drinking water. This is reflected in this year's water quality performance.

On behalf of Aqwest-Bunbury Water Corporation I have pleasure in submitting the 2020 Annual Water Quality Report for the period 1 July 2019 to 30 June 2020.

Mark Crabtree
General Manager Water Services
Aqwest





AUSTRALIAN DRINKING WATER GUIDELINES

The Australian Drinking Water Guidelines (ADWG) provide the water industry's best practice on how to manage water quality. This includes a management framework and target levels (health and aesthetic) for water quality parameters.

The ADWG are produced by the National Health and Medical Research Council (NHMRC) and are available from the NHMRC website:

www.nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines.

One of the major aspects of the ADWG is the risk management approach from source to tap, ensuring there are control and monitoring points within the process chain to achieve water quality.

Aqwest follows the ADWG Framework for the Management of Drinking Water Quality and undertakes risk assessments on the water system. The Department of Health has been involved in these processes and is a major stakeholder in assessing water quality.

The Department of Health has established a Memorandum of Understanding (MoU) with Aqwest, to foster a strong co-operative relationship to manage drinking water quality and protect public health.

The MoU, executed in 2011, was updated and replaced with a new MoU in December 2019.

This MoU is available from the Aqwest website:

www.aqwest.com.au/about-aqwest/water-industry-regulation

The MoU is structured to reflect the 12 guiding elements of the Framework for the Management of Drinking Water Quality contained within the Australian Drinking Water Guidelines.

The MoU covers items such as the agreed monitoring program, management practices and procedures, approved chemicals and material to be used within the drinking water system, data management and reporting mechanisms and the type of incident and emergency responses required.

Aqwest provides the Department of Health with quarterly drinking water quality reports, which outlines performance against the agreed requirements as specified in the MoU.

Aqwest recognises and supports the ongoing work of the Advisory Committee for the Purity of Water (ACPOW).

The Economic Regulation Authority (ERA) provides the licence for Aqwest to operate. The licence sets minimum service and performance standards and requires Aqwest to enter into a MoU with the Department of Health.

The Department of Water and Environmental Regulation (DWER) is responsible for protecting and managing the State's water resources, including managing the licensing system for water source allocation. Aqwest provides raw water information and data to DWER to ensure the long-term sustainability of water supply for the Greater Bunbury region.

STAKEHOLDERS

Aqwest has a number of key stakeholders including:

- The WA Department of Health
- The WA Department of Water and Environmental Regulation
- The WA Economic Regulation Authority
- The City of Bunbury





COMMITMENT



DRINKING WATER QUALITY POLICY

 Aqwest will provide drinking water that consistently meets consumer expectations and is in accordance with Australian Drinking Water Guidelines and relevant regulatory requirements.

Aqwest will:

- > Secure access to quality water resources
- > Adopt a multi-barrier approach to best practice water quality management
- > Keep abreast of emerging water treatment technology
- > Continue investment in water production, treatment and distribution infrastructure for the future
- > Draw on the combined water quality expertise of a range of stakeholders by maintaining a Water Quality Committee
- > Maintain a Memorandum of Understanding on water quality with the Department of Health WA as required by Aqwest's Operating Licence
- > Regularly monitor drinking water quality
- > Ensure relevant staff training is provided
- > Provide timely and relevant information on water quality
- > Promote confidence in the water supply and its management
- > Maintain appropriate contingency planning and incident response capability
- > Welcome consumer feedback on water quality and promptly address any concerns identified

Drinking Water Quality Policy

Aqwest is committed to providing sustainable, high quality drinking water that consistently meets or exceeds consumer expectations, the Australian Drinking Water Guidelines and regulatory requirements.

Key Corporate Water Quality Objectives

The Aqwest Statement of Corporate Intent identifies water quality as one of its key result areas.

Key Result Area: Customer Service
Commitment: Excellence
Objective: Provide water quality in accordance with the Australian Drinking Water Guidelines (ADWG)

No	Performance Indicator	Target
CS1	Microbiological compliance	100%
CS2	Water quality complaints (per year, per 1000 properties)	<2.0

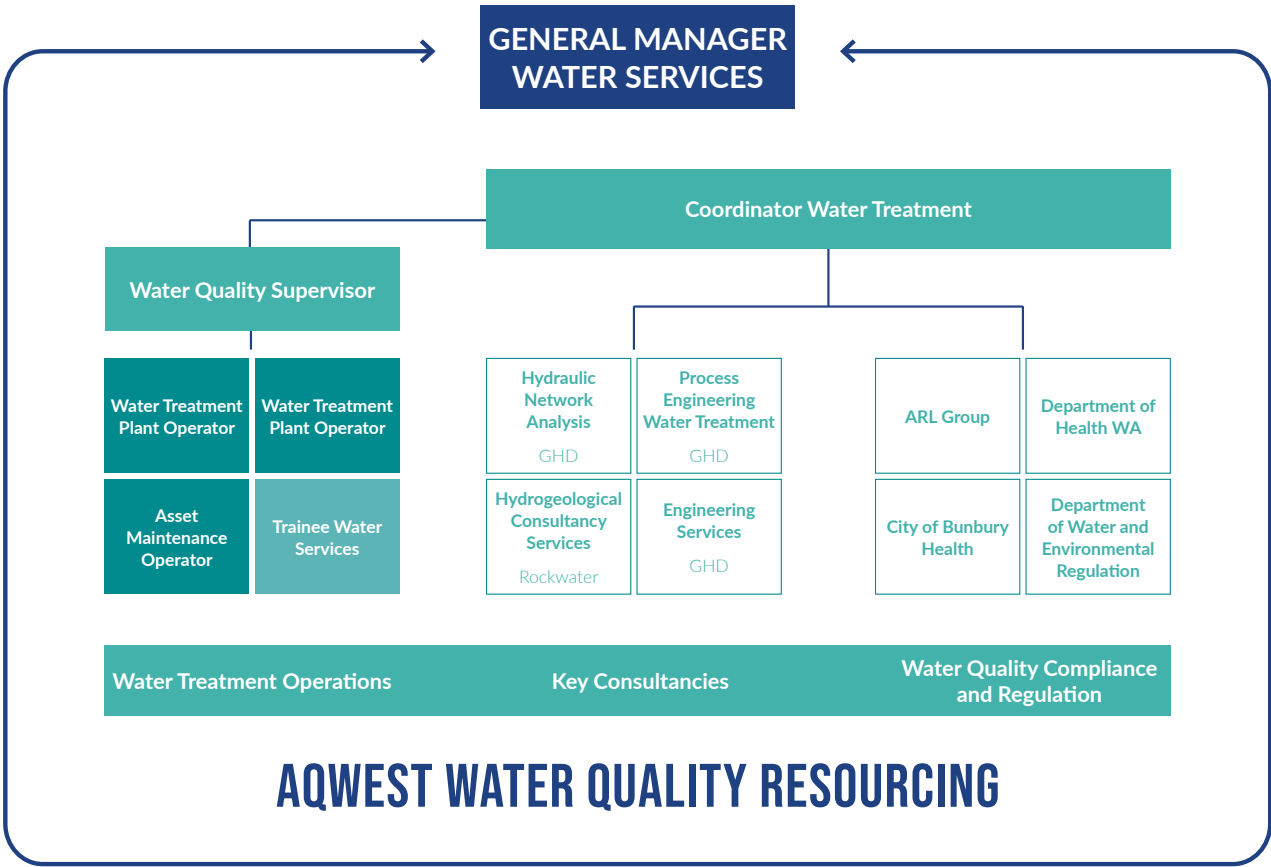
Aqwest Water Quality Resourcing

Aqwest has a dedicated team to operate and maintain its water supply systems. Effective water quality management is the core focus of the organisation and as a result, Aqwest has formed strong relationships with regulatory and compliance bodies and a number of external consultancies that provide technical assistance as required.

