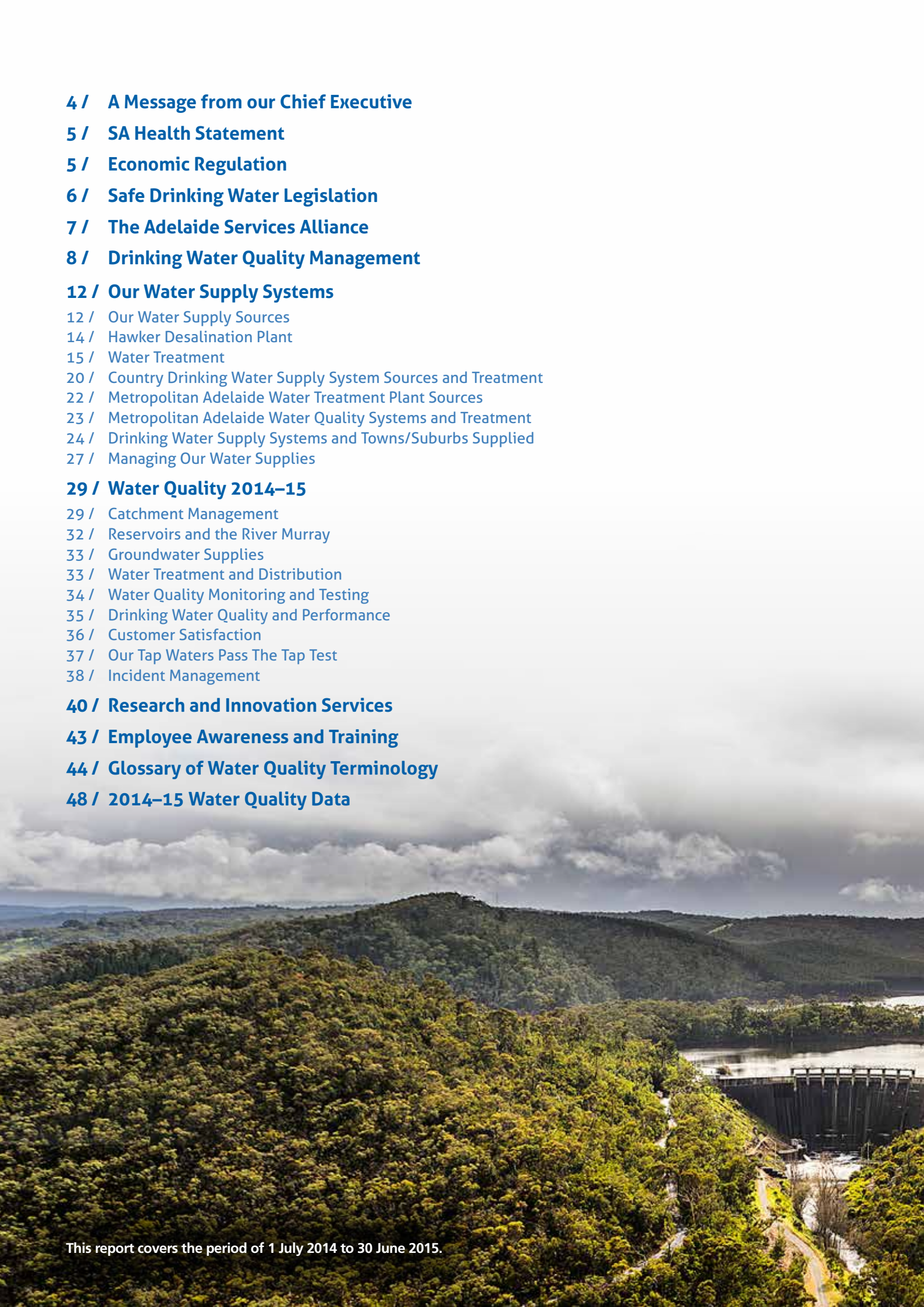
SA Water

Drinking Water Quality Report

2014-15

Government of South Australia

SA Water



This report covers the period of 1 July 2014 to 30 June 2015.

2014-15 Highlights

Raw water sources
% of total water supplied

River Murray: 50%

Surface water: 34%

Seawater: 10%

Groundwater: 6%

Incident management

Achieved a significant decrease in Priority Type 1 incident notifications compared with previous years.

Incident response index exceeded the 84% target by 13%, achieving **97%.**

For details see pages 38-39.

Number of routine water quality tests carried out

293 415
(total)

50 720
(metropolitan Adelaide)

242 695
(country)

Total number of routine samples collected

(Includes samples for health-related compliance)

83 139 (total)

11 698 (metropolitan Adelaide)

71 441 (country)

Total water usage
(raw water for treatment)

218 979 ML

Population served

1 200 000 in metropolitan Adelaide through **9 220 km** of water mains.

432 000 in country areas through **17 600 km** of water mains.

Drinking water quality & performance

43 762 of the routine samples collected from our drinking water supplies throughout South Australia were used to determine health-related compliance.

Achieved **99.85%** compliance with the *Australian Drinking Water Guidelines* (ADWG 2011) health-related parameters in metropolitan Adelaide and **99.78%** in country areas.

E. coli compliance at customer taps was **100%** in metropolitan Adelaide and **100%** in country areas.

A Message from our Chief Executive

John Ringham
Chief Executive

The Corporation has seen improved performance across its operations in the past year. SA Water managed to meet almost all of its service standards relating to water quality, service delivery and environmental compliance.

During 2014–15, SA Water achieved a number of outcomes in relation to maintaining high water quality standards across our systems. A Critical Control Point identification process was formalised and the first *Safe Drinking Water Act 2011* audit was successfully undertaken. A *Drinking Water Quality Management Improvement Plan* was also developed that consolidates and prioritises capital and operational water quality improvement actions.

Plant optimisations occurred at Hope Valley, Happy Valley and Anstey Hill Water Treatment Plants that aimed to enable each plant to operate in accordance with best practice. A new 440 kilolitre per day reverse osmosis desalination plant began delivering improved quality water to the township of Hawker.

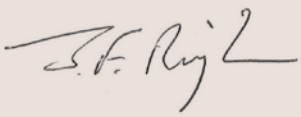
The Little Para and Happy Valley Reservoirs were fitted with floating pontoons containing automated vertical water quality profiling systems. The systems provide information at set intervals throughout the profile of the water column. Real-time data for temperature, turbidity, total cyanobacteria, chlorophyll, pH, conductivity and dissolved oxygen is made available to water quality managers via an online web-based interface. Work is now focused on maximising the benefit of the additional information.

SA Water, through its Research and Innovation Services (R&IS) group, has a national and international reputation for high quality water research and innovation. R&IS expanded its research to improve our understanding of customer preferences and perception of the taste of our drinking water by co-managing a program of community engagement surveys. This data will guide future planning and service delivery when selecting the most cost-effective treatment options for enhancing customer satisfaction.

Our continued drive to improve our operating efficiency and harness technology was recognised by us receiving the Water Initiative Award at the Global Water Summit in Athens, Greece in April 2015. This award recognised our partnership with MWH Global, Optimatics and C3 Global to develop modelling and analytical tools to allow more efficient operation of Adelaide's water distribution network.

We have been working throughout the year to finalise our Regulatory Business Proposal (RBP) to the Essential Services Commission of South Australia (ESCOSA) for the period 2016-20, with a major focus on affordability, provision of reliable services, and improving the customer experience. The RBP 2016 was submitted to ESCOSA for review on 31 August.

I hope you enjoy reading the report and welcome your feedback. Please email customerservice@sawater.com.au or phone us on 1300 650 950.



John Ringham
Chief Executive

SA Health Statement

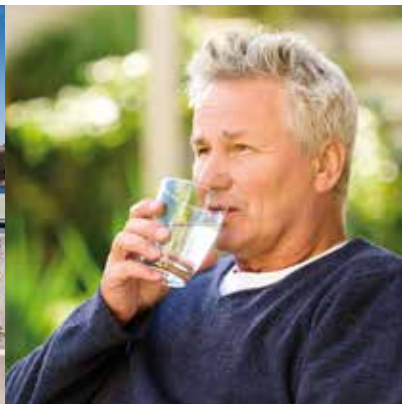
Drinking water provided to the public by SA Water in the 2014–15 reporting period was safe. Operation of the interagency *Water/Wastewater Incident Notification and Communication Protocol* was maintained successfully throughout the period. None of the incidents reported were considered to represent a risk to public health.

The number of incidents reported by SA Water during the 2014–15 financial year was consistent with 2013–14 but significantly less than previous years. Strategic upgrades to filters and filter control systems at a number of water treatment plants and optimisation of monitoring has continued to reduce the number of notified incidents. Water quality incidents were notified by SA Water in a timely and appropriate manner and appropriate preventive measures were implemented.

SA Water collected a total of 43 762 samples in the reporting period from drinking water supplies to test for health-related compliance. No *E. coli* were detected in samples collected from metropolitan Adelaide and country areas (100% compliance with the *Australian Drinking Water Guidelines* (ADWG 2011). Compliance with the ADWG for health-related parameters was 99.85% for metropolitan systems and 99.78% for country areas.

SA Water has met all obligations under the *Safe Drinking Water Act 2011* and Safe Drinking Water Regulations 2012.



Economic Regulation

Economic regulation of SA Water commenced on 1 January 2013 in line with the requirements of the *Water Industry Act*. The role of economic regulation is to ensure water and wastewater customers receive value for money for the services SA Water delivers.

The Essential Services Commission of South Australia (ESCOSA) is the independent regulator responsible for protecting the long term interests of water and wastewater customers with respect to price and service.

During 2014–15 SA Water has performed satisfactorily under the economic regulatory regime, working hard to deliver against its service standards and the requirements of the framework.

On 31 August 2015 SA Water submitted its Regulatory Business Proposal (RBP 2016) setting out its proposed levels of service and expenditure for the second regulatory period (commencing 1 July 2016).

ESCOSA will review SA Water's proposal over the coming months and make a determination.

SA Water engaged with customers and key stakeholders whilst preparing RBP 2016 and has worked hard to produce a proposal that (if accepted by ESCOSA) will result in price reductions for its customers.

Safe Drinking Water Legislation

South Australia's *Safe Drinking Water Act 2011* commenced on 1 March 2013. The Audit and Inspection Schedule for this reporting period commenced on 1 July 2014. SA Water successfully completed the first round of yearly audits and inspections and met all legislative requirements.

The Act provides the regulatory framework for drinking water providers in South Australia and is administered primarily by SA Health with assistance from local government. Provisions in the Act are underpinned by the ADWG (2011) and stipulate requirements for drinking water providers, including:

- Registration of drinking water providers with SA Health
- Development and implementation of risk management plans (RMPs)
- Establishment of approved drinking water quality monitoring programs
- Notification of incidents or non-compliance
- Audits and inspections to determine compliance with the Act
- Use of NATA accredited laboratories for sample testing
- Reporting of water quality test results to SA Health and providing consumers with drinking water quality information.

SA Water is registered as a drinking water provider and has approved monitoring programs and an incident notification protocol. SA Water is the only South Australian drinking water provider in the "Complex Drinking Supplies – Drinking Water providers >50,000" group and is required to provide regular reports of water quality testing. SA Water provided water quality testing reports for metropolitan and country water supplies on a monthly basis with results showing a high level of compliance. The first round of yearly audits to be completed under the Act commenced on 1 July 2014. A number of representative SA Water drinking water supplies were audited during the reporting period to satisfy the requirement of the Act. SA Water met the legislative requirement for all metropolitan, country and remote community supplies that it operates.

At SA Water, our approach to managing drinking water quality through our Drinking Water Quality Management System (DWQMS) is based on the ADWG (2011) *Framework for Management of Drinking Water Quality*. This means that SA Water already satisfies most of the requirements outlined in the *Safe Drinking Water Act 2011*. Details of key components are outlined in this report, which in itself addresses one of the requirements of the Act – to report results and provide consumers with drinking water quality information.

Further information on the *Safe Drinking Water Act 2011* can be found at: *www.sahealth.sa.gov.au/safedrinkingwateract*

The Adelaide Services Alliance

The Adelaide Services Alliance is an agreement between SA Water and Allwater to operate and maintain metropolitan Adelaide's water, wastewater and recycled water systems.

Allwater is a joint venture between Suez and Transfield Services, each bringing a wide range of water expertise to the partnership.

The Alliance agreement has an extensive set of internal performance measures to track progress and drive continuous improvement across the full range of delivered services.

Delivering high quality water to Adelaide's customers is of paramount importance to all members of the Alliance. SA Water conducts regular testing throughout the network to ensure the water produced at the Allwater-operated treatment plants meets the required standards. SA Water collected 11 698 samples from the metropolitan Adelaide drinking water supply systems last financial year to determine health related compliance. Compliance was achieved in 99.85% of tests – a high performance result.

In total, more than 50 000 tests were conducted on metropolitan Adelaide's drinking water during 2014–15. A 100% *E. Coli* compliance was achieved in all tests.

Allwater worked closely with SA Water and the operators of the Adelaide Desalination Plant to ensure desalinated water was effectively blended with Happy Valley water and distributed throughout the network via the North South Interconnection System.

A new tank cleaning team was established by Allwater to increase the frequency of tank cleaning and improve the cleaning process.

SA Water funded a number of capital projects at Allwater-operated metropolitan water treatment plants in 2014–15, including filter and control system upgrades to improve water quality at the Barossa and Myponga water treatment plants and relining and covering treated water storage facilities at Happy Valley Water Treatment Plant.

Drinking Water Quality Management

SA Water manages drinking water quality from catchment to tap in line with our Drinking Water Quality Management System to ensure a consistent and reliable supply of high quality, safe drinking water to our customers.

This management system is based on the *Framework for Management of Drinking Water Quality* outlined in the ADWG (2011) that is endorsed by the National Health and Medical Research Council (NHMRC). The framework provides benchmark water quality guidelines and values for the design of a structured and systematic approach to drinking water quality management, ensuring a safe and reliable water supply.

There are 12 elements within the framework which are considered best practice:

1	Commitment to drinking water quality management
2	Assessment of the drinking water supply system
3	Preventive measures for drinking water quality management
4	Operational procedures and process control
5	Verification of drinking water quality
6	Management of incidents and emergencies
7	Employee awareness and training
8	Community involvement and awareness
9	Research and development
10	Documentation and reporting
11	Evaluation and audit
12	Review and continual improvement.

SA Water's Drinking Water Quality Policy and Small Communities Water Supply Management Policy underpin the corporation's commitment to deliver ongoing drinking water quality and improvement.

To regularly assess our improvements against implementation of the 12 elements of the ADWG framework, SA Water uses 'AQUALITY', which is a measurement and evaluation tool developed by the Water Services Association of Australia (WSAA) as a key performance indicator. For the 2014–15 period, a target of 93.5% framework implementation was set and an implementation rate of 93.6% (93.2% in 2013–14) was achieved, as outlined on page nine.

During 2014–15, SA Water achieved the following outcomes in relation to maintaining high water quality standards across our systems:

- Reviewed roles and responsibility matrices for SA Water's Water Quality Processes to align with the current organisational structure
- Formalised a Critical Control Point identification process
- Improved water treatment plant and distribution system water quality performance reports
- Successfully undertook the first South Australian *Safe Drinking Water Act 2011* audit
- Completed an 'AQUALITY' moderating audit as an independent external benchmark of SA Water's internal 'AQUALITY' assessments
- Developed a Drinking Water Quality Management Improvement Plan that consolidates and prioritises capital and operational water quality improvement actions, endorsed by senior management.

Future strategies that are proposed for the 2015–16 period include:

- Continued use of the 'AQUALITY' tool to determine strategies that will enable us to meet ADWG framework implementation targets
- Continued roll-out of the framework across systems managed by our contractors to ensure continuous improvement of documentation, processes, procedures and practices in order to maintain high water quality standards
- Developing enhanced strategies and initiatives, in line with the *Safe Drinking Water Act 2011*, to meet regulatory requirements including risk processes, system auditing and reporting. These strategies will cover SA Water operations, its contractors and alliance partner Allwater.

The 12 elements included in the *Framework for Management of Drinking Water Quality* (ADWG 2011)

1 Commitment to drinking water quality management

System Analysis & Management

2 Assessment of the drinking water supply system

3 Preventive measures for drinking water quality management

4 Operational procedures and process control

5 Verification of drinking water quality

6 Management of incidents and emergencies

Supporting Requirements

7 Employee awareness and training

8 Community involvement and awareness

9 Research and development

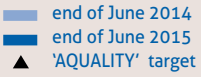
10 Documentation and reporting

Review

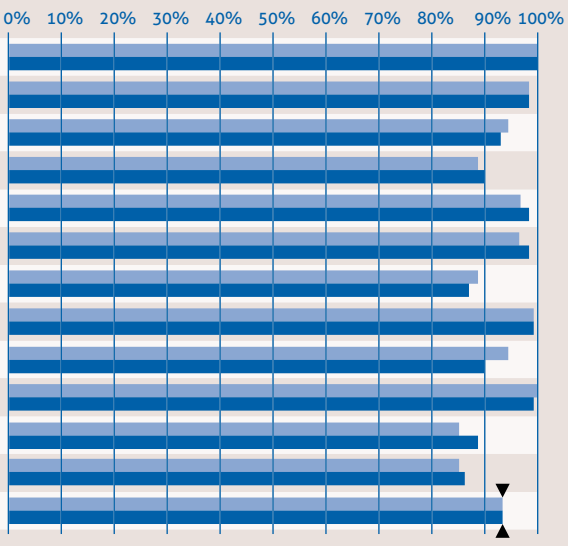
11 Evaluation and audit

12 Review and continual improvement

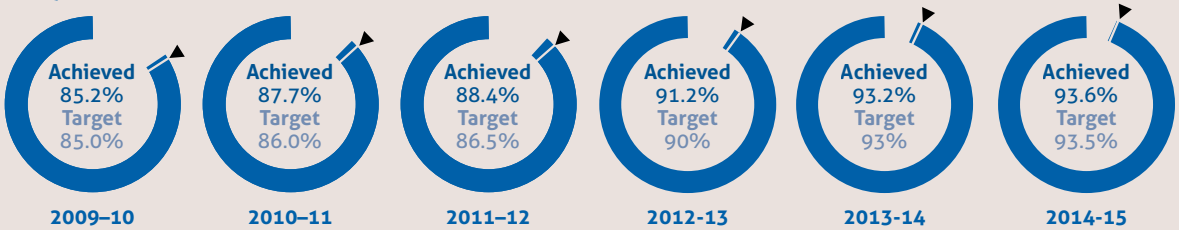
SA Water's progress in implementing the *Framework for Management of Drinking Water Quality* (ADWG 2011)



ADWG Framework elements	
1	Commitment to drinking water quality management
2	Assessment of the drinking water supply system
3	Preventive measures for drinking water quality management
4	Operational procedures and process control
5	Verification of drinking water quality
6	Management of incidents and emergencies
7	Employee awareness and training
8	Community involvement and awareness
9	Research and development
10	Documentation and record-keeping
11	Evaluation and audit
12	Review and continual improvement
OVERALL 'AQUALITY' SCORE	



'AQUALITY' score across all elements



Examples of how SA Water is applying the *Framework for Management of Drinking Water Quality* (ADWG 2011)

1 /	Commitment to drinking water quality management	• A Drinking Water Quality Policy, endorsed by the Chief Executive, in place and has been communicated to employees. • Responsibility matrices that define roles, accountabilities and responsibilities for quality processes are implemented. Regulatory compliance is identified and the requirements documented through a compliance manual.
2 /	Assessment of the drinking water supply system	• A robust system risk assessment process developed. • Web-based Water Quality Safety Plans documenting key characteristics of the water supply system are reviewed and updated regularly. • Tools have been developed to identify trends and relationships in water quality data that may indicate potential water quality risks.
3 /	Preventive measures for drinking water quality management	• Water quality hazard identification, risk assessment, and risk mitigation are centrally managed and details accessible by all SA Water staff and select contractors. • Critical control points are managed and corresponding corrective actions are in place should deviations to target limit occur, thus ensuring water supply systems are operated to a high standard.
4 /	Operational procedures and process control	• Water quality procedures are in place to support reliable achievement of the target criteria, critical limits and water quality objectives. • Supervisory Control and Data Acquisition (SCADA) online monitoring is in place. SCADA allows SA Water to continuously remotely monitor and control water and wastewater assets and infrastructure. • Processes are in place to ensure procurement of water infrastructure is compliant with Australian Standard 4020.
5 /	Verification of drinking water quality	• SA Water's Water Quality Monitoring Handbook outlines our philosophy for water quality monitoring in all systems and is based on the ADWG. Deviations from the ADWG are documented in the handbook and have been approved by SA Health. • Regular and event based monitoring of water quality is conducted and samples are analysed by a National Association of Testing Authorities (NATA) accredited laboratory. • Processes are in place to capture customer feedback, including reports developed to analyse feedback to assist in determining appropriate responses.
6 /	Management of incidents and emergencies	• SA Health interagency Water/Wastewater Incident Notification and Communication Protocol is in place and updated regularly. From this an internal Incident and Emergency Management Protocol has been developed which integrates the SA Health and SA Water requirements for incident and emergency response. • A web-based Incident Management System is in place to record and generate notification of water quality incidents to a defined list of key SA Water response personnel. • An Emergency Management Manual and emergency management plans are in place and regularly updated.