Aqwest holds quarterly Water Quality Committee meetings with key internal and external stakeholders and Aqwest is a member of the Advisory Committee for the Purity of Water (ACPOW).

More information on ACPOW can be found at the Department of Health website:

Advisory Committee for the Purity of Water
(health.wa.gov.au).



All employees are encouraged to increase their knowledge and skills and take part in professional development training.

Aqwest has a Memorandum of Understanding in place with the Water Corporation, which delivers training in accordance with the National Water Industry Training Package.

This arrangement has been highly successful with all operators either holding, or working towards a Certificate III in Water Industry Operations.

Aqwest embraces the employment of trainees as its contribution to developing people and communities.

Staff attendance (in person or virtually due to COVID-19 restrictions) at relevant training courses and conferences is also encouraged.





AQWEST WATER SYSTEM

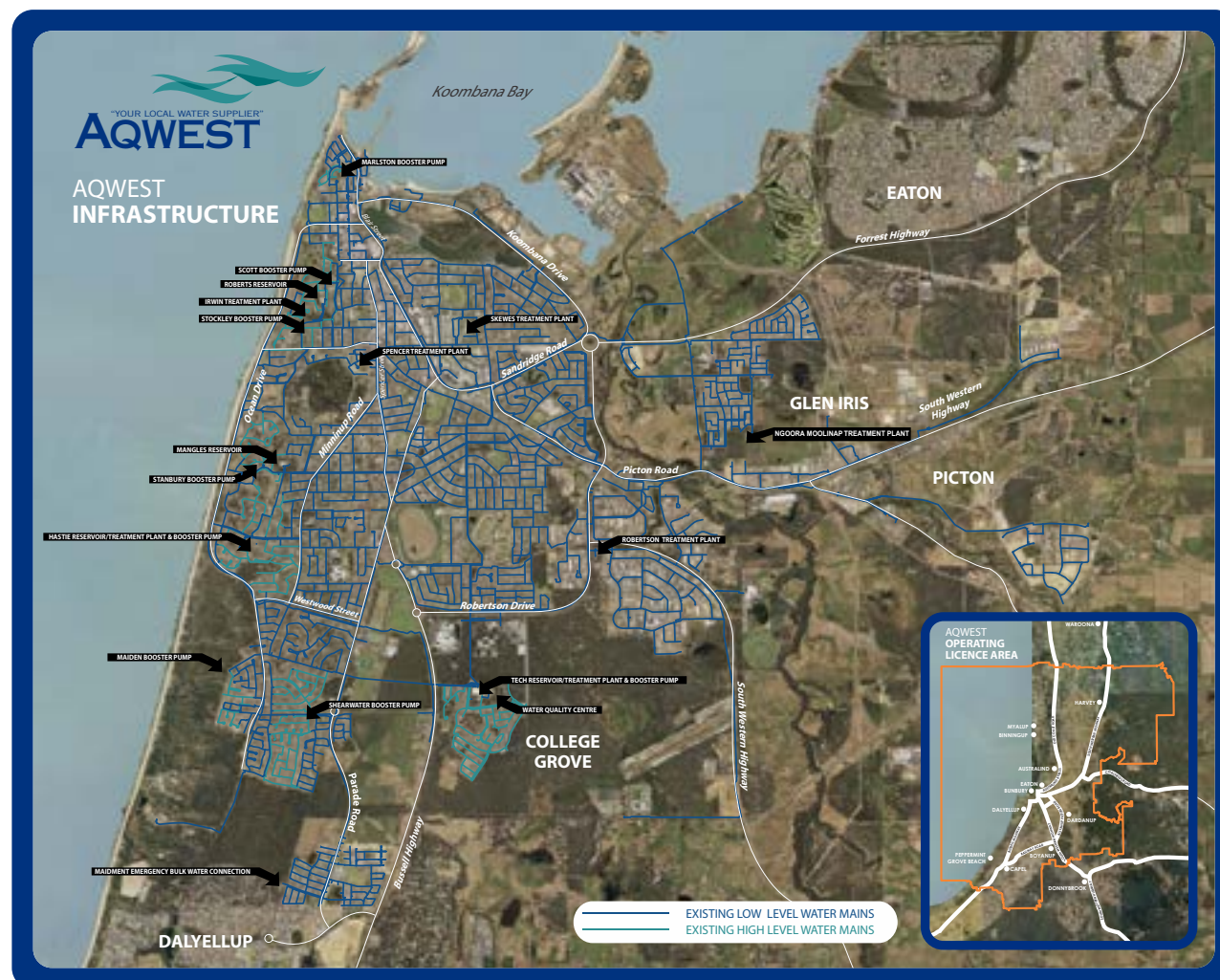
COMMUNITY

Aqwest services areas from Koombana Bay to Dalyellup and out to Picton East, which is approximately 17,539 properties.

This includes:

- Bunbury
- Carey Park
- College Grove
- Dalyellup East
- Davenport
- East Bunbury
- Glen Iris
- Picton
- Picton East
- South Bunbury
- Usher
- Withers

The service area is illustrated in the adjacent operating licence area plan.



Water Source

Aqwest sources water from the Yarragadee Aquifer within the Perth Basin.

There are three broad levels of groundwater systems within the southern Perth Basin. They are the superficial aquifer, Leederville Aquifer and Yarragadee Aquifer. The Lesueur Sandstone upon the Vasse Shelf is treated as a separate aquifer system which is connected to the Yarragadee Aquifer.

The Bunbury Basalt is considered an almost total barrier to groundwater flow, with the Yarragadee Aquifer recharged directly by rainfall where the Bunbury Basalt outcrops.

Aqwest has an extraction licence issued by the Department of Water and Environmental Regulation to extract water from the Yarragadee Aquifer and has 13 production bores. The table below is an outline of the amount of water Aqwest has produced over the past eight years. Water production for 2019/20 was 6,459,834 kL.