7 /	Employee awareness and training	• Water quality training courses have been developed in accordance with the National Australian Qualifications Framework (AQF) standard and presented to targeted staff covering topics such as water quality sampling, water quality testing, disinfection for operators and demonstration of knowledge of ADWG risk management principles. • Ongoing training program for water quality awareness, root cause analysis, incident management, corporate employee induction, odours in water supplies and introduction to recycled water reviewed and delivered to relevant staff.
8 /	Community involvement and awareness	• A dedicated community involvement team ensures customer issues and concerns are assessed and responded to according to policy requirements. • A Customer Research and Engagement initiative is in place to better understand customers and their experiences with SA Water and our Alliance partners. • SA Water conducts a Community Investment Program that delivers regular education sessions on water quality and treatment to schools and community groups. • SA Water's website (www.sawater.com.au) provides general information on key water quality parameters (including hardness data for dishwasher settings) and water quality performance data for all SA Water drinking water supply systems (for individual suburbs and townships).
9 /	Research and development	• The Research and Innovation Services (R&IS) group undertakes research to generate new knowledge, provide solutions to operational challenges and implement effective technologies to mitigate risk and improve operational performance. • Research includes collaborations with other water utilities, universities and external research providers, both locally, nationally and internationally to ensure the delivery of optimum water quality solutions.
10 /	Documentation and reporting	• The DWQMS has been developed to authorise, control and review water quality related documentation in accordance with ADWG requirements. • SA Water's annual Drinking Water Quality Report details performance against the ADWG and outlines SA Water's commitment to delivering safe, reliable and high quality drinking water to South Australian communities. An overview of key performance targets, achievements and areas identified for improvement is included in the report.
11	Evaluation and audit	• Long-term trends for key water quality parameters are reviewed to help determine priorities for improving drinking water quality. • Internal auditing is programmed across the water supply systems to assess the performance of drinking water quality management and against the ADWG framework requirements. • External audits are undertaken by an independent third party auditor (RABQSA certified). SA Water's contractors and alliance partners are also audited as part of this process.
12	Review and continual improvement	• The DWQMS as a whole, including the policy, objectives and performance measures, is reviewed at a senior management level and by relevant operations business units to ensure its ongoing relevance and effectiveness in addressing any water quality issues. • The 'AQUALITY' tool (WSAA developed) is used to report progress on the implementation of the DWQMS. • Actions arising from audits, root cause analysis outcomes from incidents and agreed improvements are tracked and managed through a web based compliance system.

Our Water Supply Systems

SA Water has an extensive network of drinking water supply systems across South Australia, with more than 26 800 km of water mains.

We provide high quality drinking water to an estimated population of 1.2 million across metropolitan Adelaide through 9 220 km of water mains, and to an estimated population of 432 000 through 17 600 km of water mains across regional communities.

Our Water Supply Sources

In South Australia, raw water for treatment is collected from four distinctly different sources: reservoirs, the River Murray, groundwater and the ocean.

Reservoirs

Treatment plants supplying the Adelaide metropolitan area are supplied with raw water collected from the Mount Lofty Ranges catchment and supplemented with water from the River Murray. Once soils in the catchment are saturated as a result of rainfall, water runs off the land and into streams. The streams flow into reservoirs where this water, together with any water pumped from the River Murray, is stored and pumped or gravity fed to water treatment plants to be filtered, disinfected and transferred into the distribution network. Ten reservoirs, with a combined storage volume of almost 200 gigalitres at full capacity, and six water treatment plants service metropolitan Adelaide's water supply systems and beyond. Outside of the metropolitan area, Middle River Reservoir on Kangaroo Island supplies a water treatment plant which provides filtered and disinfected water to Kingscote and smaller communities along the transfer pipeline. In 2014–15, 34% of the water supplied by SA Water was provided by surface water.

River Murray

The River Murray is a key source of raw water for South Australia. Of SA Water's 68 drinking water supply systems, 34 source water either directly or indirectly from the River Murray, including 18 water treatment plants located along South Australia's reaches of the River Murray. The River Murray also supplements metropolitan Adelaide's reservoirs (with the exception of Myponga reservoir) via two raw water pipelines: the Murray Bridge-Onkaparinga pipeline (48 km in length) and the Mannum-Adelaide pipeline (60 km in length).

Three major pipelines supply treated water from the River Murray to various regional communities:

- The Morgan-Whyalla pipeline (356 km long via Port Augusta and 281 km long via the undersea section from Baroota) is used to transfer treated River Murray water from the Morgan Water Treatment Plant to the Iron Triangle; significant areas of the mid-north, the Yorke Peninsula and the Eyre Peninsula.
- The Swan Reach-Stockwell pipeline (54 km in length) supplies treated water from the Swan Reach Water Treatment Plant to communities along its route, including those in the Barossa Valley; it also feeds into the Yorke Peninsula supply.
- The Tailem Bend-Keith pipeline (133 km in length) supplies treated water from the Tailem Bend treatment plant to 13 communities in the upper South East and around Lake Albert.

The percentage of water supplied to Adelaide from the River Murray varies from year to year, with the river providing about 40% of the city's water in an average year. During 2014–15, 50% of water supplied by SA Water was sourced from the River Murray.

Groundwater

Groundwater is contained in underground water bodies known as aquifers. SA Water has 31 drinking water supply systems that draw water from aquifers as their primary source of domestic water. Most of these are located in the South East, Eyre Peninsula and northern region of South Australia.

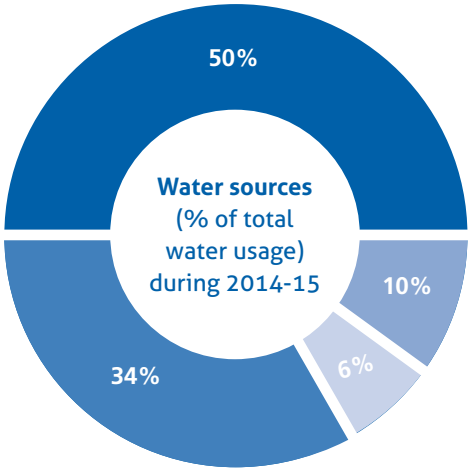
The Blue Lake, which supplies the city of Mount Gambier, is included in this as it is a volcanic crater containing groundwater from local aquifer systems. The quality and volume of water that can be extracted from an aquifer varies from region to region. During 2014–15, almost 6% of water supplied by SA Water was provided by groundwater.

Seawater

Desalinated drinking water from Adelaide Desalination Plant (ADP) was introduced into the distribution network in October 2011. Desalinated drinking water from the plant is pumped through a transfer pipeline to the Happy Valley Water Treatment Plant where it is blended with treated water from Happy Valley Reservoir before being delivered via the distribution network to Adelaide customers.

A desalination plant with an output of approximately 300 kilolitres of drinking water per day has been in operation on Kangaroo Island since 1999 supplying the Penneshaw community.

In 2014-15, desalinated seawater accounted for 10% of South Australia's total water supply.



Water sources
(% of total water usage) during 2014–15
(Total water usage: 218 979 ML)

- River Murray
- Surface water
- Seawater
- Groundwater

New desalination plant improves water quality for Hawker residents

In September 2014, SA Water's $5.75 million reverse osmosis desalination plant at Hawker, in the southern Flinders Ranges, began operating with the capability of supplying up to 440 kilolitres of treated drinking water per day to local homes and businesses.

Water supplied to the Hawker township is sourced from the local groundwater basin. The natural characteristics of the groundwater is hard and high in total dissolved solids. While the water quality complied with the ADWG, it has historically been regarded by the local community as being too salty for drinking purposes. High levels of salinity can also result in scaling in pipes, fittings and household appliances.

SA Water worked closely with the Flinders Ranges Council to identify an appropriate solution suitable for a remote location, to improve the quality of water being supplied to Hawker. In 2012, SA Water undertook a detailed investigation of the quality and quantity of the available groundwater. A preferred option was identified that would improve the quality of drinking water, provide a sustainable long-term solution that would meet the needs of residents, businesses and tourists, and that would be delivered efficiently and within budget.

The endorsed option was a new packaged desalination plant, which was constructed on land immediately adjacent to the existing bore field and iron removal plant. The desalination plant reduces salinity levels to within acceptable aesthetic targets outlined in the ADWG of less than 600 milligrams per litre.

Similar to the Penneshaw and Adelaide desalination plants, the Hawker plant uses reverse osmosis with pre- and post-treatment. However, the salinity of the local groundwater is much lower than that of seawater so low pressure, low energy membranes are suitable for the production of clean drinking water.

A new pre-treatment iron removal facility provides effective removal of dissolved iron and manganese, which is necessary to protect the sensitive membrane filtration process. Desalinated water is then blended with a small amount of filtered groundwater to provide the necessary mineral balance to improve taste. The product water is then pH corrected to reduce its corrosive properties, followed by chlorine disinfection and distribution to customers.

The new plant, which is located about four kilometres outside of the Hawker township, now supplies approximately 200 local SA Water customers. SA Water is undertaking ongoing monitoring to ensure the sustainability of the town's groundwater basin.

Water Treatment

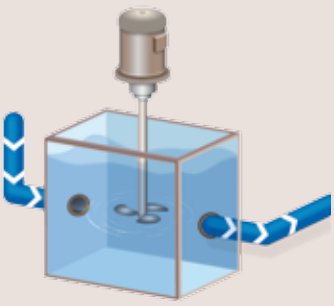
Numerous water treatment plants have been constructed in South Australia over the years to improve the quality of available water sources. The treatment program started with the construction of an iron removal plant at Kingston SE in 1963.

Today there are 42 operational water treatment plants, comprising:

- Six large conventional water treatment plants serving metropolitan Adelaide
- Twenty-three water treatment plants serving country regions and towns. Earlier plants were of conventional design while more recent plants incorporate newer technologies such as ion exchange, membrane filtration and activated carbon adsorption
- Ten iron removal plants in the South East and one serving Hawker
- Two seawater desalination plants serving Adelaide and Penneshaw and one bore water desalination plant serving Hawker.

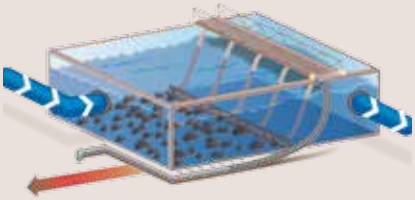
Conventional water treatment plants

SA Water's conventional water treatment plants typically use a seven step process to deliver safe drinking water to our customers.



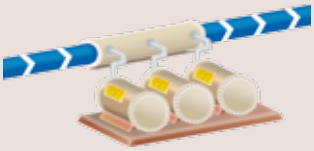
Step 1: Coagulation – a chemical (coagulant) is added to the untreated raw water and reacts with impurities such as small particles and dissolved organic matter. The coagulant traps the suspended particles and much of the dissolved organic material. The success of the treatment process very much depends on successful coagulation and SA Water is investing in the latest instrumentation to help maximise coagulation effectiveness.

Step 2: Flocculation – the coagulant combined with the captured particles is called 'floc'. Flocculation is a gentle mixing process that brings together the flocs formed in the coagulation step to form larger flocs that settle more easily. Water remains in the flocculation tanks for a minimum of 20–30 minutes.

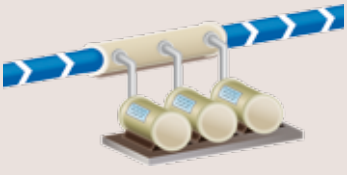


Step 3: Sedimentation – water and suspended flocs pass slowly through sedimentation basins or clarifiers, where most of the floc settles to the bottom as a sludge. The clarified water (now containing only a small amount of very fine floc particles) continues on to the filters. The sludge is periodically removed from the basins for further treatment and disposal. An alternative technique called Dissolved Air Floatation (DAF) is used at the Myponga Water Treatment Plant. This uses fine air bubbles to float floc to the surface to form a sludge blanket, which is periodically removed by overflowing the floatation tanks.

Step 4: Filtration – the remaining floc particles are removed by passing the clarified water through filtration media. The most common filters at the larger treatment plants are deep beds of sand or a combination of sand and anthracite. In our newer and smaller treatment plants, the final filtration step is achieved by forcing the clarified water through synthetic membranes.



Step 5: Disinfection – a chemical disinfectant is generally added at a point between the filters and the filtered water storage tank, to destroy any microorganisms that may not have been removed in the earlier flocculation and filtration stages. In South Australia, chlorine is the disinfectant of choice for supply systems with relatively short detention times of a day or two, while chloramine (produced by reacting chlorine and ammonia) is used in supply systems with longer pipeline infrastructure. Disinfection sometimes requires the pH of the water to be adjusted to enhance the performance of the disinfectant. In some applications, ultraviolet (UV) light is used to complement chemical disinfection.



Step 6: Fluoridation – fluoride is added to major water supply systems at a concentration determined by SA Health to help prevent tooth decay.

Step 7: Storage and distribution – after disinfection, the finished water is transferred to covered water storage tanks, ready for distribution to SA Water's customers.

Magnetic Ion Exchange (MIEX®)

In some more challenging raw water supply systems, additional treatment requires the use of MIEX® – a specialised ion exchange resin which contains unique magnetic properties. MIEX® resin is added to the raw water to remove dissolved organic carbon (DOC) prior to employing conventional water treatment processes. DOC is found in all natural water sources and is the result of the decomposition of natural organic matter which can cause colour, taste and odour in drinking water. The orange/brown colour of many surface waters is attributed to DOC compounds. The DOC is adsorbed onto the MIEX® resin and the resin's magnetic properties allow the loaded resin to combine and settle out. This settled resin is then collected and regenerated using a salt solution so that it can be reused. Pre-treatment employing the MIEX® process results in a significant reduction in chemical usage, sludge generation and the amount of chlorine required for effective disinfection and public health protection.

Ultraviolet light disinfection

Ultraviolet (UV) light is used to disinfect water in some water treatment plants. Exposure to adequate doses of UV light renders bacteria, viruses and protozoa non-pathogenic to humans. In the UV disinfection process, the water passes through reactors with sufficient UV lamps to deliver the required UV dose. The required UV dose is dependent on certain water quality factors such as clarity, dissolved compounds and microorganisms present. For a listing of the water treatment plants that employ UV disinfection please refer to the table on page 20-21.

Iron removal plants (IRPs)

Many South Australian groundwater sources contain elevated iron concentrations. The presence of iron in water does not pose a risk to human health, but it can lead to brown discolouration and possible staining of fixtures and washing. IRPs are a simplified version of conventional treatment plants, where chlorine is added to oxidise the iron to an insoluble form that precipitates naturally, forming small floc. The iron floc is removed from the water by filtration through sand media. SA Water is currently engaged in a program to upgrade many iron removal plants by installing facilities to capture and reprocess backwash water.

This will reduce the amount of groundwater extracted and minimise environmental impact. For a listing of IRPs please refer to the table on pages 20-21.

Desalination

Due to a lack of an alternative viable water supply, a small seawater desalination plant was constructed at Penneshaw on Kangaroo Island in 1999. Seawater is drawn into the plant through an intake pipe and pre-screened. UV disinfection is used to minimise biological growth and filters remove most of the particulate matter. The filtered seawater is forced under high pressure through reverse osmosis membranes that allow fresh water to pass through, with very little salt. The desalinated water is re-mineralised with carbon dioxide (CO_2) and marble chips to reduce its corrosive properties and improve taste prior to chlorine disinfection and distribution to customers.

The Adelaide Desalination Plant at Port Stanvac also uses reverse osmosis with pre- and post-treatment. The plant first produced drinking water in 2011 and has the ability to produce up to 100 billion litres (100 GL) of drinking water each year. The water produced is transferred to the Happy Valley Water Treatment Plant, where it is blended with filtered water prior to distribution. The ratio of desalinated water in the blend can vary and the Happy Valley water quality can differ in characteristics, such as chlorine demand, so considerable care is exercised at Happy Valley to ensure that the blended water customers receive is of a consistently high quality. The Hawker Desalination Plant is now providing Hawker residents with a long-term, sustainable solution to water quality and supply (see page 14).

Membrane filtration

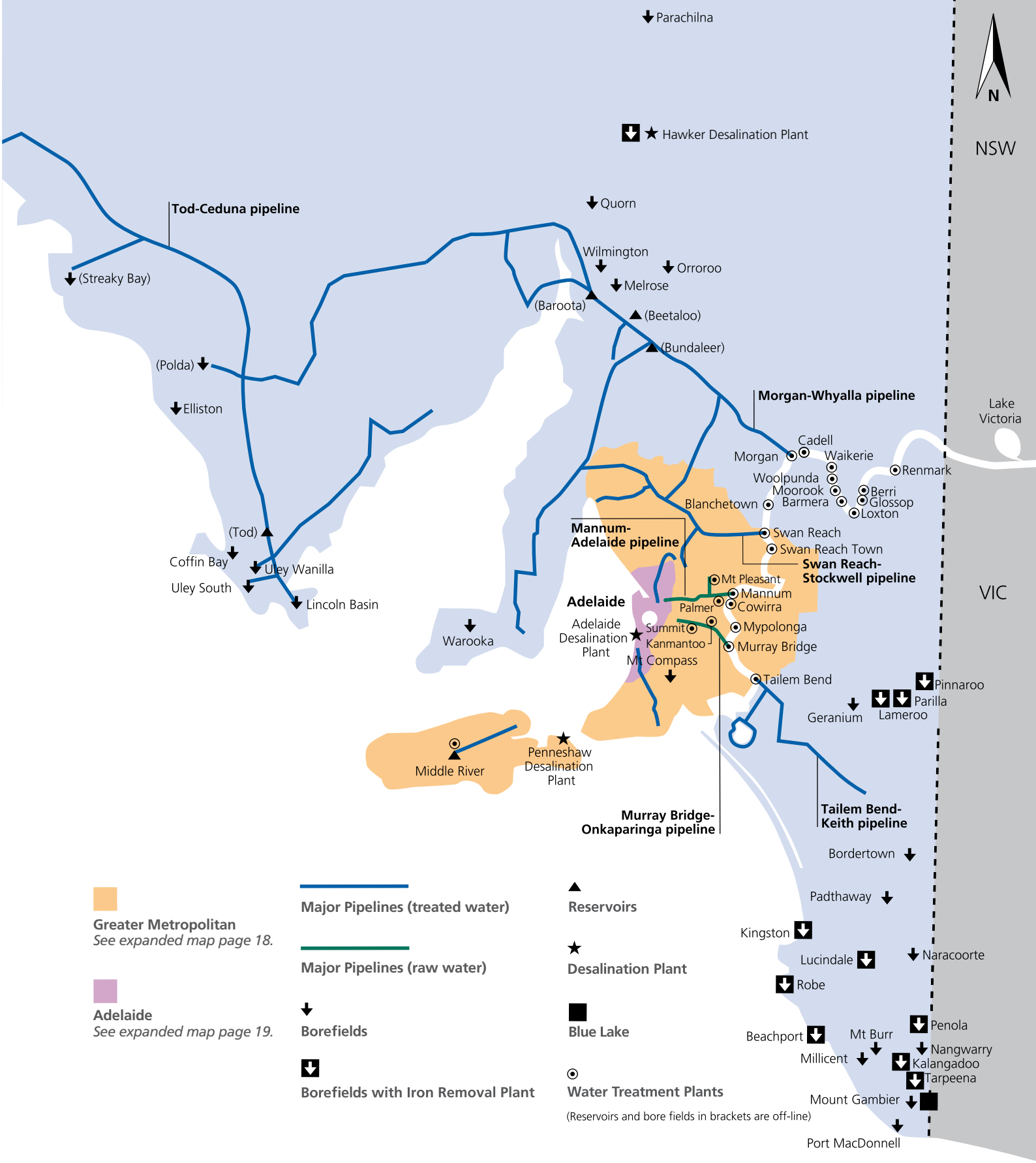
SA Water has strategically invested in membrane filtration plants, which represent the future of water treatment. The technology is mature and very competitive against traditional sand filtration processes. Typically, a membrane plant requires 30–40% less footprint area than traditional sand filters. Membrane filters are made of specialised polymers with very small holes. The pore size of membrane filters is typically less than 0.1 microns, which is about 50–100 times smaller than the thickness of a human hair. Membranes provide a direct physical barrier to waterborne pathogens, such as *Cryptosporidium*, which is resistant to chlorine disinfection. Pre-treated clean water is sucked through the membranes at low pressure, much like the suctioning action through a straw.

Membrane filters are regularly backwashed with air and clean water to remove accumulated solids. Chemical cleaning is required on a monthly basis to remove material not effectively removed by air and water backwash. Typical membrane life ranges from 3–8 years depending upon the quality of the raw water. SA Water employs membrane filtration at 11 facilities treating River Murray water, including Mount Pleasant (since 2000) and the Country Water Quality Improvement Program Stage 3 plants (since 2008).

Reservoirs, Water Treatment Plants, Bore Fields and Major Pipelines for SA Water

Statewide (as at 30 June 2015)

See map on following pages for detailed enlargement of Metropolitan and Greater Metropolitan areas.



Greater Metropolitan
See expanded map page 18.

Adelaide
See expanded map page 19.