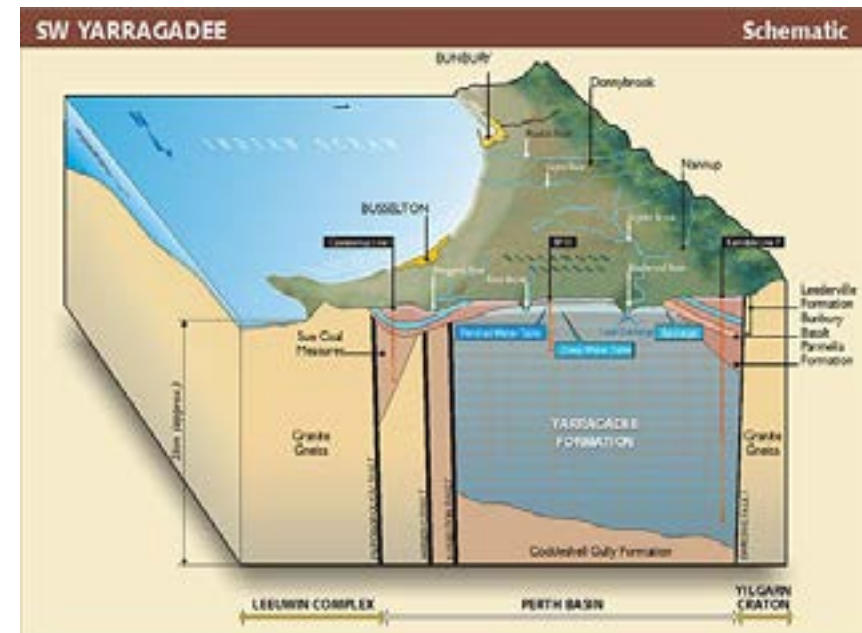
The Department of Water and Environmental Regulation released a Source Protection Plan for the Bunbury Water Reserve in 2008, which includes eight bores:

- Hastie 1 and 2
- Irwin 1 and 2
- Spencer 1 and 2
- Tech 1 and 5

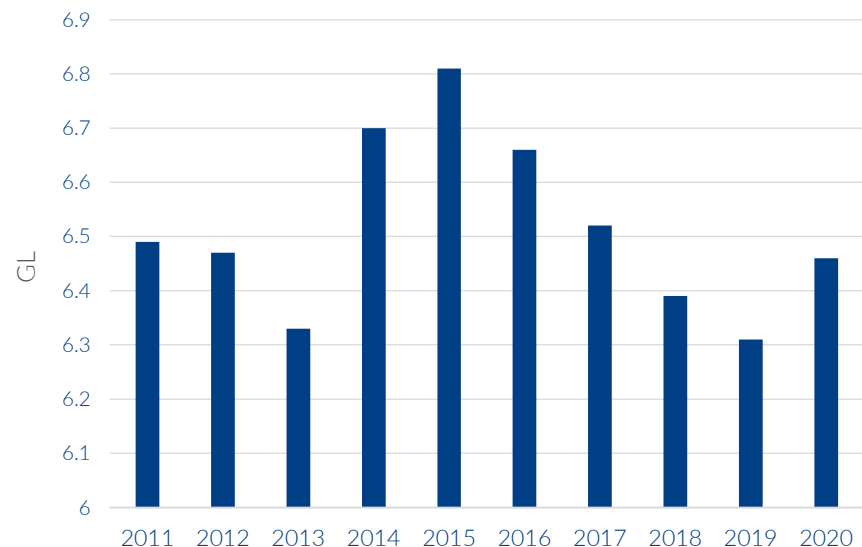
The Department of Water and Environmental Regulation released another Source Protection Plan for the Bunbury East Water Reserve in 2019, which includes two bores:

- Glen Iris 1
- Robertson 3

These Plans provide a risk assessment of current land use and actions to secure and protect sources for the future. Hydrogeological consultant, Rockwater, is regularly engaged to review the Source Protection Plans along with current groundwater results and extraction to ensure future operational strategies are sustainable.



ANNUAL PRODUCTION (GL)

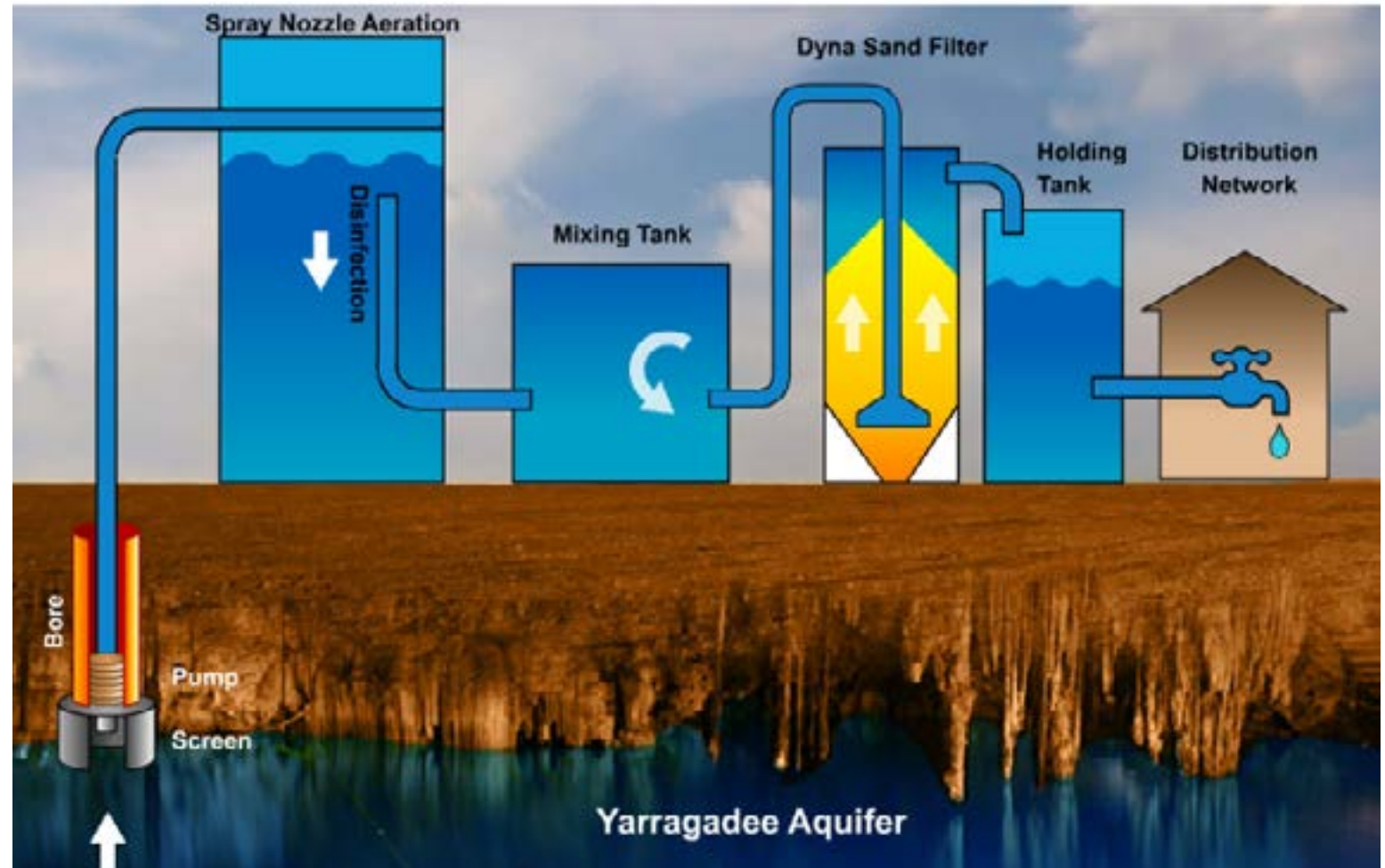


Aqwest has seven treatment plants which are designed to treat water from the Yarragadee Aquifer and focus on removing iron and manganese.

- Hastie WTP
- Tech WTP
- Irwin WTP
- Robertson WTP
- Spencer WTP
- Skewes WTP
- Ngoora Moolinap WTP (Glen Iris)

The treatment plants have a number of key treatment steps which treat the raw water from the Yarragadee Aquifer to produce safe and high-quality water. As part of the water treatment process, a number of physical and chemical treatment steps are carried out. At each of these steps, Aqwest complies with the requirements for chemicals in contact with or added to drinking water as required by the Department of Health.

Aqwest's water treatment steps are described in more detail on the next page.



Aqwest Water Treatment Process

PRODUCTION BORES		Bores are drilled through the Bunbury basalt layer to the Yarragadee Aquifer
AERATION		Water is sprayed to aerate and oxidise iron (turning it from soluble to particulate iron) and helps to increase the pH levels
OXIDATION		After aeration, chlorine is added to the water, which oxidises manganese and any remaining iron so it can be filtered out
FILTRATION		Filtration is used to capture the solid particles of iron and manganese. This reduces the turbidity and colour in the water
DISINFECTION		The amount of chlorine added in the oxidation phase is enough to maintain the disinfection levels required to preserve microbiological safety

Aqwest's distribution network delivers water from the treatment plants to the Bunbury community. The distribution system has the following major components:

Estimated population (2016 Census)	32,856
Total number of connections	17,539
Total length of mains	393 km
Area covered	100 km ²
Number of reservoirs	4
Number of booster stations	7
Number of reticulation/distribution Water Quality Zones	1
Chlorine Residual target	0.4 – 0.6 mg/L

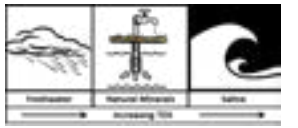


Key Water Quality Parameters

The water that Aqwest sources from the Yarragadee Aquifer has a number of unique characteristics. The source water is higher in iron and manganese and also has low pH levels. The groundwater can also have high levels of Total Dissolved Solids (which is typical of groundwater supplies).

While the Bunbury Basalt protects the Yarragadee Aquifer, there is a risk of microbiological contamination after the water is taken from the Aquifer and within the reticulation system. Because the water is warm, there is a risk of Amoeba, such as thermophilic *Naegleria*. As a result, chlorine is used

to disinfect the water and to provide ongoing disinfection protection within the reticulation system.

Iron		Iron in water does not present a health hazard, but it may cause taste, staining and accumulation problems. A high concentration of iron (> 0.3 mg/L) in treated water gives water an undesirable rust brown appearance, causing reddish-brown staining of laundry, porcelain, dishes, utensils and glassware.	The ADWG recommend that based on aesthetic considerations, the concentration of iron should not exceed 0.3 mg/L.
Manganese		Manganese acts in a similar way to iron and can cause brownish-black stains, as well as taste and accumulation problems. Manganese is not considered a health concern unless the concentration exceeds 0.5 mg/L.	The ADWG recommend that based on aesthetic considerations, the levels of manganese should not exceed 0.1 mg/L.
Colour and Turbidity		Turbidity is a measurement of the light scattering property of water. Turbidity is caused by the presence of fine suspended matter such as clay, silt, colloidal particles and the degree of scattering is dependent on the type, amount and composition of the suspended matter. Turbidity of 5 NTU would appear slightly muddy or milky in a glass. Crystal clear water usually has a turbidity of less than 1 NTU. Colour is measured in Hazen Units (HU). As a guide, tea has a colour of about 2500 HU, and a colour of 15 HU can be noticed in a glass of water. In bore water (such as in Bunbury) red rusty coloured water is often caused by the oxidation of iron and dark blackish water is often due to manganese.	The ADWG recommend that turbidity should not exceed 5 NTU for aesthetic considerations, however, if disinfection is required then a turbidity of less than 1 NTU is desirable at the point of disinfection. The ADWG value for colour is based on the colour that is noticeable in a glass. This is generally accepted as 15 HU.
pH		pH is the measure of the hydrogen ion concentration of water. pH is not measured in any units. Very high and low pH values in the water can cause skin and eye irritations and corrosion issues within water assets.	The suggested aesthetic pH target from the ADWG is 6.5 to 8.5.
Total Dissolved Solids		Total Dissolved Solids (TDS) consist of inorganic salts such as sodium, potassium, calcium, magnesium, chloride, sulphate, bicarbonate, carbonate, silica, organic matter, fluoride, manganese, nitrate and phosphate. Groundwater often has higher levels of TDS and hardness due to dissolved minerals compared to surface waters.	Treated water quality containing TDS levels of below 600 mg/L is classified as good.

Fluoride		Fluoride is a mineral that is found naturally in some water sources including groundwater. Typical naturally occurring fluoride levels in Aqwest bores is between 0.2 – 0.4 mg/L. Aqwest does not add fluoride to the water.	The ADWG recommend that based on health considerations, the levels of fluoride are not to exceed 1.5 mg/L.
Microbiological Pathogens and Disinfection		The most common and widespread health risk associated with drinking water is contamination by microorganisms. Organisms associated with the gut of humans and mammals cause the usual waterborne diseases (from faecal contamination). Tests are undertaken for <i>Escherichia coli</i> (<i>E.Coli</i>) to indicate the presence of faecal contamination. As Bunbury water is consistently above 24°C, there is also a risk of the Amoeba <i>Naegleria fowleri</i> and therefore, tests are undertaken for this. <i>Naegleria fowleri</i> is an environmental pathogen, which naturally lives in warm water. If the organism is in the water and the water passes up the nose, such as from diving into water, it can travel to the brain causing Primary Amoebic Meningoencephalitis (PAM). PAM is a rare but fatal condition where the organism attacks brain matter. To ensure microbiological safety, Aqwest uses chlorine to disinfect water. Chlorine is monitored weekly to ensure water within the reticulation system maintains disinfection protection. As an additional measure, a Heterotrophic Plate Count (HPC) is also undertaken, which is an indicative test of the level of microbiological growth in the reticulation system. This is an indicator test only and does not have health related targets; however, Aqwest responds to any level of HPC with remedial action within the reticulation system.	The ADWG state that thermotolerant coliforms/<i>E.Coli</i> should not be present in a minimum 100 mL sample. A presence suggests a potentially serious fault in the integrity of the water supply system. The Department of Health has notification protocols in place regarding <i>Naegleria</i>. Chlorine levels have health and aesthetic targets. The health target is that chlorine should be less than 5 mg/L, and for aesthetic consideration. Aqwest aims for chlorine residual at the customer's tap to be no more than 0.6 mg/L.
Radiological Health		There are natural levels of radiation within the environment, and groundwater sources such as the Yarragadee Aquifer can have higher background levels than that of surface water systems. Radiological levels are not highly variable over time and as a result, testing is undertaken periodically. Initial testing is undertaken for gross alpha and gross beta radioactivity, following which Radium-226 and Radium-228 can be determined if levels exceed 0.5 Bq/L.	Total estimated dose per year from all radionuclides in drinking water, excluding the dose from potassium-40 should not exceed 1.0 mSv. Guideline compliance for radiological quality in drinking water should be assessed by screening for gross alpha and gross beta activity concentrations. The recommended screening levels for both alpha and beta activity is 0.5 Bq/L after subtracting the contribution from potassium-40.
Per-Fluoroalkyl & Poly-Fluoroalkyl (PFAS & PFOS)		Per and Poly-Fluoroalkyl substances (PFAS) are manufactured substances that do not occur naturally in the environment. These substances show potential bioaccumulation and biomagnification and are proven to be toxic in animal studies. Due to the water and heat resistant nature, PFAS has been used in a range of consumer products such as non-stick cookware or fire extinguishers. This substance has been flagged by the Department of Health for monitoring within the Aqwest licensed operating area this year, with levels well below the guideline. PFAS and PFOS monitoring is now part of Aqwest's water quality sampling regime.	ADWG recommend exposure to the "sum of PFAS and PFOS" to remain below 0.07µg/L for health-related reasons. No Aesthetic guidelines have been set for PFAS & PFOS.