Major Pipelines (treated water)

Major Pipelines (raw water)

Borefields

Borefields with Iron Removal Plant

Reservoirs

Desalination Plant

Blue Lake

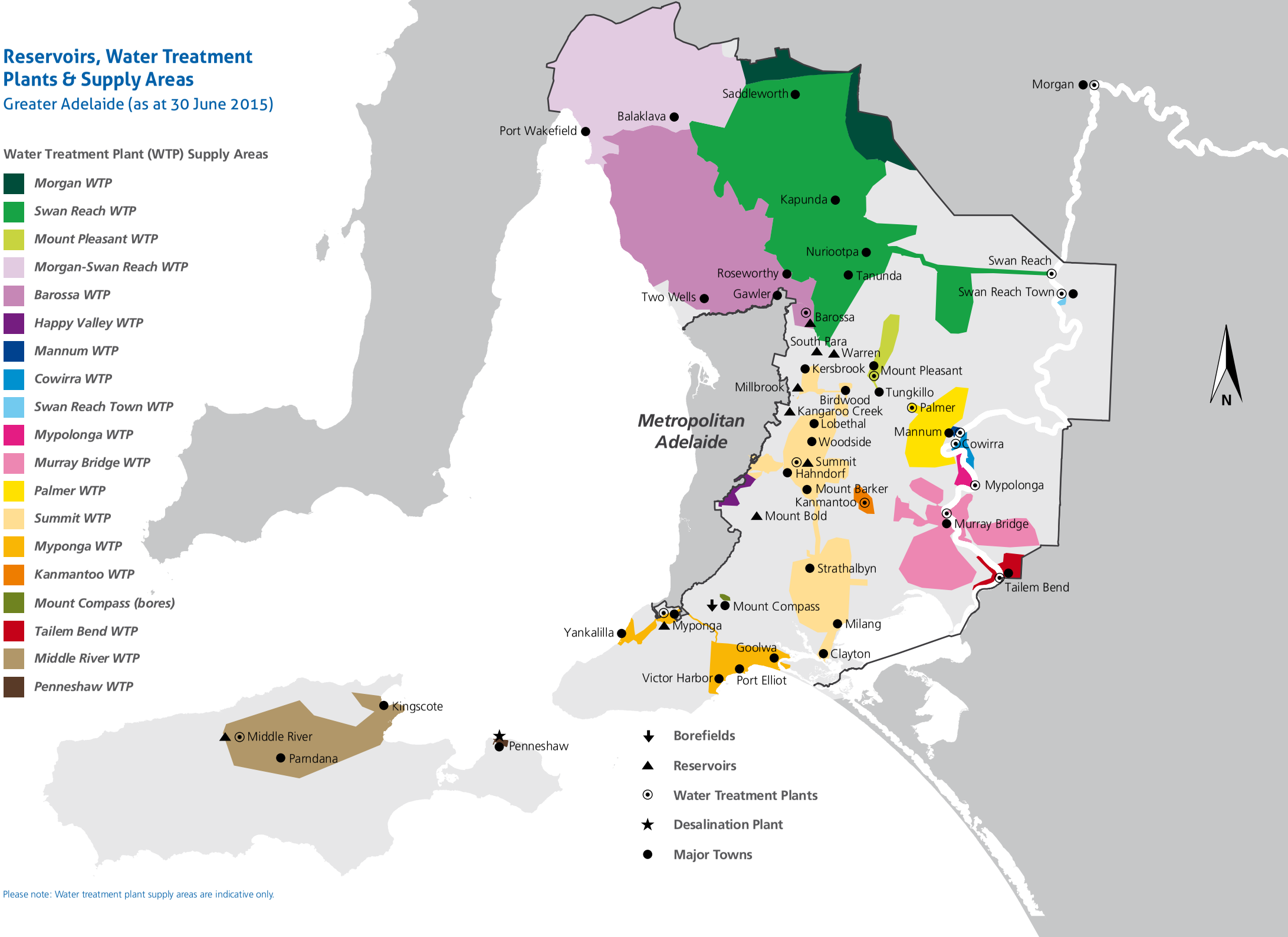
Water Treatment Plants

(Reservoirs and bore fields in brackets are off-line)

Please note: Map detail is indicative only.

Reservoirs, Water Treatment Plants & Supply Areas

Greater Adelaide (as at 30 June 2015)



Please note: Water treatment plant supply areas are indicative only.

Reservoirs, Water Treatment Plants & Supply Areas

Metropolitan Adelaide (as at 30 June 2015)

Please note: Water treatment plant supply areas are indicative only and may vary according to demand and operational requirements.

Country Drinking Water Supply System Sources and Treatment (as at 30 June 2015)

The following table presents a listing of SA Water's country drinking water supply systems, their raw water sources and the type of water treatment/disinfection applied.

Water supply system	Supply source	Treatment					Disinfection				Fluoridation
		Conventional water treatment plant	Iron removal plant	Desalination plant	Membrane plant	MIEX® pre-treatment	Cl_2		NH_2Cl	UV	
							Gas (G)	Liquid (H)			
Barmera WTP	RM	✔ (RW)					✔ (G)			✔	✔
Barossa WTP #	Res/RM	✔ (AW)					✔ (G)	✔ (H)(2nd)			✔
Beachport IRP	Bores		✔ (SAW)				✔ (G)				
Berri WTP	RM	✔ (RW)					✔ (G)			✔	✔
Blanchetown WTP	RM				✔ (SAW)			✔ (H)			
Bordertown	Bores						✔ (G)				
Cadell WTP	RM				✔ (SAW)			✔ (H)			
Coffin Bay	Bores						✔ (G)				
Cowirra WTP	RM				✔ (SAW)			✔ (H)			
Elliston	Bores						✔ (G)				
Eyre South [1]	Bores						✔ (G)				
Eyre South /Morgan WTP [2]	Bores/RM	✔ (SAW) (Morgan WTP)					✔ (G) (at Eyre South bores)		✔ (G) (at Morgan WTP)		✔ (at Morgan WTP)
Geranium	Bores							✔ (H)			
Glossop WTP	RM				✔ (SAW)			✔ (H)			
Happy Valley WTP #	Res/RM/ADP	✔ (AW)					✔ (G)				✔
Hawker Desalination WTP	Bores		✔ (SAW)	✔ (SAW)			✔ (G)				
Kalangadoo IRP	Bores		✔ (SAW)					✔ (H)			
Kanmantoo WTP	RM				✔ (SAW)			✔ (H)			
Kingston SE IRP	Bores		✔ (SAW)				✔ (G)				
Lameroo IRP	Bores		✔ (SAW)					✔ (H)			
Loxton WTP	RM	✔ (RW)							✔ (G)	✔	✔
Lucindale IRP	Bores		✔ (SAW)				✔ (G)				
Mannum WTP	RM	✔ (RW)					✔ (G)			✔	✔
Melrose	Bores						✔ (G)				
Middle River WTP	Res	✔ (SAW)				✔	✔ (G)			✔	
Millicent	Bores						✔ (G)				
Moorook WTP	RM				✔ (SAW)			✔ (H)			
Morgan WTP	RM	✔ (SAW)							✔ (G)		✔
Morgan/Swan Reach WTP [3]	RM	✔ (Morgan WTP, SAW; Swan Reach WTP, RW)							✔ (G)	✔ (at Swan Reach WTP)	✔
Mt Burr	Bores							✔ (H)			
Mt Compass	Bores							✔ (H)			
Mt Gambier	Blue Lake/ bores						✔ (G)				✔ (Blue Lake source only)

Water supply system	Supply source	Treatment					Disinfection				Fluoridation
		Conventional water treatment plant	Iron removal plant	Desalination plant	Membrane plant	MIEX® pre-treatment	Cl_2		NH_2Cl	UV	
							Gas (G)	Liquid (H)			
Mt Pleasant WTP	RM	✔ (SAW)			✔	✔	✔ (G)				✔
Murray Bridge WTP	RM	✔ (RW)					✔ (G)	✔ (H)(2nd)		✔	✔
Mypolonga WTP	RM				✔ (SAW)			✔ (H)			
Myponga WTP #	Res	✔ (AW)					✔ (G)	✔ (H)(2nd)			✔
Nangwarry	Bores							✔ (H)			
Naracoorte	Bores						✔ (G)				
Orroroo	Bores						✔ (G)				
Padthaway	Bores							✔ (H)			
Palmer WTP	RM				✔ (SAW)			✔ (H)			
Parachilna	Bores							✔ (H)			
Parilla IRP	Bores		✔ (SAW)					✔ (H)			
Penneshaw WTP	Seawater			✔ (SAW)	✔			✔ (H)			
Penola IRP	Bores		✔ (SAW)				✔ (G)				
Pinnaroo IRP	Bores		✔ (SAW)				✔ (G)				
Port Lincoln 4	Bores						✔ (G)				
Port MacDonnell	Bores						✔ (G)				
Quorn	Bores						✔ (G)				
Renmark WTP	RM	✔ (RW)					✔ (G)			✔	✔
Robe IRP	Bores		✔ (SAW)				✔ (G)				
Summit WTP	RM	✔ (RW)							✔ (G)	✔	✔
Swan Reach WTP	RM	✔ (RW)						✔ (H)(2nd)	✔ (G)	✔	✔
Swan Reach Town WTP	RM				✔ (SAW)			✔ (H)			
Tailem Bend WTP	RM	✔ (RW)							✔ (G)	✔	✔
Tarpeena IRP	Bores		✔ (SAW)					✔ (H)			
Waikerie WTP	RM	✔ (RW)					✔ (G)			✔	✔
Warooka	Bores						✔ (G)				
Wilmington	Bores						✔ (G)				
Woolpunda WTP	RM				✔ (SAW)				✔ (H)		

ADP Adelaide Desalination Plant
AW Operated by Allwater
Cl_2 Chlorine
G Chlorine gas
H Chlorine liquid (Sodium hypochlorite)
2nd secondary disinfection only
IRP Iron removal plant
MIEX® Magnetic Ion Exchange
NH_2Cl Chloramine
Res Reservoir
RM River Murray
RW Operated by Riverland Water
SAW Operated by SA Water
UV Ultraviolet
WTP Water Treatment Plant

Supplies both country and metropolitan systems
1 Eyre South – supplied by Lincoln Basin, Uley South and Uley Wanilla borefields
2 Eyre South/Morgan WTP – primarily supplied by Lincoln Basin, Uley South and Uley Wanilla borefields and supplemented by Morgan WTP system
3 Morgan/Swan Reach WTP system supplied from Morgan WTP and Swan Reach WTP
4 Port Lincoln system supplied by Lincoln Basin and Uley South borefields

Metropolitan Adelaide Water Treatment Plant Sources (as at 30 June 2015)

The following table presents a listing of metropolitan Adelaide's water treatment plants and their raw water sources.

Water treatment plant	Supply sources											
	River Murray	Barossa Reservoir	Happy Valley Reservoir	Hope Valley Reservoir	Little Para Reservoir	Myponga Reservoir	Kangaroo Creek Reservoir	Millbrook Reservoir	Mt Bold Reservoir	South Para Reservoir	Warren Reservoir	Seawater
ADP												●
Anstey Hill	● *							● *				
Barossa	○	●								○	○	
Happy Valley	○		●						○			
Hope Valley	○			●			○	○				
Little Para	○				●			○				
Myponga						●						

● Direct supply (connected to a water treatment plant)
○ Indirect supply (serves as a source/storage feeding into a direct supply reservoir)
* Depending on operational configuration

Metropolitan Adelaide Water Quality Systems and Treatment (as at 30 June 2015)

Water supply system	Supply source	Treatment					Disinfection				Fluoridation
		Conventional water treatment plant	Iron removal plant	Desalination plant	Membrane plant	MIEX® pre-treatment	Cl_2 Gas (G)	Cl_2 Liquid (H)	NH_2Cl	UV	
ADP	Seawater			✔ (AA)			✔ (G)				✔
Anstey Hill Metro	Res/RM	✔ (AW)					✔ (G)	✔ (H)(2nd)			✔
Barossa Metro	Res/RM	✔ (AW)					✔ (G)				✔
Central Metro	Res/RM/ADP	✔ (AW)					✔ (G)	✔ (H)(2nd)			✔
East Metro	Res/RM/ADP	✔ (AW)					✔ (G)	✔ (H)(2nd)			✔
Myponga Metro	Res	✔ (AW)					✔ (G)	✔ (H)(2nd)			✔
North Metro	Res/RM/ADP	✔ (AW)					✔ (G)	✔ (H)(2nd)			✔
South Metro	Res/RM/ADP	✔ (AW)					✔ (G)	✔ (H)(2nd)			✔
West Metro	Res/RM/ADP	✔ (AW)					✔ (G)	✔ (H)(2nd)			✔

AA Operated by AdelaideAqua Pty (Ltd)
ADP Adelaide Desalination Plant
AW Operated by Allwater

Cl_2 Chlorine
G Chlorine gas
H Chlorine liquid (Sodium hypochlorite)

MIEX® Magnetic Ion Exchange
NH_2Cl Chloramine
Res Reservoir

RM River Murray
UV Ultra violet
2nd Secondary disinfection only

Drinking Water Supply Systems and Towns/Suburbs Supplied (as at 30 June 2015)

Water supply system	Towns supplied
Anstey Hill Metro	Banksia Park, Fairview Park, Golden Grove, Gulfview Heights, Highbury, Houghton, Inglewood, Lower Hermitage, Modbury Heights, Paracombe, Redwood Park, Ridgehaven, St Agnes, Surrey Downs, Tea Tree Gully, Upper Hermitage, Vista, Wynn Vale, Yatala Vale
Barmera WTP	Barmera, Cobdogla
Barossa Metro	Concordia, Evanston, Evanston Gardens, Evanston Park, Evanston South, Gawler, Gawler Belt, Gawler East, Gawler South, Gawler West, Hewett, Hillier, Kudla, Munno Para Downs, Reid, Willaston
Barossa WTP	Avon, Barabba, Erith, Dublin, Hamley Bridge, Kangaroo Flat, Lewiston, Lower Light, Mallala, Owen, Port Parham, Redbanks, Roseworthy, Two Wells, Wasleys, Wild Horse Plains, Windsor
Beachport IRP	Beachport
Berri WTP	Berri
Blanchetown WTP	Blanchetown
Bordertown	Bordertown
Cadell WTP	Cadell
Central Metro	Aberfoyle Park, Adelaide, Adelaide Airport, Ascot Park, Ashford, Beaumont, Bedford Park, Belair, Bellevue Heights, Black Forest, Blackwood, Blewitt Springs, Brighton, Brooklyn Park, Brown Hill Creek, Burnside, Camden Park, Chandlers Hill, Cherry Gardens, Christie Downs, Christies Beach, Clapham, Clarence Gardens, Clarence Park, Clarendon, Cleland, Clovelly Park, Colonel Light Gardens, Coromandel East, Coromandel Valley, Cowandilla, Crafers West, Craigburn Farm, Cumberland Park, Darlington, Daw Park, Dover Gardens, Dulwich, Eastwood, Eden Hills, Edwardstown, Everard Park, Flagstaff Hill, Flinders Park, Forestville, Frewville, Fulham, Fulham Gardens, Fullarton, Glandore, Glen Osmond, Glenalta, Glenelg, Glenelg East, Glenelg North, Glenelg South, Glengowrie, Glenside, Glenunga, Goodwood, Hackham, Hackham West, Hallett Cove, Happy Valley, Hawthorn, Hawthorndene, Hazelwood Park, Heathpool, Henley Beach, Henley Beach South, Highgate, Hilton, Hove, Huntfield Heights, Hyde Park, Keswick, Keswick Terminal, Kidman Park, Kings Park, Kingston Park, Kingswood, Kurralta Park, Leabrook, Leawood Gardens, Linden Park, Lockleys, Lonsdale, Lower Mitcham, Lynton, Malvern, Marino, Marion, Marleston, Marryatville, Melrose Park, Mile End, Mile End South, Millswood, Mitcham, Mitchell Park, Morphett Vale, Morphettville, Mount Osmond, Myrtle Bank, Netherby, Netley, Noarlunga Centre, Noarlunga Downs, North Brighton, North Plympton, Novar Gardens, Oaklands Park, O'Halloran Hill, Old Noarlunga, Old Reynella, Onkaparinga Hills, O'Sullivan Beach, Panorama, Park Holme, Parkside, Pasadena, Plympton, Plympton Park, Port Noarlunga, Reynella, Reynella East, Richmond, Seacliff, Seacliff Park, Seacombe Gardens, Seacombe Heights, Seaview Downs, Sheidow Park, Somerton Park, South Brighton, South Plympton, Springfield, St Georges, St Marys, Sturt, Thebarton, Toorak Gardens, Torrens Park, Torrensville, Trott Park, Tusmore, Underdale, Unley, Unley Park, Urrbrae, Warradale, Waterfall Gully, Wayville, West Beach, West Richmond, Westbourne Park, Woodcroft
Coffin Bay	Coffin Bay
Cowirra WTP	Cowirra, Neeta, Pompoota

Water supply system	Towns supplied
East Metro	Ashton, Athelstone, Auldana, Castambul, Dernancourt, Erindale, Firle, Gilles Plains, Greenhill, Hectorville, Hillcrest, Holden Hill, Hope Valley, Horsnell Gully, Ingle Farm, Kensington Gardens, Kensington Park, Magill, Modbury, Modbury North, Montacute, Newton, Northfield, Northgate, Oakden, Para Hills, Para Vista, Paradise, Pooraka, Rosslyn Park, Rostrevor, Skye, St Morris, Stonyfell, Teringie, Tranmere, Valley View, Walkley Heights, Wattle Park, Windsor Gardens, Woodforde
Elliston	Elliston
Eyre South	Arno Bay, Cleve, Cowell, Cummins, Lipson, Louth Bay, North Shields, Port Neill, Tumby Bay, Ungarra, Yeelanna
Eyre South/Morgan WTP	Ceduna, Cungena, Haslam, Kyancutta, Minnipa, Poochera, Pygery, Smoky Bay, Streaky Bay, Thevenard, Warramboo, Wirrulla, Wudinna, Yaninee, Yantanabie
Geranium	Geranium
Glossop WTP	Glossop, Monash
Happy Valley WTP	Chandlers Hill, Cherry Gardens, Clarendon, Coromandel East, Ironbank
Hawker Desalination WTP	Hawker
Kalangadoo IRP	Kalangadoo
Kanmantoo WTP	Callington, Kanmantoo
Kingston SE IRP	Kingston SE
Lameroo IRP	Lameroo
Loxton WTP	Loxton
Lucindale IRP	Lucindale
Mannum WTP	Mannum
Melrose	Melrose
Middle River WTP	Brownlow, Emu Bay, Kingscote, Parndana
Millicent	Millicent
Moorook WTP	Kingston on Murray, Moorook
Morgan WTP	Alford, Appila, Auburn, Blyth, Booborowie, Booleroo Centre, Bower, Brinkworth, Bute, Burra, Caltowie, Clare, Crystal Brook, Drake Peak, Eudunda, Farrell Flat, Georgetown, Gladstone, Gulnare, Hampden, Iron Knob, Jamestown, Kiepa, Kimba, Koolunga, Konanda, Kybunga, Laura, Leasingham, Lock, Merriton, Mintaro, Morgan, Mount Mary, Mundoora, Napperby, Narridy, Penwortham, Peterborough, Port Augusta, Port Broughton, Port Germein, Point Pass, Port Pirie, Redhill, Robertstown, Rudall, Sevenhill, Snowtown, Spalding, Stirling North, Sutherlands, Tickera, Warnertown, Watervale, Wirrabara, Whyalla, Yacka, Yongala
Morgan/ Swan Reach WTP	Ardrossan, Arthurton, Balaklava, Bowmans, Clinton, Coobowie, Curramulka, Edithburgh, Halbury, Hoyleton, Kadina, Lochiel, Maitland, Melton, Minlaton, Moonta, Paskeville, Pine Point, Price, Point Pearce, Port Hughes, Port Victoria, Port Vincent, Port Wakefield, South Kilkerra, Stansbury, Wallaroo, Wool Bay, Yorketown
Mount Burr	Mount Burr
Mount Compass	Mount Compass

Water supply system	Towns supplied
Mount Gambier	Mount Gambier
Mount Pleasant WTP	Eden Valley, Mount Pleasant, Springton, Tungkillo
Murray Bridge WTP	Monarto, Monteith, Murray Bridge
Mypolonga WTP	Mypolonga, Wall Flat
Myponga Metro	Aldinga Beach, Myponga Beach, Sellicks Beach, Sellicks Hill, Willunga, Willunga South
Myponga WTP	Carrickalinga, Encounter Bay, Goolwa, Hayborough, Hindmarsh Island, Hindmarsh Valley, Lower Inman Valley, McCracken, Middleton, Myponga, Normanville, Port Elliot, Victor Harbor, Yankalilla
Nangwarry	Nangwarry
Naracoorte	Naracoorte
North Metro	Andrews Farm, Angle Vale, Blakeview, Bolivar, Brahma Lodge, Burton, Cavan, Craigmore, Davoren Park, Direk, Edinburgh, Edinburgh North, Elizabeth, Elizabeth Downs, Elizabeth East, Elizabeth Grove, Elizabeth North, Elizabeth Park, Elizabeth South, Elizabeth Vale, Globe Derby Park, Green Fields, Greenwith, Hillbank, MacDonald Park, Mawson Lakes, Munno Para, Munno, Para West, One Tree Hill, Para Hills West, Parafield, Parafield Gardens, Paralowie, Penfield, Penfield Gardens, Salisbury, Salisbury Downs, Salisbury East, Salisbury Heights, Salisbury North, Salisbury Park, Salisbury Plain, Salisbury South, Smithfield, Smithfield Plains, St Kilda, Virginia, Waterloo Corner
Orroroo	Orroroo
Padthaway	Padthaway
Palmer WTP	Caloote, Palmer
Parachilna	Parachilna
Parilla IRP	Parilla
Penneshaw WTP	Penneshaw
Penola IRP	Penola
Pinnaroo IRP	Pinnaroo
Port Lincoln	Port Lincoln
Port MacDonnell	Port MacDonnell
Quorn	Quorn
Renmark WTP	Cooltong, Paringa, Renmark
Robe IRP	Robe
South Metro	Aldinga, Maslin Beach, McLaren Flat, McLaren Vale, Moana, Port Noarlunga South, Port Willunga, Seaford, Seaford Heights, Seaford Meadows, Seaford Rise, Tatachilla, The Range, Whites Valley
Summit WTP	Aldgate, Balhannah, Blakiston, Bridgewater, Birdwood, Brukunga, Charleston, Clayton, Crafers, Crafers West, Dawesley, Forest Range, Gumeracha, Hahndorf, Heathfield, Ironbank, Kersbrook, Langhorne Creek, Lenswood, Littlehampton, Lobethal, Milang, Mount Barker, Mount Barker Springs, Mount Torrens, Nairne, Oakbank, Piccadilly, Stirling, Strathalbyn, Upper Sturt, Willyaroo, Wistow, Woodside, Verdun

Water supply system	Towns supplied
Swan Reach WTP	Angaston, Cambrai, Freeling, Greenock, Kapunda, Keyneton, Lyndoch, Marrabel, Moculta, Nuriootpa, Riverton, Rowland Flat, Rhynie, Saddleworth, Sedan, Seppeltsfield, Shea-oak Log, Stockport, Stockwell, Tanunda, Tarlee, Templers, Towitta, Truro, Williamstown
Swan Reach Town WTP	Swan Reach
Tailem Bend WTP	Coomandook, Coonalpyn, Culburra, Jervois, Karoonda, Keith, Ki Ki, Meningie, Narrung, Salt Creek, Sherlock, Tailem Bend, Tintinara, Wynarka, Yumali
Tarpeena IRP	Tarpeena
Waikerie WTP	Waikerie
Warooka	Point Turton, Warooka
West Metro	Albert Park, Alberton, Allenby Gardens, Angle Park, Athol Park, Beulah Park, Beverley, Birkenhead, Blair Athol, Bowden, Broadview, Brompton, Campbelltown, Cheltenham, Clearview, College Park, Collinswood, Croydon, Croydon Park, Devon Park, Dry Creek, Dudley Park, Enfield, Ethelton, Evandale, Exeter, Felixstow, Ferryden Park, Findon, Fitzroy, Garden Island, Gepps Cross, Gilberton, Gillman, Glanville, Glynde, Grange, Greenacres, Hackney, Hampstead Gardens, Hendon, Hindmarsh, Joslin, Kensington, Kent Town, Kilburn, Kilkenny, Klemzig, Largs Bay, Largs North, Manningham, Mansfield Park, Marden, Maylands, Medindie, Medindie Gardens, Nailsworth, New Port, North Adelaide, North Haven, Norwood, Osborne, Ottoway, Outer Harbor, Ovingham, Payneham, Payneham South, Pennington, Peterhead, Port Adelaide, Prospect, Queenstown, Regency Park, Renown Park, Ridleyton, Rose Park, Rosewater, Royal Park, Royston Park, Seaton, Sefton Park, Semaphore, Semaphore Park, Semaphore South, St Clair, St Peters, Stepney, Taperoo, Tennyson, Thorngate, Torrens Island, Trinity Gardens, Vale Park, Walkerville, Welland, West Croydon, West Hindmarsh, West Lakes, West Lakes Shore, Wingfield, Woodville, Woodville Gardens, Woodville North, Woodville Park, Woodville South, Woodville West
Wilmington	Wilmington
Woolpunda WTP	Mantung, Woolpunda, Wunkar

Managing Our Water Supplies

We use our DWQMS to manage South Australia's drinking water supply systems and to deliver safe drinking water to our customers.