WATER SYSTEMS ANALYSIS AND MANAGEMENT

Multi-barrier Approach

One of the major aspects of the Australian Drinking Water Guidelines (ADWG) is the risk management approach from source to tap, ensuring there are control and monitoring points within the process chain to achieve water quality.

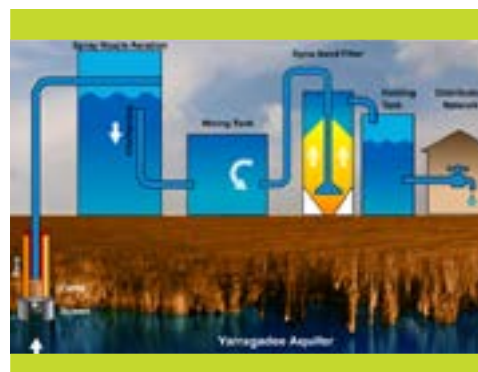
The Guidelines state that a multi-barrier approach is the most effective for safe, high quality drinking water.

Aqwest has undertaken a hazard analysis and critical control point analysis to ensure there are a number of effective controls and barriers within the treatment process. It has been identified that there are four major barriers to ensure water quality:



Protected Groundwater

The Yarragadee Aquifer is considered a confined aquifer due to the Bunbury Basalt layer. This provides the water source with a level of protection from contamination.



Treatment

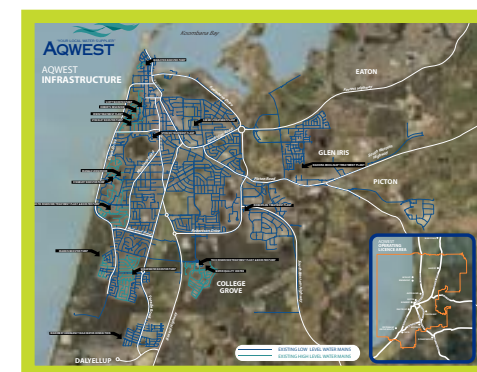
Aqwest treatment plants are monitored with online instrumentation and operational checks to ensure water quality.



Disinfection Residual

Adding chlorine provides disinfection residual within the reticulation system. Chlorine levels are monitored weekly to ensure the barrier is being maintained after water leaves the treatment plants.

Chlorine is approved for use in drinking water supplies and is sourced from an ISO9001 accredited manufacturer.



Reticulation System

The Aqwest team ensures the reticulation system is well maintained to preserve the integrity of the delivery system.

Incident Response

The identification, evaluation, assessment and treatment of risks are the prime functions of Aqwest's risk management program. This program has been developed using the Risk Management and Business Continuity Management Guidelines set by the RiskCover Division of the Insurance Commission of Western Australia and ISO31000-2009.

Aqwest maintains a comprehensive Risk Management System and a Business Continuity Plan that are both regularly reviewed by RiskCover and are internally reviewed and tested at regular intervals.

In the event of a water quality incident, staff activate the Water Quality Incident Plan, which is a comprehensive guide to handling water quality events and links to the binding protocols of the Aqwest – Department of Health MoU.

Under Section 9.6 of the MoU, Aqwest is required to test the Water Quality Incident Response Plan annually.

The 2018/19 test was carried out on the 7th of June 2019 at the Aqwest Water Quality Centre in College Grove. The test was used as an opportunity to discuss Aqwest's Water Quality Management Framework including the Drinking Water Quality Management Plan and Water Quality Risk Assessment. An overview of Aqwest's Business Continuity Plan and Memorandum of Understanding with the Department of Health was also presented to all involved.

The 2019/20 test was scheduled for June 2020. Due to COVID-19, the test was postponed as restrictions and new protocols were put in place to encourage social distancing. The testing of the Water Quality Incident Response Plan for 2019/20 has been rescheduled to take place in 2021.

This year, in accordance with Aqwest's Water Quality Incident Response Plan and the MoU with the Department of Health, there was one notifiable event to report relating to the detection of one thermotolerant coliform from the Glen Iris tank.

A review of operational activity found that no events occurred that were likely to have caused the detection. Routine diving inspections were undertaken and no signs of faecal matter or vermin were reported. A re-sample was taken with the tank offline and the test provided a negative result. Routine water quality monitoring was resumed with an on-going surveillance of operating activities.



Aqwest has a comprehensive monitoring program, which was developed in conjunction with the Department of Health. The results of this program are summarised in more detail in a later section of this report.

The results have been broken into four key groups:

MICROBIOLOGICAL AND DISINFECTION HEALTH	Includes <i>Escherichia coli</i> and Thermophilic <i>Naegleria</i> results, as well as chlorine levels and the levels of disinfection by-products, Trihalomethanes (THMs)
CHEMICAL HEALTH	Includes a large range of parameters with a health-related guideline value in ADWG, which have also been grouped into inorganic and organic
RADIOLOGICAL HEALTH	Initial screening for gross alpha and gross beta activity concentrations is undertaken annually. As per the ADWG, if required, Radium-226 and Radium-228 concentrations will also be determined
AESTHETIC RESULTS	Are non-health-related water quality parameters, which Aqwest aims to achieve. There are a number of characteristics that are related to water chemistry which are termed physical or chemical characteristics and have ADWG aesthetic targets

Note: Aqwest has a comprehensive pesticide monitoring program which is carried out annually. There were no positive detections during 2019/20.

Water Quality Results 2019/20

Microbiological and Disinfection Health Results

Aqwest collected 260 samples from water treatment plants/reservoirs (treated) and 312 from the reticulation system during the reporting period and recorded 100 per cent compliance for *Escherichia coli* and zero detections for thermophilic *Naegleria*.

A detection of one Thermotolerant Coliform was recorded from the Glen Iris Tank. Following an immediate retest and investigation of the site, it was found that the tank had been emptied for the commissioning of the new Ngoora Moolinap Water Treatment Plant and no water had been delivered from that site for several days. An early detection progress report from the follow up sample provided a result of <1. The Department of Health was notified of this result.

A further 666 samples were taken for chlorine levels in the reticulation system and these tests were all within the ADWG health target for chlorine.

As Aqwest sources water from the Yarragadee Aquifer, it has naturally low levels of organics and as a result has a low risk of forming disinfection by-products (THMs). As a result of this low risk, testing for THMs occurs on a quarterly basis. Testing showed 100 per cent compliance with the ADWG.

Chemical Health Results

There are a large number of chemical parameters that have health-related guideline values in the Australian Drinking Water Guidelines (ADWG). These include Organic and Inorganic tests completed on the treated water infrastructure (clear water tanks) and on the reticulation system.

The detailed report provided in the following section gives more information on the individual parameters and the frequency of testing. Aqwest achieved 100 per cent compliance with all the health-related requirements set out in ADWG for chemical parameters.

Radiological Health Results

Radiological testing is carried out in accordance with parameters and frequencies based on the ADWG and in consultation with the Department of Health.

Five samples were taken during the 2019/20 reporting period, all of which were compliant with the ADWG screening value of 0.5 Bq/L. Hastie Water Treatment Plant was not sampled due to a transition into redundancy and not being in an active state of ready.

Radiological testing is completed once a year on the water leaving the water treatment plant (treated).

Aesthetic Results

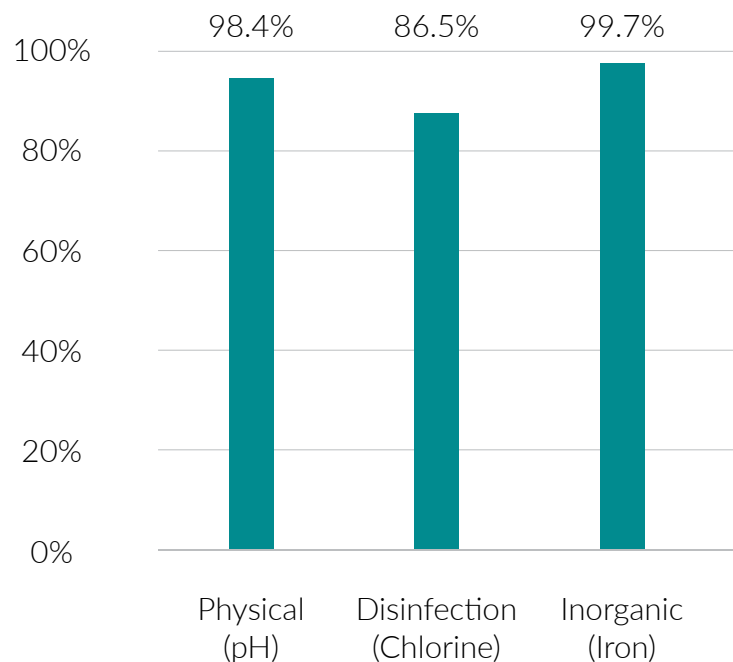
There are also a large number of parameters with aesthetic guideline values in the ADWG. These include seven parameters tested in the treated water infrastructure (clear water tanks) following the treatment plants and 17 parameters tested in the reticulation system. The detailed report provided in the following section gives more information on the individual parameters and the frequency of testing.

These guideline values for aesthetic parameters are not health-related targets. They are targets that Aqwest aims to achieve to provide a high level of water quality, beyond just meeting the primary safety targets.

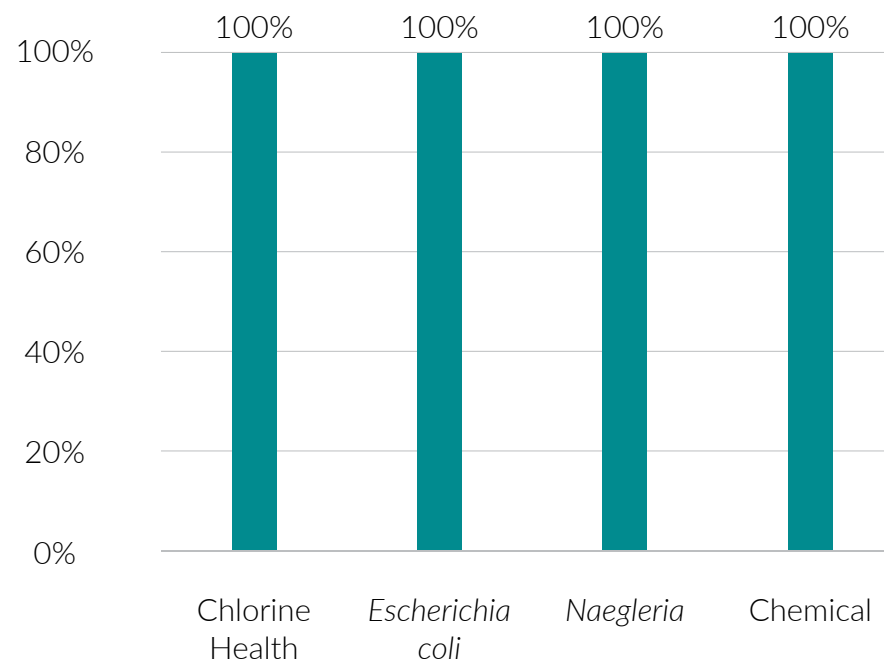
During the 2019/20 reporting period, 90 samples did not meet the aesthetic targets for chlorine.

As noted in ADWG, 0.6mg/L is the odour threshold of chlorine residual for most people. Due to operational reasons, in some instances it was considered necessary to exceed the aesthetic guideline to maintain an effective disinfection residual throughout the network.

2019/20 RETICULATION AESTHETIC TARGET (FOR PARAMETERS THAT DID NOT MEET 100% TARGET)



2019/20 RETICULATION HEALTH COMPLIANCE



AESTHETIC RETICULATION Note: those that did not meet 100% target

Parameter	Unit	ADWG	No. of Samples	No not meeting Aesthetic target	% meeting ADWG Aesthetic Target	Maximum Result
Physical (pH)	-	6.5 - 8.5	621	10	98.4%	6.2 - 8.1
Disinfection (Chlorine)	mg/L	0 - 0.6	666	90	86.5%	0.70
Inorganic (Iron)	mg/L	0 - 0.3	336	1	99.7%	0.51



Overall satisfaction

Aqwest delivers services with a clear customer focus and a major objective to achieve a minimum of 85 per cent approval rating.

In the latest Customer Satisfaction Survey, an overall satisfaction rating of 85.3 per cent was achieved. The survey provided valuable feedback on Aqwest's performance. While the majority of issues have been previously identified in prior surveys, the onus remains with Aqwest to continually improve.

Quality

Overall, 84.8 per cent of respondents agreed that *Aqwest supplies water of an acceptable quality*.

Out of the respondents who disagreed, the primary concern was the taste/odour of the water.

Drinkability

Overall, 84.3 per cent of respondents thought the water supplied by Aqwest was safe. The main concern of those who disagreed were the chemicals in the water.

The water produced and supplied by Aqwest meets all Department of Health requirements. Taste and odour are a very individual aesthetic quality and some individuals can be more sensitive than others, however, customers can be assured that the water supplied is of a high standard and is safe to drink.

Customer Complaints

Aqwest is committed to resolving complaints fairly, efficiently and in a courteous and effective manner. Feedback is valued and is assessed as part of a continuous improvement process to enhance products and customer service.