A key principle of this approach is having barriers and preventive measures in place to reduce hazards along the chain from the catchment to the customer's tap. The focus is on preventing and minimising hazards at the earliest point in the water quality management process and not relying solely on downstream controls.

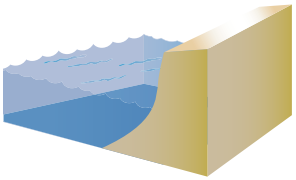
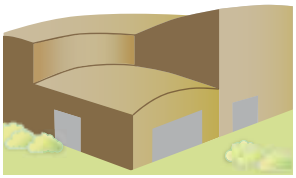
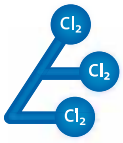
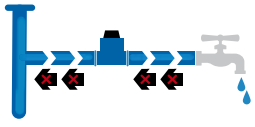
Hazards in the water can take many forms and are generally categorised into three types – biological, physical or chemical.

Typical hazards found in South Australia for each of these categories include:

- Biological – algal metabolites' by-products and pathogens (e.g. *Cryptosporidium*, *Giardia*, *E. coli*)
- Physical – sediments (turbidity) and colour
- Chemical – pesticides, hydrocarbons, iron and manganese.

We have identified potential water quality hazards and the associated level of risk for each of our water supply systems using our water quality risk management methodology. Water quality risks identified during this process are incorporated into our Water Quality Hazard & Risk Register (WQH&RR). The WQH&RR is used to capture, assess, prioritise, manage and report water quality risks and preventive actions. It is also used for planning our water quality improvements (including operational and capital improvements), monitoring, procedures, training and verification. This risk assessment process is integrated with other business areas of SA Water.

The following table shows the barriers, water quality management objectives and preventive measures from catchment to tap:

Barrier	Water quality management objective	Possible hazard(s)	Example of work to prevent/minimise hazard(s)
1. Catchment 	Minimise introduction of hazards into source water	• Pathogens • Pesticides • Hydrocarbons • Iron and manganese • Sediments • Nutrients • Dissolved organic carbon	• Finalised spatial Catchment Risk Assessment method for pathogens in the Mount Lofty Ranges Watershed. • Provided 'catchment barrier status' reports for all supply catchments in the Mount Lofty Ranges Watershed and groundwater catchments. • Provided comprehensive catchment water quality monitoring using a variety of tools: composite samplers, autosamplers, passive samplers and faecal marker studies. • Provided SA Water feedback in regards to changes in legislation affecting present and future development in water supply areas. • Collaboratively worked with government and the fishing community to explore recreational fishing opportunities in selected offline reservoirs.
2. Reservoir 	Minimise introduction of hazards and remove some hazards	• Pathogens • Pesticides • Hydrocarbons • Iron and manganese • Algal by-products including taste and odour compounds	• Increased understanding of algal bloom dynamics and investigation into the use of alternative algaecides. • Installation of vertical profilers to provide access to real time water quality data. • The use of variable level offtakes to optimise the quality of water supplied to the water treatment plants. • Management of cyanobacterial (blue-green algal) blooms in Myponga and Little Para reservoirs without the need to apply copper sulphate.
3. Treatment 	Remove most hazards	• Iron and manganese • Chemicals • Algal by-products including taste and odour compounds • Pathogens	• Completed and commissioned Hawker Desalination Plant. • Constructed new groundwater supply bores at Robe, Pinnaroo and Uley South to improve water quality and water security. • Installed low flow capabilities at Middle River Water Treatment Plant which has seen a reduction in chemical costs while maintaining water quality.
4. Disinfection 	Neutralise microbiological hazards and algal by-products	• Algal by-products • Pathogens	• Optimised disinfection at Robe. • Modified Mt Gambier distribution network to improve chlorine dosing.
5. Chlorine Residual Maintenance* 	Manage microbiological hazards throughout systems	• Pathogens	• Operational changes to water supply system, for example altering tank levels and taking tanks offline to reduce water age in the distribution systems, leading to improved maintenance of disinfection residuals. • Modified Lincoln Gap chloramination dosing to improve control and residual maintenance. • Changed disinfection method at Parachilna from UV to chlorination.
6. Closed System* 	Prevent introduction of hazards	• Pathogens • Chemicals	• Replacement of old infrastructure and improved procedures to maintain integrity of closed systems, including improved/new training in water quality procedures. • New covered and lined storage at Minnipa. • Relined storage at Renmark/Paringa.
7. Backflow Prevention* 	Prevent introduction of hazards	• Pathogens • Chemicals	• Installation of backflow prevention devices.

* Barriers collectively known as distribution system

Water Quality 2014–15

Catchment Management

The first barrier for source water protection is the drinking water supply catchment.

Most SA Water catchment areas are privately owned, intensively developed and co-managed by other agencies. Around 90% of SA Water's drinking water supply catchments are privately owned, with the exception of Eyre Peninsula where SA Water owns significant land around borefields. SA Water also relies on the River Murray as a raw water source, but its influence on catchment management in the Murray Darling Basin is limited to policy and planning inputs as we are only one of many stakeholders. In the reservoir catchment areas (e.g. the Mount Lofty Ranges Watershed), narrow buffer zones or reservoir reserve land exist around SA Water infrastructure.

To protect our source waters, SA Water works closely with planning and natural resource management agencies to advocate for suitable land use policies in our supply catchments and encourage the adoption of sound land management practices. Through the initiation of, and participation in, collaborative projects and water quality improvement initiatives we aim to achieve additional, mutually beneficial water quality outcomes. This approach ensures we effectively and efficiently achieve our obligations under the ADWG. During 2014–15, we have focused on specific catchment water quality improvement projects critical to SA Water's business, such as the mitigation of pathogen risks and combating potential water quality impacts resulting from the Sampson Flat bushfire (January 2015). In collaboration with other government agencies, we strive to ensure water quality improvement measures can be delivered in a pragmatic and, ideally, whole-of-government manner.

Public access to reservoir reserves

In recognition of the role that our narrow reservoir land buffer zones play as part of the multi-barrier approach to water quality protection, SA Water has developed a public access and land use policy. The policy balances the basic principle of water quality protection against providing some limited access for public benefit. In 2014–15, access permits were approved for a variety of low impact purposes including scientific research, film production, biological surveys and education.

In 2014, a commitment was made by the Minister for Water and the River Murray to investigate the potential for opening up to five offline reservoirs to recreational fishing activities. As a member of the Ministerial Recreational Fishing Taskforce, SA Water has been working with other government agencies, local councils and RecFish SA to enable recreational fishing access to Warren, Bundaleer and Baroota reservoirs in particular, and is continuing to investigate opportunities at Tod and Hindmarsh Valley reservoirs. The enhancement of recreational fishing activities will be managed in the spirit of community collaboration and water quality protection.

Bushfires and prescribed burns on SA Water land

In 2014–15, SA Water continued to implement its extensive annual bushfire prevention maintenance regime across its landholdings to manage the ever present bushfire risk. SA Water continued its collaboration on bushfire prevention and suppression as well as prescribed burning under its agreement with other agencies (DEWNR, CFS and ForestrySA). Similar to previous years, SA Water has successfully achieved its prescribed burn targets on SA Water land as set out in the *Code of Practice for Fire Management on Public Land in South Australia*, incorporating a due diligence environmental and water quality risk assessment approach.

On 2 January 2015 the Sampson Flat bushfire burnt approximately 12 500 hectares in the mid and northern Mount Lofty Ranges. Water supply catchments impacted by the fire included the Little Para, South Para and Millbrook reservoirs. The burn scar enveloped the Millbrook reservoir reserve (~700 ha burnt) and burnt 76% of the Kersbrook Creek catchment (feeding Millbrook reservoir), 12% of the South Para catchment and 41% of the Little Para catchment (~10 000 ha in total). Bushfire events of this extent can fundamentally change catchment responses in terms of water quality. In response to heavy rainfall forecast following the bushfires, the SA Water Natural Assets (catchments and land management) and Operations teams lead the installation of 18 erosion control structures within the Millbrook Reservoir reserve. These structures have already prevented approximately 1.5 tonnes of sediment entering the Millbrook Reservoir. In addition to the potential for sediment and nutrient ingress into the supply reservoirs due to the loss of vegetation cover, we also need to keep watch on the potential effect of fire retardants. Approximately 500 000 litres of fire retardant were used in the area, most of which contains phosphorus-based ingredients, one of the factors that contributes to algal blooms.

A post-fire action plan and research project have been implemented to evaluate potential changes in water quality over the next years and to further quantify the risk of pathogen, nutrient and sediment exports during large rainfall-runoff events in bushfire affected catchments.

Catchment barrier status

As part of SA Water's DWQMS, water quality risks originating from the first barrier – surface and groundwater supply catchments – are assessed using a combination of field investigations and semi-quantitative and quantitative risk analysis methods. The second two-year review of our 'catchment barrier status' report was conducted and this has now been undertaken for all drinking water supply catchments across the state.

The reports are a key knowledge resource of catchment characteristics, as well as trends in rainfall, flow, water quality and pollutant exports from our catchments. As such, they are used to effectively communicate water quality risks from a drinking water supply perspective to internal and external stakeholders. This, in turn, helps other natural resource management agencies to prioritise whole-of-government water quality improvement initiatives.

Catchment risk assessment	In 2014–15, the Catchment Team completed a new catchment risk assessment (CRA) method for pathogens, which replaces its 10 year old methodology. This new CRA method brings together spatial information, water quality data, expert knowledge and modelling results to assess the potential risk to water	quality from current pollution sources across some of the highest-developed drinking water catchments in the Mount Loft Ranges Watershed. In 2015–16, the assessment methodology will be peer reviewed by relevant experts, to be further refined and then implemented into the DWQMS.
***Cryptosporidium* risk in our drinking water supply catchments**	As a result of SA Water's *Cryptosporidium* risk assessment across all barriers for our key water supply systems, the Catchment Team is driving the implementation of pathogen mitigation works in SA Water's drinking water catchments. A number of projects are currently underway in the Mount Lofty Ranges, including investigating the effectiveness of fencing and juvenile stock removal near watercourses. We have also established new monitoring sites to investigate *Cryptosporidium* infectivity and speciation in catchments which deliver	source water to the Anstey Hill, Hope Valley and Little Para water treatment plants. The results of this study will be used to improve our understanding of pathogen risks from our drinking water catchments. A trial using passive samplers was undertaken in 2014–15 which looked at human waste contamination indicators such as caffeine and pharmaceuticals and personal care products (PPCPs), to identify areas of failure in onsite waste management systems (OWMS). The trial was successful and will be used in a full scale project in 2015–16.
Waste control program	The review of the 10-year waste control project in the Mount Lofty Ranges watershed has concluded that the septic audit and upgrade services project had been successful in reducing pathogen inputs into the drinking water supply catchments. With limited opportunities to sewer certain areas in the watershed due to steep terrain or distance to main sewer lines, influencing landholders to adequately maintain or	improve their septic systems (OWMS) is a sound way to minimise pathogen pollution that originates from residential use. As a member of the Waste Control Program's Steering Committee in 2014–15, SA Water has been a strong driver and contributor to the program's ongoing efforts to educate the community and make use of existing opportunities to rectify failing septic systems.
Monitoring and assessment of long term impacts of acid sulphate soils near River Murray water offtakes	The assessment of the potential impact of acid sulphate soil derived pollution in the River Murray on SA Water offtakes continued through 2014–15. Whilst the 'millennium' drought has eased concerns in relation to low river flows and the drying out of wetlands, the legacy of the drought is still present. This year, SA Water is a partner of the SA River Murray Sustainability (SARMS) research project through the University of Adelaide and the EPA which investigates	different irrigation schemes at its Mobilong and Toora sites (located in the Lower River Murray Reclaimed Irrigation Area (LMRIA)). The project aims to allow for the future optimisation of the irrigation approach to minimise salinisation and acid sulfate soil leaching to the River Murray near SA Water offtakes. It will be another step in the design of future land use options for these SA Water-owned sites.
Nutrient mitigation from Cox Creek wetland system	The Cox Creek wetland system is part of an inter-agency nutrient mitigation project which has been in operation since 2006. SA Water continues its maintenance program of the wetland to ensure nutrient inputs into the Happy Valley Reservoir are reduced, and ultimately lower the risk of algal blooms. The frequency of the maintenance cycle (dredging of sediments every two to three years and annual harvesting of macrophytes to remove excess nutrients) was confirmed	through a PhD thesis in 2011. Dredging of the Brookes Bridge Sedimentation Basin occurred in 2011 and 2013, and at Scouts Australia's Woodhouse Activity Camp (Woodhouse) wetland in 2013. The scout camp and various schools continue to benefit from the wetland by arranging tours and educational events, focusing on exploring and evaluating the benefits of wetlands, riparian rehabilitation and catchment protection.

Reservoirs and the River Murray

Management plans and new technology played a part in 2014-15 water quality monitoring.

Real-time water quality monitoring

Access to real time water quality data is essential to effectively respond to risks associated with algal blooms and reservoir inflows. In the 2014–15 financial year the Little Para and Happy Valley reservoirs were fitted with floating pontoons containing automated vertical water quality profiling systems. The systems provide water quality information at set intervals throughout the profile of the water column. Real time data for temperature, turbidity, total cyanobacteria, chlorophyll, pH, conductivity and dissolved oxygen (DO) is made available to water quality managers via an online web-based interface. Work is now focused on maximising the benefit of the additional information and to help water quality managers:

- Track the flow of water which has the potential to carry catchment-derived pollutants into reservoirs.
- Identify the depth of the best water quality within a vertical profile of a reservoir.
- Manipulate the water quality supplied to water treatment plants through the use of multiple offtakes so that the best possible water quality can be selected.
- Reduce reliance on algaecides as a method for managing algal blooms.
- Optimise the effectiveness of algaecide treatment.
- Optimise water treatment processes for the removal of cyanobacteria-derived taste and odour compounds.

Management of cyanobacteria in reservoirs

Where possible, SA Water continued to manage cyanobacterial blooms without the need to apply copper sulphate. This was achieved through an alternative management strategy which includes *in situ* field measurements of key water quality parameters, optimised management of multiple offtakes and enhanced water treatment plant processes, including the application of powdered activated carbon (PAC) to remove cyanobacteria-derived taste and odour compounds.

Groundwater Supplies

New bores and better technology are improving the quality of groundwater supplies.

Bore condition assessments	A tool has been developed which will assist in the prioritising of bore condition assessments in SA Water bores across the state. It is anticipated the results from the condition assessments can then be used to prioritise	scheduled maintenance and the replacement program in capital works. This will improve the water quality of the groundwater systems.
New bores for Robe	Two new bores were drilled at Robe in 2014-15. These bores have lower salinity levels than	the existing bores, which will improve the quality of the water supplied to Robe.
New Pinnaroo bore	A new bore was drilled in 2014-15. This bore replaced an existing bore which was in poor condition. The replacement bore	has a lower salinity level and will improve the general water quality of the Pinnaroo town water supply.

Water Treatment and Distribution

A number of water quality improvement projects were initiated or completed during the 2014-15 financial year. These included:

Plant optimisation at Hope Valley, Happy Valley and Anstey Hill water treatment plants	Last year these plants underwent a significant equipment upgrade for the purpose of improving their capability to continue delivering safe drinking water. This year the focus on these plants was to utilise the capabilities recently installed so that they	could be operated in line with best practice. Each plant underwent an optimisation of these new control systems which incorporated predictive tools to help improve the water quality, safety, efficiency and to minimise cost.
Plant monitoring and controls upgrades at Little Para, Morgan and Mount Pleasant water treatment plants	These upgrades were undertaken to improve the resilience of each plant so that they are better able to meet current and future water quality challenges. The focus of these equipment upgrades was to enable the plants	to operate in accordance with best practice. New tools to optimise chemical dosing and plant operation were installed to ensure the plants continue to produce high quality, safe drinking water.
An upgrade to the disinfection processes at Robe	Following the installation of a large treated water tank, an upgrade to the disinfection process was necessary. Maintaining appropriate	levels of disinfectant throughout the system is essential for the continued delivery of safe drinking water to our customers.
A disinfection upgrade at Naracoorte	Following the construction of a new bore and transfer main, additional demand was placed on the existing disinfection plant. Consequently a capacity upgrade to the	chlorine dosing facility was undertaken late 2014 to ensure that all water is adequately disinfected before being delivered to customers.
Desalination plant at Hawker commissioned	A new 440 kilolitre per day reverse osmosis desalination plant was constructed in the remote township of Hawker. The plant desalinates the saline bore supply and generates high quality drinking water with	salinity less than 600 mg/L. Prior to this, the Hawker customers faced ongoing aesthetic challenges relating to salinity, hardness and taste and odour. Refer to page 14 for more information on this project.

Water Quality Monitoring and Testing

To ensure the quality of our product, SA Water performs extensive water quality monitoring across metropolitan and country South Australia, from catchment to tap, including field and laboratory tests. Samples are collected by trained field staff to ensure samples are taken correctly and field results have a high degree of integrity. Laboratory analyses are carried out by SA Water's Australian Water Quality Centre (AWQC) in accordance with ISO 9001 Quality Systems and the requirements of the National Association of Testing Authorities (NATA).

The following table summarises monitoring and testing activities in our water supply systems during 2014–15.

Number of samples and tests – metropolitan and country water supply systems (2014–15)

	Metropolitan	Country	Total
Drinking water supply systems	8	60	68
Customer taps	192	326	518
Total sample taps	388	994	1 382
Total number of routine samples	11 698	71 441	83 139
Total number of routine tests	50 720	242 695	293 415

Drinking Water Quality and Performance

During 2014–15, SA Water demonstrated robust management of water quality by consistently providing clean, safe drinking water to our customers in a complex operational environment. This included the Adelaide Desalination Plant (ADP) providing approximately 10% of South Australian's drinking water in 2014–15 financial year.

The following table and graph provide a summary of our performance for health-related parameters of routine samples at customer taps during 2014–15.

Metropolitan and country drinking water supply systems health related performance (2014–15)

Health related parameters	Metropolitan systems (number of tests)	Country systems (number of tests)
Samples free from *E. coli*	100% (3 455)	100% (8 238)
Samples compliant with ADWG health parameters *	99.85% (12 710) 2014–15 target: 100%	99.78% (31 052) 2014–15 target: 99.80%

* Includes performance against *E. coli.*

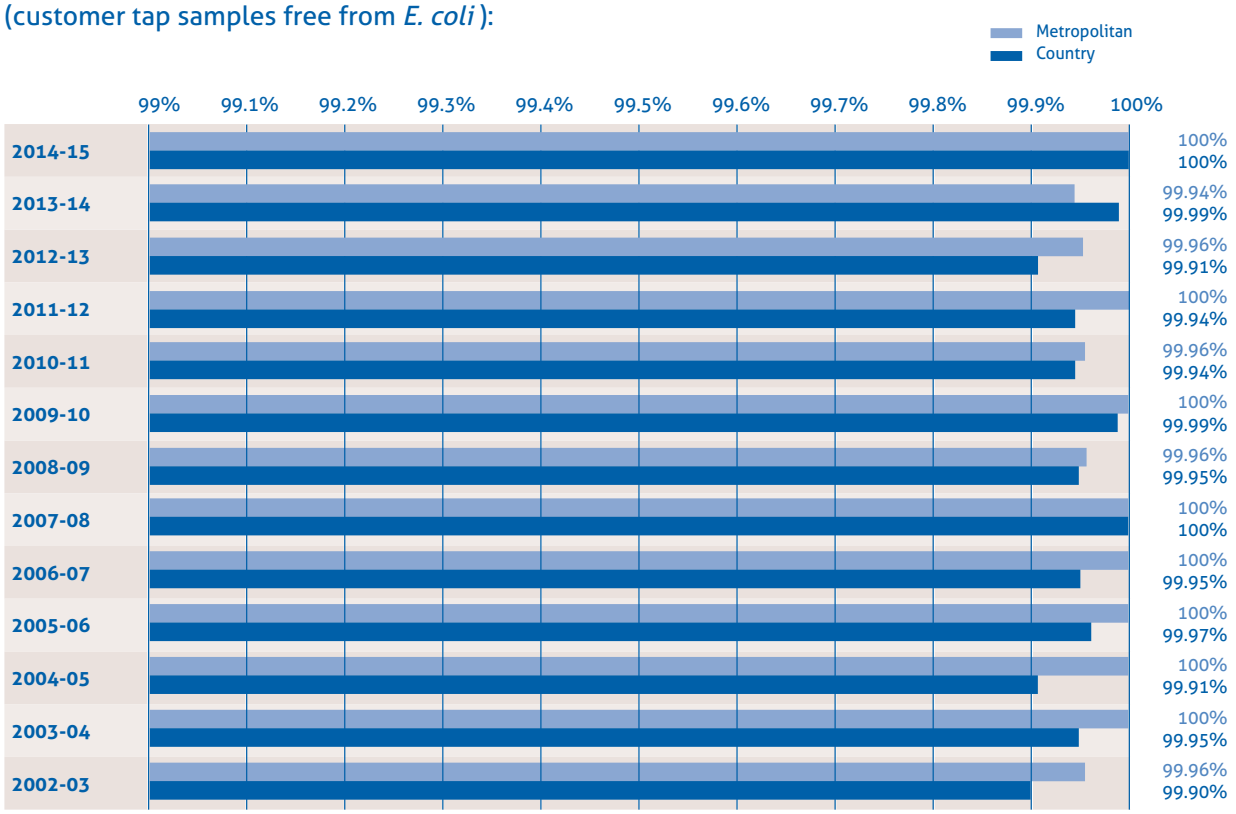
We analysed a total of 43 762 routine tests from our drinking water supplies throughout South Australia to determine health-related compliance.

- We achieved 100% *E. coli* compliance at all customer taps in metropolitan Adelaide for the 2014–15 financial year across 3 455 samples taken from our eight metropolitan supply systems.
- We achieved 100% *E. coli* compliance at all customer taps in regional South Australia for the 2014–15 financial year across 8 238 samples taken from our 60 country supply systems.

Compliance with the ADWG health-related parameters was 99.85% for metropolitan Adelaide and 99.78% in the country areas.

The minimum ADWG requirements for health-related parameters is 95% overall compliance. SA Water targets a higher percentage than this – 100% in metropolitan Adelaide and 99.8% for country areas – as we are continuously striving to achieve zero exceedences in all our drinking water systems. During 2014–15 we identified distribution systems where we were below target and proactively implemented management strategies to address these situations, including working with SA Health. Immediate corrective action was taken to investigate any potential risks to public health. Such measures included flushing of systems, additional disinfection, immediate follow-up sampling and close communication with SA Health.

E. coli compliance at metropolitan and country drinking water supply system customer taps since 2002 (customer tap samples free from *E. coli*):



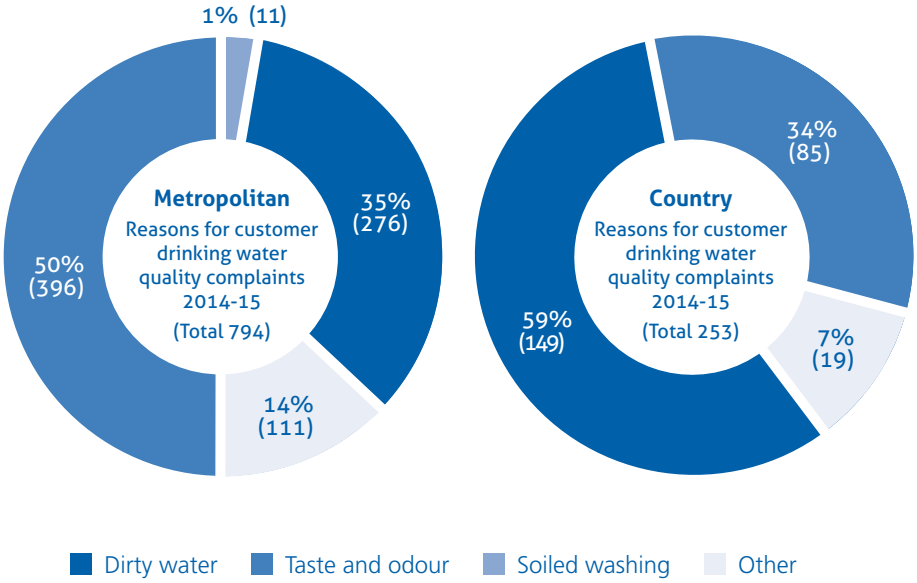
Customer Satisfaction

Water quality customer enquiries or complaints are received through the Customer Service Centre.

All water quality customer complaints are treated seriously, with the highest priority given to health related complaints. Health related complaints are directed to the Operations and Maintenance group and targeted to be attended within 1 hour. Complaints of a health concern are also often directed to SA Health for advice or information.

In 2014–15 a total of 794 metropolitan customer complaints and 253 country customer complaints relating to drinking water were received.

We have achieved better water quality outcomes in the distribution system and a dramatic decrease in customer complaints since the mid-1990s by focusing on water quality impacts in the network and continually improving our knowledge of the system operation and causes of water quality problems.



Our Tap Waters Pass The Tap Test

Since August 2014 SA Water has been working to bust some myths about SA's drinking water and understand customers' perceptions about the quality of their supply.

Take the Tap Test is an activity designed to discover what our customers think about the taste of their tap water, and start a conversation about water quality and treatment. It is a blind taste testing of five water samples (four tap water samples from various metropolitan and regional supplies and one commercial spring water). Participants are asked how satisfied they are with the taste of each water and if they can pick the spring water. The *Take the Tap Test* has taken place at regional centres (Berri, Port Augusta, Mt Gambier, Port Pirie, Kadina, Murray Bridge and Port Lincoln), Science Alive and in Rundle Mall during National Water Week.

Approximately 1500 people participated in the taste test in regional and metropolitan Adelaide in 2014-15 and the results were consistent – in a blind tasting our customers are as satisfied with the taste of our major regional and metropolitan supplies as they are with the taste of a popular commercially available spring water. In contrast, opinion was divided on the taste of the Mt Gambier water. This result was perhaps the most surprising as the Blue Lake is an excellent quality water source and the only treatment given before distribution is the addition of fluoride and disinfection with chlorine for safety. The most common comments about the Mt Gambier water appeared to relate to mouthfeel, which may be related to the higher calcium content and hardness of this water.

Interestingly, when tasters were asked to choose which sample was bottled water around two thirds could not tell the difference and picked an SA Water tap water. The results indicate that customers prefer Adelaide metropolitan or regional tap water and can generally not discriminate between tap water and bottled water, which on average is 2500 times more expensive per litre.

There was also wide media coverage across South Australia with significant interest in this new engagement strategy and the outcomes of the *Take the Tap Test*. We estimate this interest may have resulted in a potential exposure to almost 120 000 South Australians.

Incident Management

SA Water is committed to applying the ADWG 2011 *Framework for Management of Drinking Water Quality* which includes two components for the management of incidents and emergencies: communication protocols and incident and emergency response protocols.

SA Water has a *Water Quality Incident and Emergency Management Protocol* in place and a web-based incident management system to record and generate notifications of water quality incidents. These are in line with the interagency *Water/Wastewater Incident Notification and Communication Protocol* that is maintained by SA Health to adopt the principles of the ADWG 2011 and satisfy requirements of the *Safe Drinking Water Act 2011* and Safe Drinking Water Regulations 2012.

SA Health defines three types of health related incident classifications based upon a precautionary approach:

- Priority Type 1 incident notification – an incident that, without immediate appropriate response or intervention, could cause serious risk to human health and is likely to require immediate interagency meetings to consider responses. Procedures for Type 1 incident notifications also apply
- Type 1 incident notification – an incident that, without appropriate response or intervention, could cause serious risk to human health
- Type 2 incident notification – an incident that, without appropriate response or intervention, represents a low risk to human health.

A comparative summary of the Priority Type 1, Type 1 and Type 2 incident notifications reported against the interagency Water/Wastewater Incident Notification and Communication Protocol.

Reporting period	Priority Type 1	Type 1	Type 2
2014–15	**1**	**43**	**84**
2013–14	3	34	87
2012–13	4	67	89
2011-12	2	88	121
2010-11	5	111	172
2009-10	9	88	135

Note: These notifications do not include wastewater, recycled water, non-drinking supply and Remote Communities incidents.

All Priority Type 1 and Type 1 notifications were immediately reportable to SA Health, while all Type 2 notifications were reportable within 24 hours, in line with the interagency *Water/Wastewater Incident Notification and Communication Protocol.* Overall in 2014–15 the number of incident notifications was consistent with 2013–14 figures. The number of Priority Type 1 incidents decreased and Type 1 incident notifications slightly increased in 2014–15. This increase was primarily due to increased algal activity in the River Murray.

During 2014–15, we continued our focus on early detection and reporting to external agencies, briefing the Minister for Water and the River Murray, ensuring prompt corrective action and addressing the causes of preventable Type 1 notifications, such as turbidity issues. Strategies employed to ensure prompt corrective action include optimisation of our drinking water quality monitoring program and capital improvements such as upgrades to filters and filter control systems.

The continual review and improvement of our incident management processes has positively impacted on our water quality incident response and overall performance, maintaining a score well above our target. The proactive water quality management of targeted individual water supply systems and detection and management of risks continued during 2014–15. Changes in reporting criteria issued by SA Health in the interagency *Water/Wastewater Incident Notification and Communication Protocol* also occurred and contributed to a change in reporting requirements.

Incident Response Index (IRI)

The purpose of the IRI is to drive and guide correct responses when a Type 1 or Priority Type 1 incident is detected. The IRI is assessed against a number of criteria, with each component in the IRI designed to assist with the management of water quality incidents, including reporting, initial response and longer term preventive measures. The overall 2014-15 strategic target for the IRI is at least 84% compliance.

Criteria used in the Incident Response Index (based on total reportable SA Health Priority Type 1 and Type 1 incident notifications)	
Incident reported to relevant agencies by phone immediately (less than one hour)	Overall strategic 2014–15 target: at least 84%
Incident entered into the incident management system (IMS) in less than two hours	
Initial effective response taken within three hours	
Written report to Minister for Water and the River Murray by 3pm next business day	
Root cause analysis completed within 10 working days	
Preventive actions implemented within agreed timeframes	

The Incident Response Index achieved in country and metropolitan areas and overall for 2014–15 compared to 2013–14.

System	Incident response index (IRI) 2014–15 financial year	Incident response index (IRI) 2013–14 financial year
Country	97%	94%
Metropolitan	94%	96%
Overall (weighted combined country and metropolitan)	**97%**	**94%**

During 2015–16, we will:

- Deliver Phase 1 of our new online incident management system for reporting and management of water quality incidents and hazards
- Continue to work collaboratively with SA Health in the review and update of the interagency *Water/ Wastewater Incident Notification and Communication Protocol*
- Conduct refresher training on the *Water Quality Incident and Emergency Management Protocol* for country and metropolitan incident managers
- Increase the Incident Response Index target to 85%.

Research and Innovation Services

SA Water, through its Research and Innovation Services (R&IS) network, continues to enhance its considerable national and international reputation for high quality science, research, innovation and advice.

We live in a world of climatic and environmental challenges as well as scientific and technological advances. SA Water's strong commitment to research and innovation enables it to respond rapidly and effectively to emerging issues to maintain its high standards of drinking water quality.

Research direction and business alignment

SA Water's research activity focuses on delivering targeted outputs that drive business efficiency, underpin innovation, reduce risk and provide high-level technical advice to the business to improve services to our customers. Our strategic priority areas are:

- **Customers and community** – assessing and positively influencing customer perception of water quality
- **Quality and delivery** – public health and risk mitigation; water and wastewater treatment and distribution system management
- **Planning for the future** – environment, climate variability and sustainability
- **Business success** – energy efficiency, asset management and infrastructure investment.

The R&IS group has worked with the business this year to develop a future SA Water Research Directions Plan which sets out knowledge and research needs aligned with future business needs and goals.

Key research projects

Supporting SA Water's strategic priority of Customers and Community, the R&IS group has a strong program of customer-focussed research ranging from understanding how our customers perceive the products and services we provide to investigating the relationships between customer perceptions and objective measures of water quality. Our *Take the Tap Test* program has provided an opportunity for an estimated 5000 people to take a blind taste test of a range of waters, with very positive findings for the SA Water product and people's opinion of it.

To contribute to practical improvements to our customers' experience we have partnered with our Adelaide Services Alliance partner Suez to better understand sediment deposition in water supply networks and to provide insight into the causes of this sediment. This will enable targeted cleaning programs to reduce the likelihood of adverse impacts on our customers.

Suez has also recognised our extensive knowledge of blue-green algal issues by partnering with the R&IS group in a $1.2 million research project to provide a package of tools for water treatment plant operators, bridging that vital link between investigation and implementation. The package includes online monitoring of the water entering a plant coupled to mathematical modelling to optimise treatment for removal of algal tastes and odours. In addition, the project will provide advice on how to support natural biological removal in our treatment plants, reducing the need for costly chemical treatment options.

Research is all about planning for the future, and so we have a strong program of research aimed at understanding the potential impacts of climate change on water quantity and quality. It is important that SA Water understands what the impacts may be for our own water supplies locally, so we are working to develop the links between the global models and our knowledge of our local climate, geography and hydrography. The models predict that South Australia will experience a greater likelihood of extreme weather events. To inform future decision-making, a number of other projects are developing better risk assessment processes that can help build the resilience needed to cope with such events.

Finally, SA Water has made a large investment in online monitoring systems to help us manage our complex networks in an efficient and coordinated manner. An R&IS project is supporting that effort by developing data management and quality control processes to ensure that network monitoring information is integrated and reliable, providing the right information at the right time to inform investment and future decision-making.

Alliances and partnerships

SA Water's R&IS group has celebrated significant achievements in the national and international arena. These include receiving competitive funding grants from a wide range of funding bodies such as the Australian Research Council Linkage Grants Scheme, Water Research Australia, the Water Research Foundation (USA) and more recently the Premier's Research and Industry Fund. Members of SA Water's R&IS group are well represented on many of the decision-supporting committees, highlighting our impact and influence. SA Water has signed Memoranda of Understanding with a range of international research partners including the Vienna University of Technology, the Research Centre for Ecology and Environmental Sciences (Beijing) and Beijing Water, with the aim of initiating joint research programs in areas of common interest and of mutual benefit to our respective organisations.

Advice and Investigations

Research and Innovation Services is a significant pool of knowledge that can be accessed by the Corporation. The value of this resource is now tracked through the Advice & Investigations register, which documents more than 40 pieces of work, completed or underway, where the Corporation has accessed the valuable knowledge resource that sits within R&IS, many relating to drinking water quality.

Highlights

- R&IS team members were invited to present at a workshop on Algal Management at the IWA Specialist Group Meeting on Lake and Reservoir Management, Virginia, USA, August 2015.
- An R&IS team member was an invited speaker at the APEC Climate Symposium, Jiangsu, China, November 2014.

Employee Awareness and Training

The skills of the water industry workforce must adapt to manage Australia's highly variable rainfall, frequent water shortages and floods.

Efficient use of limited water resources is essential for South Australia's long-term sustainability and commercial viability. SA Water staff receive internal training to fulfil statutory and legislative requirements and, importantly, to ensure that safe drinking water and safe sanitation services are provided efficiently.

The training is either nationally accredited under the Australian Qualification and Training Framework or SA Water specific and driven by the ADWG, Australian Guidelines for Water Recycling (AGWR) and national certification requirements. SA Water endeavours to be a national leader with regards to sustainable water operations, best environmental practice and integrated water management practice. Effective training assists us to meet high standards.

Training undertaken during 2014–15 is summarised below:

Internal, competency-based training

- Overview of water quality awareness (understanding the risk management principles of the ADWG).
- Integrated incident management procedures, water quality, environmental, Work Health and Safety (WHS), operational and security.
- Disinfection of mains.
- Integrated root cause analysis.
- Recycled water (understanding the risk management principles of the AGWR).
- Native vegetation guidelines.
- Best practice operating procedure.
- Environmental management for project managers.
- Environmental management awareness.
- Disinfection system awareness.
- Incident management system awareness.
- Incident Management Protocols (training course for nominated incident managers).

National Water Package (NWP) accredited, competency-based training

- Water sampling (NWP 218B).
- Disinfection for operators.
- Work safely with liquefied chlorine gas.
- Optimisation of water quality in distribution networks (NWP 317B).
- Demonstrate knowledge of the risk management principles of the *Australian Drinking Water Guidelines* (NWP 279).
- Monitor, operate and control wastewater treatment processes (NWP 346B).
- Network core knowledge (NWP 226B Prepare and restore worksite; NWP 301B Organise personal work priorities and development; and NWP303B Contribute to OHS hazards and risk assessment).
- Operate maintain and repair valves (NWP 221A Operate Basic Flow Control Devices; and NWP 310B Monitor and Operate Water Distribution Systems).
- Read, monitor and install meters (boundary work) (NWP 223A Read, monitor and install meters).

Operational Staff Training Strategy

Along with nationally recognised training provided to ancillary and support staff, SA Water has undertaken a process to map training needs to occupation specialisation.

SA Water aims to have all operational staff trained to a minimum of Certificate III in their relevant water industry specialisation:

- Networks
- Water treatment
- Wastewater treatment
- Source water operation (dams and storages).

E-learning

As an adjunct to formal and face–to-face training delivery methodologies, SA Water's Learning and Development division are developing a suite of online e-learning programs aimed at educating all staff about water quality requirements and as refresher modules for trained staff, particularly in the areas of ADWG and chlorine awareness.

Glossary of Water Quality Terminology

Algae

A diverse group of simple photosynthetic organisms with no true roots, stems or leaves. They occur mostly in freshwater and marine environments and range in size from unicellular to multicellular forms.

Algal bloom

A rapid growth of algae in aquatic environments often triggered by an input of high levels of nutrients (particularly nitrogen and phosphorus) and an increase in temperature. Blue-green algae (or cyanobacteria) are of most concern to SA Water. Algal blooms frequently cause environmental problems and can create challenges for water treatment.

Alum

An aluminium sulphate-based chemical used as a coagulant in the water treatment process.

Aluminium (Al)

A naturally-occurring element in soils which can enter water from catchments.

Ammonia (NH_3)

A highly soluble compound resulting from the decomposition of organic matter containing nitrogen. Usually only found in small concentrations in surface waters.

Aquifer

A layer or section of earth or rock that contains fresh water (known as groundwater), any water that is stored naturally underground or that follows through rock or soil, supplying springs and wells.

Australian Drinking Water Guidelines (ADWG)

Drinking water guidelines established by a joint committee of the National Health and Medical Research Council (NHMRC) and Agricultural Resource Management Council of Australia and New Zealand (ARMCANZ), published in 2011. These national guidelines provide a framework and benchmark water quality values for best practice in drinking water supply operations.

Australian Water Quality Centre (AWQC)

A business unit of SA Water which provides a comprehensive range of water and wastewater analytical services. The AWQC also undertakes investigations and consultancies on a commercial basis on a wide range of water quality and treatment technology issues. The AWQC has been National Association of Testing Authorities (NATA) accredited since 1974 and obtained quality system certification to ISO 9001 in 1997. For more information, visit www.awqc.com.au.

Blue-green algae

See cyanobacteria.

Calcium (Ca)

A naturally occurring element that can enter water from catchments. It may also be added to water in the treatment process to reduce the acidity levels or increase the capacity of water to buffer pH changes.

Catchment

An area of land surrounding a water storage. The run-off water from rain falling over the catchment drains into the storage and collects nutrients, minerals and other contaminants (including microorganisms) from the surface of the land.

Chloramination

The application of chlorine followed by ammonia to create monochloramine (NH_2Cl), a stable disinfectant that is added to drinking water to kill bacteria or to oxidise undesirable compounds. Chloramines persist for a longer time than chlorine and as a result are used in longer water distribution systems.

Chlorination

The disinfection of water, wastewater and industrial waste through the application of chlorine (Cl) as part of the water treatment process. Chlorination kills microorganisms and oxidises undesirable compounds.

Coliforms

Coliform bacteria are used as one of the indicators of the quality of drinking water and the possible presence of disease-causing microorganisms. These bacteria are killed by chlorine.

Colour

See True colour.

Cryptosporidium

A parasitic protozoan (microorganism) which can cause gastroenteritis (stomach upsets) in humans. These organisms occur in the gut of infected warm-blooded animals and can be introduced into source water through faecal contamination.

Customer tap

Strategically placed sampling location in a water distribution system to enable verification of water quality in the distribution system as supplied to customers; typically located near a water meter.

Cyanobacteria (blue-green algae)

Single-celled, filamentous or colony-forming organisms which are widely distributed in freshwater and marine environments. Under favourable conditions of light, temperature and nutrient supply, extensive growth of cyanobacteria may occur, leading to blooms. Cyanobacteria blooms frequently result in environmental problems and can create challenges for water treatment.