Under Aqwest's Water Services Operating Licence, customer complaints must be received, recorded, and where possible, resolved within 15 business days. Customers are kept fully informed on the progress of their complaint until a solution is found.

The Water Services Code of Conduct 2013 requires Aqwest's Complaints Management Procedure to conform to *Australian Standard Customer Satisfaction - Guidelines for Complaints Handling in Organisations AS ISO 10002-2006*.

Staff are trained to handle customer complaints and where necessary, liaise with officers who are authorised to settle complaints.

If a customer is not satisfied with Aqwest's response to a complaint they can refer the matter to the Energy and Water Ombudsman for further investigation. Additional information is available from Aqwest's website: www.aqwest.com.au.

The following performance indicators were set by Aqwest for complaints in 2019/20 (per 1000 properties, per year). The performance indicators are monitored at monthly Board meetings.

Indicator	2019/20 target	2019/20 actual	Status
CS2. Water quality complaints (per 1,000 properties)	<2.00	0.17	
CS3. Water service complaints (per 1,000 properties) (a)	<0.80	1.19	
CS4. Billing or accounts complaints (per 1,000 properties)	<2.00	1.82	
CS6. Percentage of customer complaints resolved in less than 15 business Days (%) (b)	100.00	94.00	

(a) Twenty-one (21) water service complaints were received. Target would have been met at fourteen (14) complaints.

(b) Four (4) out of 63 complaints were not resolved within 15 business days.



Infrastructure Investment Objectives

Ngoora Moolinap Water Treatment Plant (Glen Iris)

A future water treatment and storage facility was identified at Glen Iris as part of Aqwest's future planning to secure sustainable, high quality water for the Bunbury community.

Moving water production inland ensures the water source will not be affected by community development or seawater intrusion. The Glen Iris location was chosen based on hydrogeological surveys and preliminary testing which indicated the excellent quality of raw water.

The new water treatment plant is designed with a maximum output capacity of 12 megalitres per day using conventional treatment process methods via aeration, oxidation, filtration and disinfection.

Commissioning started in early 2020 and the plant will produce a high quality, sustainable water supply for the Greater Bunbury region into the future.

Reservoir Integrity Analysis

Aqwest operates four large reservoirs with a combined storage capacity of 115 million litres, including the Tech Reservoir which holds up to 76 million litres of water. This is more than three days' supply for Bunbury and is Aqwest's largest drinking water storage facility.

The Hastie Reservoir was the last of the four large reservoirs to undergo integrity analysis during 2018/19. In late 2019, Aqwest procured the services of a local diving contractor to undertake routine "wet inspections" of all four storage reservoirs along with the Ngoora Moolinap Water Treatment Plant storage tank to monitor the integrity of the assets.

There is a rolling schedule of dives at the storage sites to provide Aqwest staff with information about the overall condition of the assets, which informs the maintenance required.

Mains and Valve Replacement

Aqwest continued its ongoing maintenance program to replace water mains and valves. These assets are prioritised and replaced on a rolling program to ensure Aqwest's long term capability strategies can be met.

The water supply network consists of approximately 390 kilometres of large water mains and about 17,500 water service connections.

In 2019/20, the East Bunbury area was identified as a high-risk zone after consecutive critical failures which has resulted in mains and infrastructure upgrades.

Water Quality Management

Aqwest carried out a major review of its Water Quality Management Plan and Risk Assessment during 2019/20, in accordance with the requirements of the Memorandum of Understanding with the Western Australia Department of Health. This management plan is stringently adhered to through various sampling regimes.

In 2019/20 Aqwest partnered with Do Diligence to develop and implement a new, highly interactive water quality management system to assist in the scheduling and analysis of the sampling program.

Aqwest has an engineering alliance with GHD which includes a water quality and process aspect which provides support for water quality related incidents and unusual sample test results. Additionally, the support includes reviews of Aqwest's water quality risk profile and management plans.





WATER QUALITY REPORTS

CALCULATION ASSUMPTIONS

The following is an explanation of the calculations presented in this report:

1. Datasets presented and used for analysis in the report are from the Aqwest monitoring program which have been classed as assessable.
2. Treated water are results from samples taken from the water treatment plant delivery line or the water treatment plant clear water tanks or reservoirs.
3. Reticulation are results from samples taken from the Aqwest reticulation system from official sample points.
4. Percentages are rounded to whole numbers in this report. Values less than 0.5 rounded down and values equal or greater than 0.5 rounded up.

UNITS AND ABBREVIATIONS

The following is an explanation of the units and abbreviations presented in this report:

Units	
mg/L	Milligrams per Litre
µg/L	Micrograms per Litre
CFU/100 mL	Colony Forming Units per 100 millilitres
org/250 mL	Organisms per 250 millilitres
HU	Hazen Units
NTU	Nephelometric Turbidity Units
Bq/L	Becquerels per Litre

TEST/PARAMETER ABBREVIATIONS

Comp	Compliance
No	Number
%	Percent
Max	Maximum Value
THMs	Trihalomethanes
TDS	Total Dissolved Solids
ND	Not Detected

Water Quality Reports 2019/20 - Aesthetic

DRINKING WATER QUALITY REPORT - AESTHETIC From 1/07/2019 to 30/06/2020 - Reticulation

CHARACTERISTIC	Units	ADWG (Aesthetic Target)	Max	No not meeting Aesthetic target	No of Samples	% meeting Aesthetic target
Physical						
Hardness	mg/L	0 - 200	124	0	24	100
pH	-	6.5 - 8.5	6.2 - 8.1	10	621	98.4
TDS	mg/L	0 - 600	390	0	24	100
Turbidity	NTU	0 - 5	0.40	0	24	100
Disinfection						
Chlorine	mg/L	0 - 0.6	0.70	90	666	86.5
Organic						
Toluene	µg/L	0 - 25	<0.5	0	24	100
Xylene	µg/L	0 - 20	<3	0	24	100
Inorganic						
Aluminium	mg/L	0 - 0.2	0.03	0	24	100
Ammonia (as NH ₃)	mg/L	0 - 0.5	0.04	0	24	100
Chloride	mg/L	0 - 250	160	0	24	100
Copper	mg/L	0 - 1	0.09	0	24	100
Hydrogen Sulphide	mg/L	0 - 0.05	<0.05	0	24	100
Iron*	mg/L	0 - 0.3	0.51	1	336	99.7
Manganese	mg/L	0 - 0.1	0.088	0	335	100
Sodium	mg/L	0 - 180	77	0	24	100
Sulphate	mg/L	0 - 250	22	0	24	100
Zinc	mg/L	0 - 3	0.025	0	24	100

*Note: The Iron aesthetic failure was an operational test, a flush and retest of the sample point was completed with the result below guideline limit.