Desalination

A water treatment process used to convert highly saline water into water suitable for human consumption. Treatment involves passing saline water through membranes at a high pressure.

Disinfection

Inactivation (killing) of pathogens or organisms capable of causing infectious disease by physical or chemical processes, including chlorination.

Disinfection byproducts (DBPs)

Products of reactions between disinfectants – particularly chlorine – and naturally occuring organic material.

Dissolved organic carbon (DOC)

DOC is derived from organic materials (such as decomposed plant matter) which may give water a brownish appearance.

Drinking water

Water that is suitable for human consumption.

Drinking Water Quality Management System (DWQMS)

SA Water's DWQMS is used to ensure our drinking water supplies are managed effectively to provide high quality drinking water and to ensure the protection of public health.

Escherichia coli (E. coli)

The most common thermotolerant (heat tolerant) coliform present in faeces, which is regarded as the most specific indicator of recent faecal contamination. *E. coli* can be killed by standard disinfection practices.

Faecal coliforms

Bacteria which inhabit the intestines of humans and other mammals and are present in faeces. Faecal coliforms are used as an indicator of human and animal waste contamination and can be killed by standard disinfection practices.

Filtration

A process for removing particles by passing water through a porous barrier, such as a screen, membrane, sand or gravel. Often used in conjunction with a coagulant (e.g. alum) to settle contaminants.

Fluoride (F)

Fluoride is regarded as a useful constituent of drinking water, particularly for the prevention of tooth decay. Fluoride has been added to Adelaide's water supply since 1971. Concentration is maintained within the recommended levels set by SA Health.

Geosmin

An organic compound with a distinct earthy/musty smell, produced by certain blue-green algae, which can impart an unpleasant smell and taste to water.

Giardia

A parasitic protozoan (microorganism) found in untreated surface water and removed by filtration. It can cause gastroenteritis (stomach upsets) in humans. These microorganisms occur in the gut of infected warm-blooded animals and can be introduced into source waters through faecal contamination.

Gigalitre (GL)

A metric unit of volume equal to one thousand million (1 000 000 000) litres or 1000 megalitres.

Groundwater

Water beneath the earth's surface (often between saturated soil and rock) that supplies bores, wells or springs.

Heavy metals

Individual metals and metal compounds that negatively affect people's health. These occur naturally in the environment and include arsenic and selenium. In very small amounts, many of these metals are necessary to support life. However, in larger amounts, they become toxic.

Incident Management System (IMS)

The Incident Management System (IMS) is SA Water's web-based incident management tool for the reporting and management of all incidents.

Inflows

Water flowing from catchments into reservoirs through streams, rivers and creeks.

Iron (Fe)

An element which, when found in water, leads to a brownish discolouration. Limits on the amount of iron in water are usually due to taste and appearance factors rather than any detrimental health effects.

Kilolitre (kL)

A metric unit of volume equal to 1 000 litres.

Magnetic Ion Exchange (MIEX®)

An ion exchange resin that is designed to remove dissolved organic carbon from water as part of the water treatment process.

Manganese (Mn)

Manganese in a water supply may affect taste, cause staining of clothes, produce deposits in pipes and contribute to turbidity.

Megalitre (ML)

A metric unit of volume equal to one million (1 000 000) litres or 1 000 kilolitres.

2-Methyl Isoborneol (MIB)

An earthy/musty smelling organic compound produced by certain blue-green algae, which can impart an unpleasant smell/taste to water.

Microorganisms

Organisms invisible to the unaided eye.

Monitoring

An ongoing observation and testing program to assess potential changes in circumstances.

National Association of Testing Authorities (NATA)

NATA is Australia's national laboratory accreditation authority. NATA accreditation recognises and promotes facilities competent in specific types of testing, measurement, inspection and calibration.

National Health and Medical Research Council (NHMRC)

NHMRC is Australia's peak body for supporting health and medical research for developing health advice for the Australian community, health professionals and governments, and for providing advice on ethical behaviour in health care and in the conduct of health and medical research.

Naturally occurring

Present in the natural environment as minerals, elements, salts and other substances.

Nephelometric Turbidity Unit (NTU)

A measure of turbidity in water.

Nitrate (NO_3)

The most stable form of combined nitrogen in water. Present in surface waters in small amounts, the major sources are from human and animal wastes.

Nitrogen (N)

Nitrogen is an essential nutrient for plant growth. It is used in fertilisers and is present in sewage effluent. High levels of nutrients (including nitrogen) can lead to excessive algal growth in lakes, rivers and reservoirs.

Non-drinking water

Water that is not suitable for human consumption.

Nutrients

Compounds required for growth by plants and other organisms. Major nutrients for plant growth are phosphorus and nitrogen.

Organic

Substances that come from animal or plant sources and always contain carbon.

Parasite

An organism that relies on a host organism to grow.

Pathogens

Disease-causing organisms such as bacteria and viruses.

pH

The pH value indicates if a substance is acidic, neutral or alkaline. It is calculated from the number of hydrogen ions present and is measured on a scale from zero to 14. A pH greater than seven is alkaline, less than seven is acidic and seven is neutral. The pH of public water supplies should be slightly alkaline to minimise corrosion.

Phosphorus (P)

Phosphorus is an essential nutrient for plant growth. High levels of phosphorus can lead to excessive algal growth in lakes, rivers and reservoirs and can be due to inputs from human activity such as fertiliser run-off and land clearing.

Protozoa

Single-celled organisms that feed on other, smaller microorganisms. A number of these (such as some types of *Giardia* and *Cryptosporidium*) are responsible for waterborne diseases.

Reservoir

A natural or artificial body of water used as a storage for water supply.

SA Health *Water/Wastewater Incident Notification and Communication Protocol*

An agreement between SA Health and SA Water which covers incident notification and reporting requirements.

Salinity

The concentration of salts in water, mostly sodium chloride. Salinity can affect potability, water use for irrigation and industrial purposes as well as aquatic life.

Source water

Water prior to any treatment or disinfection.

Suspended solids

Particles suspended in water that may be removed by sedimentation or filtration.

Total Dissolved Solids (TDS)

A measure of inorganic salts and small amounts of organic matter that are dissolved in water. Usually determined by converting electrical conductivity to TDS values.

Total hardness

Total hardness is the sum of the concentrations of calcium and magnesium ions expressed as calcium carbonate ($CaCO_3$) equivalent. Waters with a high mineral content (a total hardness in excess of 200mg/L) are considered hard.

Treatment (water)

The filtration and disinfection processes employed to produce drinking water.

Trihalomethanes (THMs)

Compounds that may occur in a chlorinated water supply as a by-product of organic materials present in the water reacting with chlorine.

True colour

Colour is mainly due to the presence of dissolved substances from organic matter in water, such as decaying leaves and vegetation. True colour refers to the colour of water after particles of organic matter have been removed through filtration and is the measurement of the extent to which light is absorbed by the water. Measured in Hazen Units (HU).

Turbidity

Refers to the presence of suspended solids in water causing a muddy or discoloured appearance. Turbidity is measured in Nephelometric Turbidity Units (NTU).

Ultraviolet (UV)

Natural UV light from the sun or artificial UV light from low pressure mercury lamps will kill pathogens, depending on contact time and light intensity. The water must be relatively clear, of low turbidity and dissolved compounds.

Water cycle

The water cycle is the simplest natural cycle on earth involving the transfer of water between water bodies (e.g. oceans and lakes) and the atmosphere. Water evaporates from water bodies into the atmosphere. The water vapour rises and cools, forming droplets that join together to form clouds (condensation). As the droplets join together and become heavier they fall to earth as rain or other forms of precipitation. The rain can then infiltrate the soil into groundwater aquifers or flow as surface runoff into water bodies and the cycle begins again.

Water Quality Hazard and Risk Register (WQH&RR)

A web based register that centrally manages water quality hazard identification, risk assessment and risk mitigation.

Water Services Association of Australia (WSAA)

Australia's peak body for the Australian urban water industry. Its members provide water services to over 15 million Australians.

Water supply system

The complete system that provides a water supply to customers. It includes all infrastructure from catchment to tap, including the source water, water storage reservoirs, treatment plants and distribution networks.

Water treatment plant (WTP)

A treatment plant that improves water quality by removing impurities through filtration and disinfection.

Water Quality Data 2014-15

Water quality data and water quality information is available on SA Water's website.




We are actively enhancing the way we provide water quality information to our customers.

We provide the following water quality information on our website www.sawater.com.au:

- Performance data for our drinking water supply systems, including data on the quality of drinking water supplied to individual suburbs and towns, updated monthly.
- Web pages that provide easy-to-read descriptions about the nature of key water quality parameters, the factors that may influence their presence in water and the effects that they can have on water quality.

This report covers the period of 1 July 2014 to 30 June 2015.

Table 1

2014–15 Metropolitan Adelaide source water quality (inlets to water treatment plants)

	Anstey Hill WTP				Hope Valley WTP			
	Samples	Min	Max	Ave	Samples	Min	Max	Ave
Colour - True [456nm] [HU]	13	6	46	18	9	13	61	34
Dissolved Organic Carbon [mg/L]	52	3.2	12.8	5.4	37	7.4	11.4	9.9
Fluoride [mg/L]	13	0.10	0.22	0.14	9	0.22	0.31	0.26
Hardness - Total [mg/L]	14	97	122	110	14	115	145	136
Nitrate as Nitrogen [mg/L]	27	0.011	0.297	0.183	27	<0.005	0.073	0.019
pH Units	13	6.9	8.2	7.6	9	6.8	8.4	7.7
Phosphorus - Total [mg/L]	27	0.026	0.091	0.051	27	0.014	0.104	0.038
Total Dissolved Solids [mg/L]	13	150	360	203	9	310	370	344
Turbidity [NTU]	13	4.5	80.0	33.5	9	1.2	11.0	4.1

	Barossa WTP				Little Para WTP			
	Samples	Min	Max	Ave	Samples	Min	Max	Ave
Colour - True [456nm] [HU]	13	25	35	30	8	16	31	21
Dissolved Organic Carbon [mg/L]	52	9.4	11.2	10.5	34	6.9	8.5	7.5
Fluoride [mg/L]	13	0.24	0.35	0.29	8	0.25	0.28	0.26
Hardness - Total [mg/L]	14	102	118	113	14	113	141	127
Nitrate as Nitrogen [mg/L]	27	0.005	0.045	0.024	27	<0.005	0.198	0.092
pH Units	13	7.3	8.0	7.7	8	7.5	8.0	7.7
Phosphorus - Total [mg/L]	27	0.009	0.035	0.017	27	0.013	0.069	0.030
Total Dissolved Solids [mg/L]	13	350	350	350	8	310	350	326
Turbidity [NTU]	13	0.5	1.6	0.8	8	4.7	17.0	8.9

	Happy Valley WTP				Myponga WTP			
	Samples	Min	Max	Ave	Samples	Min	Max	Ave
Colour - True [456nm] [HU]	13	18	54	40	13	41	75	58
Dissolved Organic Carbon [mg/L]	52	5.7	9.2	7.9	52	12.1	14.2	13.1
Fluoride [mg/L]	13	0.17	0.34	0.25	13	0.17	0.23	0.20
Hardness - Total [mg/L]	13	93	120	107	13	105	127	120
Nitrate as Nitrogen [mg/L]	42	<0.005	0.105	0.030	52	<0.005	0.207	0.072
pH Units	13	7.6	8.4	8.0	13	7.4	7.8	7.6
Phosphorus - Total [mg/L]	42	0.025	0.069	0.042	52	0.022	0.119	0.044
Total Dissolved Solids [mg/L]	13	270	350	300	13	350	390	368
Turbidity [NTU]	13	2.2	6.7	3.7	13	1.2	4.2	2.2

Table 2

2014–15 Metropolitan Adelaide distribution system customer tap water quality against 2011 ADWG

	Anstey Hill Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]		297	<0.1	1.4	0.3	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	297	<0.1	1.4	0.3	88.6
Colour - True [HU]		≤ 15[HU]	26	<1	4	1	100
***E. coli* [per 100mL]**	++		297	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]		8	0.53	0.90	0.81	100
Hardness - Total [mg/L]		≤ 200[mg/L]	8	60	128	75	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	8	0.0018	0.0119	0.0074	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]		8	0.0004	0.0016	0.0009	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	8	0.0004	0.0016	0.0009	100
pH Units		6.5 - 8.5[pH units]	26	7.1	7.9	7.4	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	8	170	390	235	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]		61	55	249	97	100
Turbidity [NTU]		≤ 5[NTU]	26	<0.1	0.34	0.15	100

	Barossa Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]		141	<0.1	0.9	0.2	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	141	<0.1	0.9	0.2	96.5
Colour - True [HU]		≤ 15[HU]	26	<1	2	1	100
***E. coli* [per 100mL]**	++		139	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]		8	0.75	0.92	0.84	100
Hardness - Total [mg/L]		≤ 200[mg/L]	8	142	148	144	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	8	0.0028	0.0405	0.0147	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]		8	0.0003	0.0019	0.0011	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	8	0.0003	0.0019	0.0011	100
pH Units		6.5 - 8.5[pH units]	26	7.0	7.6	7.3	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	8	380	420	400	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]		46	130	220	176	100
Turbidity [NTU]		≤ 5[NTU]	26	<0.1	0.2	0.1	100

	Central Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]		1485	<0.1	2.5	0.4	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	1485	<0.1	2.5	0.4	77.6
Colour - True [HU]		≤ 15[HU]	119	<1	3	1	100
***E. coli* [per 100mL]**	++		1437	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]		38	0.23	0.89	0.66	100
Hardness - Total [mg/L]		≤ 200[mg/L]	38	61	129	102	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	38	0.0014	0.0249	0.0068	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]		38	0.0002	0.0061	0.0019	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	38	0.0002	0.0061	0.0019	100
pH Units		6.5 - 8.5[pH units]	119	7.0	8.0	7.4	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	82	110	350	266	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]		236	4	268	134	99.6
Turbidity [NTU]		≤ 5[NTU]	119	<0.1	0.63	0.16	100

++ *E. coli* should not be detected in samples of drinking water. However the ADWG recognise that occasional detections may occur.
In accordance with the guidelines any detection is immediately investigated and corrective action implemented as agreed with SA Health.

Table 2

2014–15 Metropolitan Adelaide distribution system customer tap water quality against 2011 ADWG *continued*

	East Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]		389	<0.1	1.1	0.3	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	389	<0.1	1.1	0.3	88.2
Colour - True [HU]		≤ 15[HU]	39	<1	3	1	100
***E. coli* [per 100mL]**	++		390	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]		12	0.37	0.92	0.75	100
Hardness - Total [mg/L]		≤ 200[mg/L]	12	56	103	77	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	12	0.0010	0.0293	0.0090	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]		12	0.0006	0.0028	0.0013	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	12	0.0006	0.0028	0.0013	100
pH Units		6.5 - 8.5[pH units]	39	7.0	7.9	7.5	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	12	160	290	212	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]		74	29	268	114	97.3
Turbidity [NTU]		≤ 5[NTU]	39	<0.1	0.26	0.14	100

	Myponga Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]		105	<0.1	0.5	0.1	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	105	<0.1	0.5	0.1	100
Colour - True [HU]		≤ 15[HU]	13	<1	3	2	100
***E. coli* [per 100mL]**	++		104	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]		4	0.71	0.88	0.81	100
Hardness - Total [mg/L]		≤ 200[mg/L]	4	116	125	121	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	4	0.0060	0.0285	0.0128	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]		4	0.0006	0.0020	0.0013	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	4	0.0006	0.0020	0.0013	100
pH Units		6.5 - 8.5[pH units]	13	7.2	7.6	7.3	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	4	370	420	400	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]		52	130	276	215	84.6
Turbidity [NTU]		≤ 5[NTU]	13	<0.1	0.39	0.16	100

++ *E. coli* should not be detected in samples of drinking water. However the ADWG recognise that occasional detections may occur. In accordance with the guidelines any detection is immediately investigated and corrective action implemented as agreed with SA Health.

Table 2

2014–15 Metropolitan Adelaide distribution system customer tap water quality against 2011 ADWG *continued*

	North Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]		502	<0.1	1.4	0.3	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	502	<0.1	1.4	0.3	87.5
Colour - True [HU]		≤ 15[HU]	52	<1	3	2	100
***E. coli* [per 100mL]**	++		500	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]		16	0.38	0.98	0.81	100
Hardness - Total [mg/L]		≤ 200[mg/L]	16	59	149	109	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	16	0.0022	0.0265	0.0083	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]		16	0.0005	0.0014	0.0007	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	16	0.0005	0.0014	0.0007	100
pH Units		6.5 - 8.5[pH units]	52	7.0	7.9	7.4	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	17	190	420	310	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]		93	51	265	134	97.8
Turbidity [NTU]		≤ 5[NTU]	52	<0.1	0.3	0.1	100

	South Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]		102	<0.1	1.0	0.2	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	102	<0.1	1.0	0.2	97.1
Colour - True [HU]		≤ 15[HU]	13	<1	3	1	100
***E. coli* [per 100mL]**	++		102	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]		4	0.46	0.85	0.74	100
Hardness - Total [mg/L]		≤ 200[mg/L]	4	83	122	107	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	4	<0.0005	0.0063	0.0044	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]		4	0.0009	0.0025	0.0016	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	4	0.0009	0.0025	0.0016	100
pH Units		6.5 - 8.5[pH units]	13	7.2	8.0	7.5	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	4	190	310	273	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]		39	12	214	141	100
Turbidity [NTU]		≤ 5[NTU]	13	<0.1	0.47	0.17	100

++ *E. coli* should not be detected in samples of drinking water. However the ADWG recognise that occasional detections may occur. In accordance with the guidelines any detection is immediately investigated and corrective action implemented as agreed with SA Health.

Table 2

2014–15 Metropolitan Adelaide distribution system customer tap water quality against 2011 ADWG *continued*

	West Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]		495	<0.1	1.5	0.4	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	495	<0.1	1.5	0.4	85.5
Colour - True [HU]		≤ 15[HU]	72	<1	4	2	100
***E. coli* [per 100mL]**	++		486	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]		22	0.15	0.89	0.58	100
Hardness - Total [mg/L]		≤ 200[mg/L]	22	75	150	121	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	22	0.0031	0.0379	0.0099	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]		22	0.0005	0.0035	0.0016	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	22	0.0005	0.0035	0.0016	100
pH Units		6.5 - 8.5[pH units]	70	7.0	7.9	7.3	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	45	160	380	321	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]		123	7	266	153	96.7
Turbidity [NTU]		≤ 5[NTU]	72	<0.1	0.3	0.2	100

	Metropolitan Adelaide - Total Distribution System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]		3,518	<0.1	2.5	0.3	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	3,518	<0.1	2.5	0.3	84.2
Colour - True [HU]		≤ 15[HU]	360	<1	4	1	100
***E. coli* [per 100mL]**	++		3,455	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]		112	0.15	0.98	0.71	100
Hardness - Total [mg/L]		≤ 200[mg/L]	112	56	150	106	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	112	<0.0005	0.0405	0.0086	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	112	0.0002	0.0061	0.0015	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]		112	0.0002	0.0061	0.0015	100
pH Units		6.5 - 8.5[pH units]	358	7.0	8.0	7.4	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	184	110	430	291	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]		726	4	276	141	97.4
Turbidity [NTU]		≤ 5[NTU]	360	<0.1	0.63	0.15	100

++ *E. coli* should not be detected in samples of drinking water. However the ADWG recognise that occasional detections may occur. In accordance with the guidelines any detection is immediately investigated and corrective action implemented as agreed with SA Health.

Table 3
2014-15 Country source water quality

	Total Dissolved Solids [mg/L]			Hardness - Total [mg/L]			Dissolved Organic Carbon [mg/L]			pH Units		
System	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
Barmera WTP	100	250	140	N/A	N/A	N/A	2.8	6.6	4.1	7.1	8.9	7.9
Barossa WTP	340	380	352	102	118	113	9.6	11.6	10.6	7.3	8.6	7.8
Beachport IRP	640	670	654	253	288	272	0.9	1.1	1.0	7.2	7.4	7.3
Berri WTP	88	220	134	N/A	N/A	N/A	2.7	6.6	3.9	7.1	8.5	7.6
Blanchetown WTP	130	300	169	N/A	N/A	N/A	3.0	6.5	4.3	7.1	8.9	7.8
Bordertown	380	620	475	221	295	258	0.6	1.6	0.8	7.1	7.4	7.3
Cadell WTP	120	270	162	N/A	N/A	N/A	2.7	6.6	4.1	7.0	8.7	7.8
Coffin Bay	340	470	383	178	223	207	0.4	0.4	0.4	7.7	7.8	7.7
Cowirra WTP	120	270	176	N/A	N/A	N/A	3.4	5.9	4.3	7.0	7.9	7.5
Elliston	570	990	770	256	345	290	0.5	0.5	0.5	7.3	7.6	7.5
Eyre South	430	830	592	245	382	301	0.6	0.9	0.8	7.1	7.6	7.5
Geranium	1300	1700	1412	539	557	547	0.7	0.9	0.8	6.6	7.0	6.9
Glossop WTP	88	220	134	N/A	N/A	N/A	2.7	6.6	3.9	7.1	8.5	7.6
Happy Valley WTP	270	310	291	93	120	107	5.7	10.4	8	7.6	8.5	8.1
Hawker Desalination WTP	2000	2500	2288	860	1080	977	0.6	0.8	0.7	7.1	7.3	7.2
Kalangadoo IRP	520	530	527	345	360	354	1.0	1.1	1.1	7.0	7.3	7.2
Kanmantoo WTP	150	290	190	49	74	56	3.7	6.6	4.8	7.0	7.6	7.3
Kingston SE IRP	770	1200	955	204	242	222	1.0	1.6	1.1	7.3	8.0	7.5
Lameroo IRP	890	970	932	224	240	232	0.4	0.6	0.5	7.5	7.7	7.6
Loxton WTP	92	240	139	N/A	N/A	N/A	2.5	6.9	4.0	7.3	8.9	7.9
Lucindale IRP	790	820	802	294	315	308	2.3	2.4	2.4	7.3	7.5	7.4
Mannum WTP	150	270	178	43	66	52	3.4	10.6	5.0	7.1	7.8	7.4
Melrose	1200	1700	1450	260	395	311	0.4	0.5	0.5	7.2	7.5	7.4
Middle River WTP	250	520	435	35	82	67	8.7	18.1	10.8	6.6	7.5	7.2
Millicent	530	720	604	328	366	341	0.9	1.3	1.1	7.3	7.7	7.4
Moorook WTP	99	250	141	N/A	N/A	N/A	2.7	6.8	4.3	7.3	8.9	7.9
Morgan WTP	120	260	166	35	65	49	2.1	6.4	3.9	7.2	9.2	8.0
Mt Burr	400	480	436	257	331	295	0.5	0.7	0.6	7.1	7.5	7.3
Mt Compass	130	270	195	44	87	65	<0.3	<0.3	<0.3	6.0	6.9	6.4
Mt Gambier	340	620	536	174	309	250	0.8	1.7	1.0	7.2	8.5	8.0
Mt Pleasant WTP	150	270	178	43	66	52	3.0	10.6	4.6	7.1	7.9	7.4
Murray Bridge WTP	150	290	190	49	74	56	3.7	6.6	4.8	7.0	7.6	7.3
Mypolonga WTP	140	280	185	N/A	N/A	N/A	3.4	6.0	4.4	7.0	7.6	7.4
Myponga WTP	350	450	378	105	127	120	12.1	14.7	13.4	7.0	8.3	7.7
Nangwarry	530	730	622	322	453	375	1.0	1.1	1.1	7.1	7.3	7.1
Naracoorte	1200	1300	1228	327	366	341	1.6	1.8	1.7	7.7	8.0	7.8
Orroroo	1100	2100	1842	684	726	701	0.5	0.5	0.5	7.1	7.5	7.3
Padthaway	1300	1500	1438	574	600	588	0.8	1.0	0.9	7.0	7.2	7.1
Palmer WTP	150	270	178	43	66	52	3.4	10.6	5.0	7.1	7.8	7.4
Parachilna	800	830	818	285	314	303	0.4	0.4	0.4	7.5	7.6	7.6
Parilla IRP	620	680	637	178	187	182	0.4	0.4	0.4	7.6	7.7	7.7
Penneshaw WTP	33000	36000	34867	N/A	N/A	N/A	<0.5	1.5	1.0	6.8	7.2	6.9
Penola IRP	630	670	649	308	333	319	1.3	2.6	1.8	7.2	7.4	7.3
Pinnaroo IRP	650	1400	872	242	387	277	0.4	0.7	0.5	7.1	7.6	7.4
Port Lincoln	410	1300	732	208	511	310	0.5	0.8	0.6	7.0	7.8	7.3
Port MacDonnell	680	690	685	18	22	20	1.2	1.2	1.2	8.2	8.3	8.3
Quorn	1100	1400	1226	494	538	516	0.6	1.3	0.9	6.8	7.2	7.0
Renmark WTP	80	210	118	26	54	37	2.7	7.5	4.3	6.4	8.5	7.6
River Murray	54	980	164	26	78	50	2.0	12.6	4.3	6.4	9.2	7.8
Robe IRP	690	1000	873	68	128	91	1.0	1.2	1.1	7.5	8.0	7.8
Summit WTP	150	290	190	49	74	56	3.7	6.6	4.8	7.0	7.6	7.3
Swan Reach Town WTP	130	310	168	N/A	N/A	N/A	2.9	6.3	4.3	7.2	9.1	7.9
Swan Reach WTP	130	300	167	35	71	48	3.3	7.0	4.8	7.2	9.1	7.9
Tailem Bend WTP	170	280	201	48	78	59	3.6	6.6	4.8	7.1	7.8	7.4
Tarpeena IRP	620	730	677	384	407	399	1.0	1.1	1.1	7.1	7.2	7.2
Waikerie WTP	110	250	152	N/A	N/A	N/A	3.0	7.2	4.5	7.2	8.9	7.9
Warooka	720	770	739	316	346	332	0.9	1.0	1.0	7.4	7.6	7.5
Wilmington	290	500	344	95	283	157	<0.3	2.4	1.4	6.1	7.4	6.7
Woolpunda	100	250	151	N/A	N/A	N/A	2.5	5.9	4.1	7.2	8.9	7.9

Notes: N/A: Not applicable.

Table 3

2014-15 Country source water quality *continued*

System	Turbidity [NTU]			Colour - True [HU]			Nitrate as Nitrogen [mg/L]			Phosphorus - Total [mg/L]		
	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
Barmera WTP	12.0	51.0	28.4	6	44	14	N/A	N/A	N/A	N/A	N/A	N/A
Barossa WTP	<0.1	1.9	0.9	24	57	31	0.005	0.048	0.026	0.007	0.037	0.017
Beachport IRP	1.8	3.4	2.5	<1	<1	<1	<0.005	<0.005	<0.005	0.041	0.044	0.043
Berri WTP	13.0	61.0	29.9	5	50	14	N/A	N/A	N/A	N/A	N/A	N/A
Blanchetown WTP	14.0	68.0	31.9	6	34	13	N/A	N/A	N/A	N/A	N/A	N/A
Bordertown	<0.1	8.4	0.8	<1	2	1	0.006	0.484	0.122	0.008	0.028	0.015
Cadell WTP	18.0	84.0	37.0	6	37	13	N/A	N/A	N/A	N/A	N/A	N/A
Coffin Bay	<0.1	0.2	0.1	<1	<1	<1	0.190	1.340	0.840	0.010	0.014	0.012
Cowirra WTP	12.0	76.0	35.9	7	26	13	N/A	N/A	N/A	N/A	N/A	N/A
Elliston	<0.1	0.3	0.1	<1	<1	<1	4.340	4.340	4.340	0.009	0.009	0.009
Eyre South	<0.1	9.5	0.9	<1	<1	<1	2.360	5.220	3.616	0.007	0.020	0.015
Geranium	<0.1	0.2	0.1	<1	<1	<1	0.028	0.058	0.043	0.037	0.041	0.039
Glossop WTP	13.0	61.0	29.9	5	50	14	N/A	N/A	N/A	N/A	N/A	N/A
Happy Valley WTP	1.6	26.0	4.0	16	62	41	<0.005	0.139	0.035	0.022	0.097	0.044
Hawker Desalination WTP	4.6	14.0	9.8	<1	<1	<1	<0.005	0.009	0.008	0.014	0.019	0.017
Kalangadoo IRP	1.9	5.8	3.2	<1	<1	<1	<0.005	<0.005	<0.005	0.018	0.021	0.020
Kanmantoo WTP	17.0	77.0	40.2	7	25	13	N/A	N/A	N/A	0.049	0.236	0.109
Kingston SE IRP	<0.1	23.0	10.1	<1	2	1	<0.005	0.012	0.007	0.008	0.014	0.011
Lameroo IRP	1.8	4.6	2.8	<1	<1	<1	<0.005	<0.005	<0.005	0.053	0.054	0.054
Loxton WTP	11.0	52.0	28.3	6	51	14	<0.005	0.166	0.017	0.030	0.170	0.087
Lucindale IRP	0.3	8.1	5.2	<1	2	2	<0.005	<0.005	<0.005	0.032	0.040	0.036
Mannum WTP	12.0	80.0	38.2	6	26	13	<0.005	0.252	0.079	0.053	0.397	0.116
Melrose	<0.1	1.5	0.4	<1	<1	<1	0.309	0.808	0.583	0.017	0.036	0.027
Middle River WTP	4.8	86.0	11.1	85	199	117	0.049	0.278	0.127	0.016	0.055	0.029
Millicent	0.2	3.0	0.9	<1	4	2	<0.005	0.062	0.042	0.012	0.021	0.015
Moorook WTP	12.0	52.0	30.1	6	47	14	<0.005	0.074	0.012	0.045	0.158	0.090
Morgan WTP	0.2	68.0	15.1	<1	38	8	<0.005	0.124	0.020	0.005	0.148	0.072
Mt Burr	0.1	0.7	0.3	<1	<1	<1	0.175	1.400	0.797	0.025	0.033	0.030
Mt Compass	<0.1	2.8	0.3	<1	<1	<1	0.027	0.051	0.039	0.012	0.022	0.017
Mt Gambier	0.2	20.0	3.8	<1	2	1	<0.005	3.720	2.665	<0.005	0.050	0.018
Mt Pleasant WTP	10.0	80.0	36.3	6	27	13	<0.005	0.252	0.079	0.053	0.397	0.116
Murray Bridge WTP	17.0	77.0	40.2	7	25	13	N/A	N/A	N/A	0.049	0.236	0.109
Mypolonga WTP	16.0	76.0	35.8	7	25	13	N/A	N/A	N/A	N/A	N/A	N/A
Myponga WTP	1.1	16.0	2.6	40	99	59	<0.005	0.207	0.072	0.016	0.119	0.043
Nangwarry	<0.1	1.8	0.4	<1	<1	<1	0.339	3.170	1.755	0.013	0.015	0.014
Naracoorte	0.2	0.9	0.4	4	6	5	<0.005	<0.005	<0.005	0.051	0.065	0.059
Orroroo	<0.1	0.7	0.2	<1	<1	<1	0.035	0.051	0.043	0.014	0.014	0.014
Padthaway	0.3	1.9	0.8	<1	<1	<1	0.032	0.037	0.035	0.016	0.016	0.016
Palmer WTP	12.0	80.0	38.2	6	26	13	<0.005	0.252	0.079	0.053	0.397	0.116
Parachilna	<0.1	1.4	0.2	<1	<1	<1	1.370	1.370	1.370	0.013	0.013	0.013
Parilla IRP	1.6	3.7	2.5	<1	<1	<1	<0.005	<0.005	<0.005	0.025	0.060	0.043
Penneshaw WTP	0.1	1.3	0.3	N/A	N/A	N/A	N/A	N/A	N/A	0.013	0.020	0.017
Penola IRP	5.7	13.0	9.9	1	3	2	<0.005	<0.005	<0.005	0.024	0.029	0.027
Pinnaroo IRP	1.5	24.0	5.8	<1	<1	<1	<0.005	<0.005	<0.005	0.046	0.063	0.055
Port Lincoln	<0.1	22.0	0.7	<1	<1	<1	0.586	6.220	3.413	<0.005	0.018	0.010
Port MacDonnell	<0.1	1.7	0.3	2	10	5	<0.005	<0.005	<0.005	0.175	0.205	0.190
Quorn	<0.1	0.6	0.2	<1	<1	<1	0.103	0.168	0.130	0.015	0.022	0.019
Renmark WTP	14.0	76.0	33.6	6	49	14	<0.005	0.064	0.015	0.012	0.199	0.096
River Murray	8	560	33	5	64	13	<0.005	0.252	0.023	0.012	5.330	0.101
Robe IRP	0.2	2.2	0.7	<1	2	1	<0.005	0.574	0.196	0.041	0.046	0.044
Summit WTP	17.0	77.0	40.2	7	25	13	N/A	N/A	N/A	0.049	0.236	0.109
Swan Reach Town WTP	11.0	58.0	30.7	6	35	13	N/A	N/A	N/A	N/A	N/A	N/A
Swan Reach WTP	13.0	65.0	31.0	5	37	13	<0.005	0.131	0.039	0.049	0.207	0.113
Tailem Bend WTP	14.0	72.0	36.4	8	24	13	N/A	N/A	N/A	0.044	0.291	0.109
Tarpeena IRP	0.3	18.0	7.8	<1	<1	<1	<0.005	0.126	0.066	0.030	0.055	0.043
Waikerie WTP	11.0	70.0	33.3	6	44	14	<0.005	0.127	0.014	0.039	0.329	0.103
Warooka	<0.1	0.3	0.1	<1	<1	<1	1.200	3.190	2.195	0.009	0.014	0.012
Wilmington	<0.1	2.5	0.5	<1	2	1	0.007	0.199	0.108	0.013	0.086	0.053
Woolpunda	14.0	60.0	31.6	6	41	14	N/A	N/A	N/A	N/A	N/A	N/A

Notes: N/A: Not applicable.

Table 4

2014–15 Country drinking water distribution systems – customer tap water quality against 2011 ADWG

	E. coli/100 mL		Chlorine Residual – Free [mg/L]*			
System	Samples	Health Compliance %	Min	Max	Ave	Health Compliance %
ADWG Value		0				≤ 5
Target		100% free ++				100%
Barmera WTP	102	100	1.0	2.9	1.9	100
Barossa WTP	445	100	<0.1	2.5	0.5	100
Beachport IRP	66	100	<0.1	1.4	1.1	100
Berri WTP	90	100	0.7	2.5	1.7	100
Blanchetown WTP	52	100	0.8	2.1	1.5	100
Bordertown	66	100	0.7	1.6	1.1	100
Cadell WTP	52	100	0.8	1.5	1.2	100
Coffin Bay	65	100	0.7	1.8	1.2	100
Cowirra WTP	78	100	0.2	2.0	1.0	100
Elliston	106	100	0.6	2.0	1.2	100
Eyre South	287	100	0.6	2.1	1.1	100
Eyre South/Morgan WTP	306	100	<0.1	2.7	1.6	100
Geranium	53	100	0.4	2.6	1.2	100
Glossop WTP	103	100	1.0	2.4	1.6	100
Happy Valley WTP	65	100	<0.1	3.1	0.9	100
Hawker Desalination WTP	53	100	1.0	1.6	1.3	100
Kalangadoo IRP	66	100	0.5	1.3	0.9	100
Kanmantoo WTP	78	100	0.8	2.1	1.4	100
Kingston SE IRP	67	100	0.1	1.2	0.9	100
Lameroo IRP	53	100	0.4	1.6	1.1	100
Loxton WTP	80	100	N/A	N/A	N/A	-
Lucindale IRP	66	100	0.5	1.3	0.9	100
Mannum WTP	116	100	0.6	3.0	1.7	100
Melrose	52	100	1.0	1.9	1.3	100
Middle River WTP	114	100	<0.1	2.6	0.8	100
Millicent	84	100	0.5	1.2	0.8	100
Moorook WTP	104	100	0.8	2.7	1.8	100
Morgan/Swan Reach WTP	545	100	N/A	N/A	N/A	-
Morgan WTP	990	100	N/A	N/A	N/A	-
Mt Burr	66	100	0.6	1.0	0.8	100
Mt Compass	65	100	0.6	1.5	1.1	100
Mt Gambier	159	100	<0.1	1.9	1.0	100
Mt Pleasant WTP	130	100	0.1	2.3	1.1	100
Murray Bridge WTP	159	100	<0.1	3.2	1.5	100
Mypolonga WTP	66	100	1.0	2.7	2.1	100
Myponga WTP	221	100	<0.1	1.2	0.2	100
Nangwarry	67	100	0.4	1.2	0.9	100
Naracoorte	84	100	<0.1	1.3	0.7	100
Orroroo	51	100	1.0	2.0	1.4	100
Padthaway	66	100	0.5	1.6	1.2	100
Palmer WTP	115	100	0.5	2.1	1.3	100
Parachilna	52	100	<0.1	1.8	0.5	100
Parilla IRP	53	100	0.3	1.7	1.0	100
Penneshaw WTP	66	100	0.3	4.0	1.5	100
Penola IRP	79	100	<0.1	1.6	0.9	100
Pinnaroo IRP	54	100	0.4	1.9	1.0	100
Port Lincoln	104	100	0.8	1.5	1.2	100
Port MacDonnell	66	100	0.5	1.0	0.8	100
Quorn	52	100	0.8	2.2	1.4	100
Renmark WTP	222	100	<0.1	2.9	1.4	100
Robe IRP	67	100	N/A	N/A	N/A	-
Summit WTP	502	100	N/A	N/A	N/A	-
Swan Reach Town WTP	64	100	0.8	2.1	1.3	100
Swan Reach WTP	495	100	N/A	N/A	N/A	-
Tailem Bend WTP	320	100	N/A	N/A	N/A	-
Tarpeena IRP	63	100	0.2	1.3	0.9	100
Waikerie WTP	78	100	0.5	2.5	1.6	100
Warooka	51	100	0.6	1.7	1.1	100
Wilmington	52	100	0.3	2.4	0.9	100
Woolpunda	78	100	N/A	N/A	N/A	-

Notes: * Chlorinated systems only. N/A: Not applicable ++ *E. coli* should not be detected in samples of drinking water. Although we aim for 100% compliance, the ADWG recognise that occasional detections may occur. In accordance with the guidelines any detection is immediately investigated and corrective action implemented as agreed with SA Health.

Table 4

2014–15 Country drinking water distribution systems – customer tap water quality against 2011 ADWG *continued*

	Chlorine Residual – Total [mg/L]**				Total Dissolved Solids [mg/L]			
System	Min	Max	Ave	Health Compliance %	Min	Max	Ave	Aesthetic Compliance %
ADWG Value				≤ 5.0				≤600
Target				100%				100%
Barmera WTP	N/A	N/A	N/A	-	140	240	164	100
Barossa WTP	N/A	N/A	N/A	-	380	470	417	100
Beachport IRP	N/A	N/A	N/A	-	640	660	652	0
Berri WTP	N/A	N/A	N/A	-	150	240	178	100
Blanchetown WTP	N/A	N/A	N/A	-	160	230	188	100
Bordertown	N/A	N/A	N/A	-	450	540	485	100
Cadell WTP	N/A	N/A	N/A	-	170	270	200	100
Coffin Bay	N/A	N/A	N/A	-	360	430	403	100
Cowirra WTP	N/A	N/A	N/A	-	130	190	175	100
Elliston	N/A	N/A	N/A	-	790	830	814	0
Eyre South	N/A	N/A	N/A	-	510	560	540	100
Eyre South/Morgan WTP	N/A	N/A	N/A	-	330	550	431	100
Geranium	N/A	N/A	N/A	-	1400	1500	1425	0
Glossop WTP	N/A	N/A	N/A	-	120	230	166	100
Happy Valley WTP	N/A	N/A	N/A	-	180	310	263	100
Hawker Desalination WTP	N/A	N/A	N/A	-	380	2300	778	80
Kalangadoo IRP	N/A	N/A	N/A	-	530	540	533	100
Kanmantoo WTP	N/A	N/A	N/A	-	200	270	218	100
Kingston SE IRP	N/A	N/A	N/A	-	830	1000	955	0
Lameroo IRP	N/A	N/A	N/A	-	900	960	938	0
Loxton WTP	2.8	4.4	3.5	100	160	230	188	100
Lucindale IRP	N/A	N/A	N/A	-	800	810	808	0
Mannum WTP	N/A	N/A	N/A	-	180	210	195	100
Melrose	N/A	N/A	N/A	-	1400	1500	1425	0
Middle River WTP	N/A	N/A	N/A	-	430	590	520	100
Millicent	N/A	N/A	N/A	-	560	620	593	50
Moorook WTP	N/A	N/A	N/A	-	160	160	160	100
Morgan/Swan Reach WTP	0.1	3.7	2.7	100	180	290	213	100
Morgan WTP	2.0	4.1	3.0	100	170	540	224	100
Mt Burr	N/A	N/A	N/A	-	430	450	440	100
Mt Compass	N/A	N/A	N/A	-	180	220	198	100
Mt Gambier	N/A	N/A	N/A	-	350	390	357	100
Mt Pleasant WTP	N/A	N/A	N/A	-	190	280	218	100
Murray Bridge WTP	N/A	N/A	N/A	-	180	230	203	100
Mypolonga WTP	N/A	N/A	N/A	-	190	280	215	100
Myponga WTP	N/A	N/A	N/A	-	400	440	420	100
Nangwarry	N/A	N/A	N/A	-	630	650	643	0
Naracoorte	N/A	N/A	N/A	-	1200	1300	1225	0
Orroroo	N/A	N/A	N/A	-	1900	2000	1950	0
Padthaway	N/A	N/A	N/A	-	1500	1500	1500	0
Palmer WTP	N/A	N/A	N/A	-	170	200	188	100
Parachilna	N/A	N/A	N/A	-	810	820	818	0
Parilla IRP	N/A	N/A	N/A	-	630	650	640	0
Penneshaw WTP	N/A	N/A	N/A	-	140	250	186	100
Penola IRP	N/A	N/A	N/A	-	640	660	650	0
Pinnaroo IRP	N/A	N/A	N/A	-	670	790	705	0
Port Lincoln	N/A	N/A	N/A	-	520	550	536	100
Port MacDonnell	N/A	N/A	N/A	-	690	700	693	0
Quorn	N/A	N/A	N/A	-	1100	1200	1150	0
Renmark WTP	N/A	N/A	N/A	-	120	200	144	100
Robe IRP	0.1	2.4	1.3	100	750	920	840	0
Summit WTP	1.0	4.0	2.8	100	190	260	216	100
Swan Reach Town WTP	N/A	N/A	N/A	-	170	270	203	100
Swan Reach WTP	1.5	4.2	2.8	100	170	260	195	100
Tailem Bend WTP	<0.1	4.0	2.6	100	200	310	236	100
Tarpeena IRP	N/A	N/A	N/A	-	670	680	675	0
Waikerie WTP	N/A	N/A	N/A	-	150	170	163	100
Warooka	N/A	N/A	N/A	-	750	770	758	0
Wilmington	N/A	N/A	N/A	-	300	330	313	100
Woolpunda	<0.1	2.9	1.6	100	180	210	188	100

Notes: ** Chloraminated systems only. N/A: Not applicable.