DRINKING WATER QUALITY REPORT - AESTHETIC From 1/07/2019 to 30/06/2020 - Treated Water

CHARACTERISTIC	Units	ADWG (Aesthetic Target)	Max	No not meeting Aesthetic target	No of Samples	% meeting Aesthetic target
Physical						
Hardness	mg/L	0 - 200	115	0	83	100
pH	-	6.5 - 8.5	6.3 - 8.6	14	567	97.5
TDS	mg/L	0 - 600	383	0	86	100
Turbidity	NTU	0 - 5	0.65	0	305	100
Disinfection						
Chlorine	mg/L	0 - 0.6	0.86	138	637	78.1
Inorganic						
Iron	mg/L	0 - 0.3	0.23	0	81	100
Manganese	mg/L	0 - 0.1	0.018	0	81	100

Water Quality Reports 2019/20 - Health

DRINKING WATER QUALITY REPORT - HEALTH From 1/07/2019 to 30/06/2020 - Reticulation

CHARACTERISTIC	Units	ADWG (Health)	Max	No of Non-Compliant Health	No of Samples	% Compliant Health
Physical						
Carbon Tetrachloride	µg/L	0 - 3	<0.5	0	24	100
Disinfection						
Chlorine	mg/L	0 - 5	0.70	0	666	100
Organic						
Acrylamide	mg/L	0 - 0.2	<0.1	0	24	100
Epichlorohydrin	mg/L	0 - 0.5	<0.5	0	24	100
Toluene	µg/L	0 - 800	<0.5	0	24	100
Xylene	µg/L	0 - 600	<3	0	24	100
Inorganic						
Antimony	mg/L	0 - 0.003	<0.001	0	24	100
Asbestos	MFL	No Guideline	<0.2	0	24	100
Cadmium	mg/L	0 - 0.002	<0.0001	0	24	100
Chromium	mg/L	0 - 0.05	<0.001	0	24	100
Copper	mg/L	0 - 2	0.09	0	24	100
Cyanide	mg/L	0 - 0.08	<0.005	0	24	100
Fluoride	mg/L	0 - 1.5	0.4	0	24	100
Lead	mg/L	0 - 0.01	0.002	0	24	100
Manganese	mg/L	0 - 0.5	0.088	0	335	100
Nickel	mg/L	0 - 0.02	0.002	0	24	100
Nitrate	mg/L	0 - 50	0.07	0	24	100
Nitrite	mg/L	0 - 3	<0.01	0	24	100
Microbiological						
<i>Escherichia coli</i>	CFU/100mL	0 - 1	<1	0	312	100
Thermotolerant Coliforms	CFU/100mL	0 - 1	<1	0	312	100
Thermophilic <i>Naegleria</i>	/250mL	0 - 1	ND	0	312	100
Disinfection Byproducts						
Total Trihalomethanes	mg/L	0 - 0.25	0.017	0	24	100

DRINKING WATER QUALITY REPORT - HEALTH From 1/07/2019 to 30/06/2020 - Treated Water

CHARACTERISTIC	Units	ADWG (Health)	Max	No of Non-Compliant Health	No of Samples	% Compliant Health
Disinfection						
Chlorine	mg/L	0 - 5	0.86	0	637	100
Inorganic						
Manganese	mg/L	0 - 0.5	0.02	0	81	100
Microbiological						
<i>Escherichia coli</i>	CFU/100mL	0 - 1	<1	0	260	100
Thermotolerant Coliforms	CFU/100mL	0 - 1	1	1	260	99.6
Thermophilic <i>Naegleria</i>	/250mL	0 - 1	ND	0	260	100
Radiological						
Gross Alpha	Bq/L	0 - 0.5	0.18	0	5	100
Gross Beta	Bq/L	0 - 0.5	0.14	0	5	100

Water Quality Reports 2019/20 - Health

DRINKING WATER QUALITY REPORT - HEALTH (PESTICIDES) From 1/07/2019 To 30/06/2020 - Raw Water (Bore)

CHARACTERISTIC	Units	ADWG (Health)	Max	No of Non-Compliant Health	No of Samples	% Compliant Health
Pesticides						
2-4-5-T	µg/L	100	<0.1	0	10	100
2-4-D	µg/L	30	<0.1	0	10	100
a-Chlordane	µg/L	2	<0.002	0	10	100
Aldrin	µg/L	0.3	<0.001	0	10	100
Ametryn	µg/L	70	<0.5	0	10	100
Amitrole	µg/L	9	<1	0	10	100
Atrazine	µg/L	20	<0.1	0	10	100
Bioresmethrin	µg/L	100	<5	0	10	100
Bromacil	µg/L	400	<2	0	10	100
Bromophos Ethyl	µg/L	10	<0.005	0	10	100
Bromoxynil	µg/L	10	<1	0	10	100
Carbaryl	µg/L	30	<4	0	10	100
Chlorothalonil	µg/L	50	<0.01	0	10	100
Chlorpyrifos	µg/L	10	<0.005	0	10	100
Clopyralid	µg/L	2000	<0.4	0	10	100
Cyfluthrin	µg/L	0.05	<0.05	0	10	100
Deltamethrin	µg/L	40	<1	0	10	100
Diazinon	µg/L	4	<0.01	0	10	100
Dieldrin	µg/L	0.3	<0.001	0	10	100
Dimethoate	µg/L	7	<0.1	0	10	100
Diuron	µg/L	20	<0.5	0	10	100
Endosulfan	µg/L	20	<0.001	0	10	100
Ethion	µg/L	4	<0.01	0	10	100
Fenamiphos*	µg/L	0.5	<1	0	10	100
Fenitrothion	µg/L	7	<0.01	0	10	100

DRINKING WATER QUALITY REPORT - HEALTH (PESTICIDES) From 1/07/2019 To 30/06/2020 - Raw Water (Bore) - continued.

CHARACTERISTIC	Units	ADWG (Health)	Max	No of Non-Compliant Health	No of Samples	% Compliant Health
Pesticides						
Fenvalerate	µg/L	60	<0.05	0	10	100
Fipronil	µg/L	0.7	<0.02	0	10	100
Fluazifop	µg/L	No Guideline	<0.4	0	10	100
Glyphosate	µg/L	1000	<1	0	10	100
Heptachlor	µg/L	0.3	<0.001	0	10	100
Hexazinone	µg/L	400	<0.4	0	10	100
Imazapyr	µg/L	9000	<1	0	10	100
Lindane	µg/L	10	<0.001	0	10	100
Malathion	µg/L	70	<0.01	0	10	100
MCPA	µg/L	40	<0.1	0	10	100
Methoxychlor	µg/L	300	<0.02	0	10	100
Molinate	µg/L	4	<0.1	0	10	100
Omethoate	µg/L	1	<0.1	0	10	100
Paraquat	µg/L	20	<1	0	10	100
Permethrin	µg/L	200	<0.05	0	10	100
Picloram	µg/L	300	<0.2	0	10	100
Propiconazole	µg/L	100	<0.4	0	10	100
Propyzamide	µg/L	70	<0.1	0	10	100
Simazine	µg/L	500	<0.1	0	10	100
Triclopyr	µg/L	20	<0.1	0	10	100

*Note: The limit of detection for Fenamiphos is 1 µg/L. Test method is under review aiming to test to, or below, the ADWG Health limit of 0.5 µg/L.





5 MacKinnon Way
Bunbury WA 6230
P: (08) 9780 9500
E: aqwest@aqwest.com.au
www.aqwest.com.au

OUR PURPOSE: Maximise value to the owner and customer by providing locally managed water services
OUR VISION: To work within a changing environment as an independent, viable and competitive water utility