Table 4

2014–15 Country drinking water distribution systems – customer tap water quality against 2011 ADWG *continued*

	Colour - True [HU]				Turbidity [NTU]			
System	Min	Max	Ave	Aesthetic Compliance %	Min	Max	Ave	Aesthetic Compliance %
ADWG Value				≤ 5.0				≤ 5
Target								
Barmera WTP	<1	<1	<1	100	<0.1	0.3	0.2	100
Barossa WTP	<1	3	1	100	<0.1	1.0	0.2	100
Beachport IRP	<1	<1	<1	100	<0.1	1.6	0.2	100
Berri WTP	<1	2	1	100	<0.1	0.8	0.2	100
Blanchetown WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Bordertown	<1	<1	<1	100	<0.1	0.3	0.1	100
Cadell WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Coffin Bay	<1	<1	<1	100	<0.1	0.2	0.1	100
Cowirra WTP	<1	3	1	100	<0.1	0.2	0.1	100
Elliston	<1	<1	<1	100	<0.1	0.1	0.1	100
Eyre South	<1	<1	<1	100	<0.1	0.2	0.1	100
Eyre South/Morgan WTP	<1	<1	<1	100	<0.1	0.7	0.2	100
Geranium	<1	<1	<1	100	<0.1	0.2	0.1	100
Glossop WTP	<1	<1	<1	100	<0.1	0.3	0.1	100
Happy Valley WTP	<1	<1	<1	100	<0.1	0.3	0.2	100
Hawker Desalination WTP	<1	<1	<1	100	<0.1	0.3	0.1	100
Kalangadoo IRP	<1	<1	<1	100	<0.1	0.4	0.1	100
Kanmantoo WTP	<1	<1	<1	100	<0.1	1.3	0.4	100
Kingston SE IRP	<1	<1	<1	100	<0.1	0.2	0.1	100
Lameroo IRP	<1	<1	<1	100	<0.1	2.9	0.3	100
Loxton WTP	<1	4	1	100	<0.1	0.2	0.1	100
Lucindale IRP	<1	2	1	100	<0.1	0.2	0.1	100
Mannum WTP	<1	<1	<1	100	<0.1	0.3	0.1	100
Melrose	<1	<1	<1	100	<0.1	0.2	0.1	100
Middle River WTP	<1	2	1	100	<0.1	0.8	0.2	100
Millicent	<1	<1	<1	100	<0.1	0.4	0.2	100
Moorook WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Morgan/Swan Reach WTP	<1	3	1	100	<0.1	1.0	0.2	100
Morgan WTP	<1	3	1	100	<0.1	1	0.1	100
Mt Burr	<1	<1	<1	100	<0.1	0.2	0.1	100
Mt Compass	<1	<1	<1	100	<0.1	0.5	0.2	100
Mt Gambier	<1	<1	<1	100	<0.1	0.9	0.2	100
Mt Pleasant WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Murray Bridge WTP	<1	<1	<1	100	<0.1	2.8	0.3	100
Mypolonga WTP	<1	<1	<1	100	<0.1	0.3	0.1	100
Myponga WTP	1	4	2	100	<0.1	0.9	0.2	100
Nangwarry	<1	<1	<1	100	<0.1	0.2	0.1	100
Naracoorte	<1	5	1	100	<0.1	1.4	0.4	100
Orroroo	<1	<1	<1	100	<0.1	0.3	0.1	100
Padthaway	<1	<1	<1	100	0.2	0.3	0.2	100
Palmer WTP	<1	3	1	100	<0.1	0.3	0.1	100
Parachilna	<1	<1	<1	100	<0.1	0.1	0.1	100
Parilla IRP	<1	<1	<1	100	<0.1	0.2	0.1	100
Penneshaw WTP	<1	<1	<1	100	<0.1	4.7	0.5	100
Penola IRP	<1	<1	<1	100	<0.1	0.3	0.1	100
Pinnaroo IRP	<1	<1	<1	100	<0.1	0.2	0.1	100
Port Lincoln	<1	<1	<1	100	<0.1	0.2	0.1	100
Port MacDonnell	<1	<1	<1	100	0.2	0.8	0.3	100
Quorn	<1	<1	<1	100	<0.1	0.2	0.1	100
Renmark WTP	<1	<1	<1	100	<0.1	0.6	0.2	100
Robe IRP	<1	<1	<1	100	<0.1	0.3	0.1	100
Summit WTP	<1	4	1	100	<0.1	0.7	0.1	100
Swan Reach Town WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Swan Reach WTP	<1	3	1	100	<0.1	0.6	0.1	100
Tailem Bend WTP	<1	4	1	100	<0.1	0.3	0.1	100
Tarpeena IRP	<1	<1	<1	100	<0.1	2.2	0.3	100
Waikerie WTP	<1	2	1	100	0.1	0.3	0.2	100
Warooka	<1	<1	<1	100	<0.1	0.6	0.2	100
Wilmington	<1	<1	<1	100	<0.1	1.2	0.2	100
Woolpunda	<1	2	1	100	<0.1	1.2	0.2	100

Table 4

2014–15 Country drinking water distribution systems – customer tap water quality against 2011 ADWG *continued*

	pH Units				Trihalomethanes - Total [µg/L]			
System	Min	Max	Ave	Aesthetic Compliance %	Min	Max	Ave	Health Compliance %
ADWG Value				6.5 - 8.5				≤ 250
Target								100%
Barmera WTP	7.0	7.8	7.4	100	54	134	91	100
Barossa WTP	7.0	9.3	7.6	90.0	62	400	213	80.3
Beachport IRP	7.5	7.9	7.6	100	30	41	35	100
Berri WTP	7.2	7.8	7.5	100	47	106	75	100
Blanchetown WTP	7.3	7.8	7.5	100	54	94	76	100
Bordertown	7.2	7.5	7.3	100	8	23	16	100
Cadell WTP	7.2	7.9	7.5	100	47	114	75	100
Coffin Bay	7.8	8.1	7.9	100	5	16	9	100
Cowirra WTP	7.4	8.7	7.9	92.3	82	170	124	100
Elliston	7.0	7.9	7.5	100	8	26	13	100
Eyre South	7.2	8.1	7.7	96.7	15	28	21	100
Eyre South/Morgan WTP	7.3	8.1	7.8	100	17	230	136	100
Geranium	6.9	7.4	7.1	100	<4	11	6	100
Glossop WTP	7.4	8.0	7.8	100	54	104	83	100
Happy Valley WTP	7.0	8.2	7.6	100	73	267	199	76.9
Hawker Desalination WTP	7.3	8.2	8.0	100	5	43	16	100
Kalangadoo IRP	7.1	7.4	7.3	100	30	59	41	100
Kanmantoo WTP	7.2	8.0	7.6	100	63	118	82	100
Kingston SE IRP	7.2	7.8	7.6	100	32	45	39	100
Lameroo IRP	7.7	8.0	7.8	100	<4	19	13	100
Loxton WTP	8.3	9.0	8.7	20.0	N/A	N/A	N/A	-
Lucindale IRP	7.4	7.6	7.5	100	89	112	100	100
Mannum WTP	7.1	7.8	7.4	100	48	124	70	100
Melrose	7.2	7.7	7.4	100	<4	6	6	100
Middle River WTP	7.3	7.6	7.5	100	69	336	199	82.1
Millicent	7.3	7.6	7.5	100	50	78	67	100
Moorook WTP	7.1	8.5	7.9	100	53	114	83	100
Morgan/Swan Reach WTP	7.8	9.5	9.1	5.1	N/A	N/A	N/A	-
Morgan WTP	6.9	9.8	8.9	13.3	19	169	113	100
Mt Burr	7.6	7.9	7.8	100	8	12	10	100
Mt Compass	6.5	7.2	7.0	100	<4	<4	<4	100
Mt Gambier	7.9	8.3	8.2	100	10	29	19	100
Mt Pleasant WTP	7.0	8.0	7.4	100	51	161	96	100
Murray Bridge WTP	7.1	8.7	7.7	96.8	45	244	114	100
Mypolonga WTP	7.2	7.7	7.4	100	56	166	108	100
Myponga WTP	7.0	8.0	7.4	100	120	337	222	76.9
Nangwarry	7.1	8.4	7.4	100	15	19	17	100
Naracoorte	7.6	8.0	7.8	100	172	223	197	100
Orroroo	7.1	7.8	7.5	100	<4	19	13	100
Padthaway	7.4	7.6	7.5	100	10	21	13	100
Palmer WTP	7.0	8.5	7.7	100	44	136	89	100
Parachilna	7.7	8.0	7.9	100	<4	<4	<4	100
Parilla IRP	7.6	8.0	7.8	100	17	21	19	100
Penneshaw WTP	7.7	8.3	8.2	100	<4	20	8	100
Penola IRP	7.2	7.5	7.4	100	44	74	63	100
Pinnaroo IRP	7.3	7.6	7.5	100	10	13	11	100
Port Lincoln	7.3	7.7	7.5	100	7	9	8	100
Port MacDonnell	8.1	8.3	8.2	100	74	93	85	100
Quorn	7.1	7.3	7.2	100	<4	28	12	100
Renmark WTP	7.0	10.0	7.9	68.1	31	173	88	100
Robe IRP	7.8	8.4	8.0	100	N/A	N/A	N/A	-
Summit WTP	7.8	9.7	8.7	28.5	N/A	N/A	N/A	-
Swan Reach Town WTP	7.2	7.9	7.6	100	50	106	79	100
Swan Reach WTP	8.4	9.4	8.9	5.3	N/A	N/A	N/A	-
Tailem Bend WTP	7.4	9.4	8.7	25.3	N/A	N/A	N/A	-
Tarpeena IRP	7.4	7.9	7.7	100	28	57	48	100
Waikerie WTP	7.6	7.9	7.7	100	59	134	90	100
Warooka	7.0	7.7	7.4	100	20	33	27	100
Wilmington	6.2	7.7	6.7	53.8	11	24	20	100
Woolpunda	7.8	9.4	8.6	51.9	N/A	N/A	N/A	-

Notes: N/A: Not applicable.

Table 4

2014–15 Country drinking water distribution systems – customer tap water quality against 2011 ADWG *continued*

	Fluoride [mg/L]				Iron - Total [mg/L]			
System	Min	Max	Ave	Health Compliance %	Min	Max	Ave	Aesthetic Compliance %
ADWG Value				≤ 1.5				≤ 0.3
Target				100%				100%
Barmera WTP	0.7	0.9	0.8	100	0.0024	0.0360	0.0169	100
Barossa WTP	0.6	1.0	0.8	100	0.0045	0.1115	0.0307	100
Beachport IRP	0.2	0.3	0.2	100	0.0007	0.1346	0.0122	100
Berri WTP	0.8	0.9	0.9	100	0.0222	0.0398	0.0331	100
Blanchetown WTP	<0.1	0.1	0.1	100	0.0103	0.0250	0.0158	100
Bordertown	0.3	0.3	0.3	100	0.0017	0.1636	0.0626	100
Cadell WTP	<0.1	0.2	0.1	100	0.0018	0.0068	0.0036	100
Coffin Bay	0.9	1.2	1.1	100	<0.0005	0.0009	0.0008	100
Cowirra WTP	<0.1	0.2	0.1	100	0.0065	0.0126	0.0101	100
Elliston	0.6	0.7	0.7	100	<0.0005	0.0006	0.0005	100
Eyre South	0.4	0.6	0.4	100	<0.0005	0.0372	0.0031	100
Eyre South/Morgan WTP	0.4	0.6	0.5	100	0.0007	0.0296	0.0058	100
Geranium	0.9	1.0	1.0	100	0.0074	0.0186	0.0137	100
Glossop WTP	<0.1	0.1	0.1	100	0.0209	0.0374	0.0272	100
Happy Valley WTP	0.4	0.9	0.6	100	0.0046	0.0235	0.0126	100
Hawker Desalination WTP	0.1	0.7	0.2	100	0.0010	0.0197	0.0055	100
Kalangadoo IRP	0.1	0.2	0.1	100	0.0019	0.0245	0.0095	100
Kanmantoo WTP	<0.1	0.1	0.1	100	0.0026	0.1392	0.0500	100
Kingston SE IRP	0.3	0.4	0.4	100	0.0009	0.0111	0.0041	100
Lameroo IRP	0.5	0.6	0.6	100	0.0189	0.0229	0.0221	100
Loxton WTP	0.8	0.9	0.8	100	0.0010	0.0030	0.0015	100
Lucindale IRP	0.2	0.3	0.3	100	0.0010	0.0493	0.0084	100
Mannum WTP	0.8	0.9	0.8	100	0.0075	0.0171	0.0131	100
Melrose	0.9	1.0	1.0	100	0.0010	0.0162	0.0061	100
Middle River WTP	<0.1	<0.1	<0.1	100	0.0075	0.0882	0.0339	100
Millicent	0.8	1.2	1.0	100	0.0099	0.0721	0.0311	100
Moorook WTP	<0.1	0.1	0.1	100	0.0128	0.0361	0.0196	100
Morgan/Swan Reach WTP	0.3	0.9	0.7	100	0.0011	0.0147	0.0077	100
Morgan WTP	<0.1	1.0	0.5	100	<0.0005	0.0288	0.0066	100
Mt Burr	0.2	0.3	0.3	100	0.0015	0.0071	0.0041	100
Mt Compass	0.2	0.3	0.3	100	0.0043	0.0126	0.0090	100
Mt Gambier	0.7	0.9	0.8	100	<0.0005	0.0129	0.0025	100
Mt Pleasant WTP	0.8	0.9	0.8	100	<0.0005	0.0052	0.0029	100
Murray Bridge WTP	0.8	0.9	0.8	100	0.0008	0.0027	0.0019	100
Mypolonga WTP	0.1	0.2	0.1	100	0.0094	0.0148	0.0114	100
Myponga WTP	0.8	0.9	0.8	100	0.0103	0.1004	0.037	100
Nangwarry	0.1	0.2	0.1	100	<0.0005	0.0064	0.0031	100
Naracoorte	1.0	1.2	1.1	100	0.0461	0.1557	0.0792	100
Orroroo	1.1	1.3	1.2	100	0.0066	0.0143	0.0105	100
Padthaway	0.1	0.1	0.1	100	0.0154	0.0300	0.0220	100
Palmer WTP	<0.1	0.1	0.1	100	0.0163	0.0450	0.0305	100
Parachilna	0.6	0.6	0.6	100	<0.0005	<0.0005	<0.0005	100
Parilla IRP	0.4	0.5	0.4	100	0.0015	0.0188	0.0072	100
Penneshaw WTP	<0.1	<0.1	<0.1	100	<0.0005	0.0788	0.0203	100
Penola IRP	0.2	0.4	0.2	100	0.0021	0.0551	0.0156	100
Pinnaroo IRP	0.6	0.7	0.7	100	0.0040	0.0560	0.0221	100
Port Lincoln	0.3	0.5	0.4	100	<0.0005	0.0010	0.0006	100
Port MacDonnell	0.7	0.8	0.7	100	0.0059	0.0198	0.0109	100
Quorn	0.5	0.6	0.5	100	<0.0005	0.0013	0.0007	100
Renmark WTP	0.8	0.9	0.8	100	0.0024	0.0325	0.0092	100
Robe IRP	0.3	0.3	0.3	100	0.0014	0.0486	0.0141	100
Summit WTP	0.7	0.9	0.8	100	0.0013	0.0863	0.0132	100
Swan Reach Town WTP	<0.1	0.1	0.1	100	0.0091	0.0247	0.0168	100
Swan Reach WTP	0.8	0.9	0.8	100	0.0008	0.0052	0.0025	100
Tailem Bend WTP	0.5	0.9	0.8	100	0.0016	0.0132	0.0056	100
Tarpeena IRP	0.1	0.2	0.2	100	0.0025	0.1396	0.0191	100
Waikerie WTP	0.8	0.9	0.9	100	0.0230	0.0743	0.0380	100
Warooka	0.9	1.0	0.9	100	<0.0005	0.028	0.0098	100
Wilmington	0.2	0.2	0.2	100	0.0162	0.0768	0.0324	100
Woolpunda	<0.1	<0.1	<0.1	100	0.0014	0.0054	0.0033	100

Table 4

2014–15 Country drinking water distribution systems – customer tap water quality against 2011 ADWG *continued*

	Manganese - Total [mg/L]					Hardness - Total [mg/L]			
System	Min	Max	Ave	Health Compliance %	Aesthetic Compliance %	Min	Max	Ave	Aesthetic Compliance %
ADWG Value				≤ 0.5	≤ 0.1				≤ 200
Target				100%	100%				
Barmera WTP	0.0023	0.0073	0.0039	100	100	36	63	45	100
Barossa WTP	<0.0001	0.0041	0.0017	100	100	139	164	148	100
Beachport IRP	<0.0001	0.0004	0.0002	100	100	250	291	275	0
Berri WTP	0.0019	0.0123	0.0053	100	100	35	63	48	100
Blanchetown WTP	0.0004	0.0008	0.0006	100	100	39	62	50	100
Bordertown	<0.0001	0.0020	0.0008	100	100	248	276	263	0
Cadell WTP	0.0004	0.0007	0.0005	100	100	44	64	50	100
Coffin Bay	<0.0001	0.0002	0.0001	100	100	211	230	219	0
Cowirra WTP	0.0004	0.0008	0.0005	100	100	49	76	60	100
Elliston	<0.0001	<0.0001	<0.0001	100	100	301	320	310	0
Eyre South	<0.0001	0.0003	0.0001	100	100	237	273	261	0
Eyre South/Morgan WTP	<0.0001	0.0025	0.0007	100	100	135	279	195	75.0
Geranium	0.0001	0.0005	0.0003	100	100	542	566	555	0
Glossop WTP	0.0004	0.0009	0.0006	100	100	33	61	46	100
Happy Valley WTP	0.0005	0.0033	0.0014	100	100	85	121	107	100
Hawker Desalination WTP	0.0001	0.0006	0.0003	100	100	115	949	290	80
Kalangadoo IRP	<0.0001	<0.0001	<0.0001	100	100	336	362	352	0
Kanmantoo WTP	0.0001	0.0013	0.0006	100	100	50	74	61	100
Kingston SE IRP	<0.0001	0.0002	0.0001	100	100	208	224	214	0
Lameroo IRP	0.0008	0.0011	0.0010	100	100	227	236	232	0
Loxton WTP	0.0009	0.0025	0.0015	100	100	39	58	46	100
Lucindale IRP	<0.0001	<0.0001	<0.0001	100	100	295	315	309	0
Mannum WTP	0.0013	0.0037	0.0023	100	100	51	55	53	100
Melrose	<0.0001	<0.0001	<0.0001	100	100	314	339	331	0
Middle River WTP	0.0004	0.0179	0.0028	100	100	49	83	70	100
Millicent	0.0003	0.0021	0.0012	100	100	331	350	345	0
Moorook WTP	0.0004	0.0009	0.0006	100	100	41	45	43	100
Morgan/Swan Reach WTP	0.0007	0.0035	0.0020	100	100	49	80	58	100
Morgan WTP	0.0005	0.0066	0.0023	100	100	39	251	62	98.4
Mt Burr	<0.0001	0.0002	0.0001	100	100	290	303	297	0
Mt Compass	0.0002	0.0003	0.0003	100	100	56	63	60	100
Mt Gambier	<0.0001	0.0002	0.0001	100	100	<2	198	176	100
Mt Pleasant WTP	0.0002	0.0014	0.0009	100	100	44	64	53	100
Murray Bridge WTP	0.0004	0.0020	0.0015	100	100	48	76	58	100
Mypolonga WTP	0.0004	0.0004	0.0004	100	100	49	74	56	100
Myponga WTP	0.0009	0.0104	0.0041	100	100	114	130	121	100
Nangwarry	<0.0001	<0.0001	<0.0001	100	100	385	404	394	0
Naracoorte	0.0073	0.0269	0.0131	100	100	330	378	345	0
Orroroo	0.0001	0.0004	0.0003	100	100	679	716	692	0
Padthaway	0.0004	0.0006	0.0005	100	100	573	592	582	0
Palmer WTP	0.0002	0.0010	0.0007	100	100	50	52	51	100
Parachilna	<0.0001	<0.0001	<0.0001	100	100	287	315	304	0
Parilla IRP	<0.0001	0.0002	0.0001	100	100	179	183	182	100
Penneshaw WTP	<0.0001	0.0066	0.0017	100	100	54	71	62	100
Penola IRP	0.0002	0.0005	0.0004	100	100	318	324	322	0
Pinnaroo IRP	0.0003	0.0008	0.0006	100	100	256	295	268	0
Port Lincoln	<0.0001	<0.0001	<0.0001	100	100	250	262	258	0
Port MacDonnell	0.0006	0.0010	0.0008	100	100	24	27	26	100
Quorn	<0.0001	<0.0001	<0.0001	100	100	451	537	497	0
Renmark WTP	0.0006	0.0033	0.0019	100	100	35	55	42	100
Robe IRP	0.0002	0.0013	0.0008	100	100	95	104	100	100
Summit WTP	0.0012	0.0046	0.0025	100	100	48	72	57	100
Swan Reach Town WTP	0.0004	0.0006	0.0005	100	100	44	69	52	100
Swan Reach WTP	0.0010	0.0088	0.0029	100	100	43	69	54	100
Tailem Bend WTP	0.0003	0.0053	0.0018	100	100	52	93	66	100
Tarpeena IRP	0.0002	0.0326	0.0084	100	100	378	405	394	0
Waikerie WTP	0.0017	0.0047	0.0035	100	100	38	49	45	100
Warooka	<0.0001	0.0003	0.0002	100	100	322	350	335	0
Wilmington	0.0003	0.0006	0.0005	100	100	115	128	121	100
Woolpunda	0.0003	0.0005	0.0004	100	100	42	51	47	100

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