

2011 - 2012



BUSSELTON **WATER**

ANNUAL WATER QUALITY REPORT



working together for our water future

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INTRODUCTION

Busselton Water is an independent water authority that supplies drinking water to domestic, commercial, light industrial and special rural consumers within the City of Busselton and its environs (the licensed area).

We supply over 20,000 customers within the Busselton townsite and close environs such as Port Geographe, Siesta Park, Vasse and Wonnerup. As a sought after sea-change destination this figure can rise significantly during weekends and holiday periods. The average daily supply demand is 12 megalitres per day.

Busselton's water supply comes from artesian aquifers (Leederville and Yarragadee) that offer high microbiological integrity and very low organic carbon loadings. This means that Busselton's drinking water supply is of the highest quality. From bores, the water is aerated and filtered to remove iron before it is stored in tanks at its operating plants and then pumped through approximately 301 kilometres of mains.

Water quality standards are set by a Memorandum of Understanding (MoU) between the Department of Health and Busselton Water that encompasses the requirements of the Australian Drinking Water Guidelines 2004 (ADWG 2004).

The MoU is an enforceable requirement included within the Operating Licence that requires Busselton Water to maintain a Water Quality Committee to provide a forum for the purpose of reviewing water quality data and any issues associated with drinking water as supplied by Busselton Water. The Water Quality Committee recognise and support the Advisory Committee for the Purity of Water, which is chaired by the Department of Health.

In April 2012 the method of disinfection of the water supply changed from ultra-violet (UV) irradiation and spot chlorination as required, to full-time chlorination. Busselton Water is well supported by state of the art chlorination and safety equipment to complement its modern treatment plants.

The functions and duties of Busselton Water are set out in the *Water Boards Act 1904* and the Reporting Standards are detailed in the *Financial Management Act 2006*.

Busselton Water holds an Operating Licence issued by the Economic Regulation Authority under the *Water Services Licensing Act 1995*. The licence is valid until 1 October 2021. Refer to page 9 for map details.

MESSAGE FROM THE CEO

I am pleased to present the Water Quality Report 2011-2012 on behalf of Busselton Water.

Busselton Water is committed to provide safe, high quality drinking water that consistently meets or exceeds the Australian Drinking Water Guidelines, regulatory requirements and our consumer expectations.

The Water Quality Committee at Busselton Water has again been active during the year working on the brief which is:

- To foster a culture of information sharing in the context of water quality.
- To recommend methods for improved security and quality of water supplies.
- To monitor sampling results/trend analysis.
- To be responsible for the full implementation of the Australian Drinking Water Guidelines (ADWG).
- To ensure that management of the water supply system/water quality is given the highest priority to reflect public health considerations and community expectations in accordance with Busselton Water's Policy 030-Drinking Water Quality.
- To ensure compliance with the Memorandum of Understanding and Operating Licence.

The Water Quality Committee appreciates the external expertise brought to this forum by the WA Department of Health and Hunter Water Australia and is proud to work with the Advisory Committee for the Purity of Water.

Very importantly 2011-2012 has seen the successful implementation of full time chlorination as the approved method of disinfection to the Busselton Water Supply.

This report briefly summarises the water quality performance for the 2011-2012 year and describes the process with which Busselton Water collects, treats and distributes drinking water to our customers. It also provides some insight into the customers' perceptions in relation to the quality of their supplied water service.

I would like to thank the dedicated committee members, Hunter Water Australia, Rockwater and the Advisory Committee for the Purity of Water for their efforts during 2011-2012.

Going into the future the Board and staff of Busselton Water are committed to the production, management and provision of high quality water for our customers.



Geoff Oddy

A/Chief Executive Officer

OUR COMMITMENT

Busselton Water is committed to the effective management of our drinking water supplies to provide a safe, high-quality product that consistently meets the Australian Drinking Water Guidelines (2004) and in accordance with the Memorandum of Understanding with the Department of Health and in accordance with the Operating Licence issued by the Economic Regulation Authority.

OUR PRIORITIES

- Comply with all regulatory requirements.
- Continue to improve drinking water quality from 'catchment to tap'.
- Prioritise resources for asset maintenance to deliver the best overall business outcomes.
- Continue to deliver business improvement through effective management of processes across all areas of Busselton Water.
- Manage and deliver capital investment for the long term benefit of customers.
- Grow our business via logical, cooperatives and beneficial joint ventures with other utilities.
- Embrace technology to enhance our capacity at all appropriate levels.

DRINKING WATER QUALITY MANAGEMENT

Busselton Water's Drinking Water Quality Management System is based on the ADWG (2004) Framework for Management of Drinking Water Quality and the Memorandum of Understanding between Busselton Water and the Department of Health. These outline the management structure and parameters for both health related and aesthetic water quality properties.

To achieve this, in partnership with our stakeholders, Busselton Water:

- Manages water quality at all points from source water to customer;
- Uses a risk-based approach to identify and manage potential threats to water quality;
- Uses appropriate contingency planning and incident response capability;
- Integrates the needs and expectations of customers, stakeholders, regulators and employees in water quality planning;
- Routinely monitors the quality of drinking water and uses effective reporting mechanisms to provide relevant and timely information; and
- Continually reviews and improves its practices by assessing performance against corporate commitments and stakeholder expectations.

All managers and employees involved in the supply of drinking water are responsible for understanding, implementing, maintaining and continuously improving the drinking water quality management system.

A copy of the Memorandum of Understanding can be found on the Busselton Water website at: http://www.busseltonwater.wa.gov.au/Portals/0/Water%20quality/BW%20MOU_DoH_Updated.231112.pdf

WATER QUALITY

Policy W030 - Drinking Water Quality

Busselton Water is responsible for providing drinking water to its diverse customer base – comprising industrial, business and residential customers – throughout the licensed area.

Our management of the water supply system and water quality is given the highest priority to reflect public health considerations and community expectations.

Busselton Water's Board, staff and contractors are expected to recognise their responsibilities and required diligence in undertaking this most important and privileged role on behalf of the community.

Busselton Water is committed to supplying its customers with high quality drinking water that meets the ADWG (2004). We will utilise effective, efficient and innovative management and operational practices to reliably deliver safe and aesthetically acceptable drinking water. Our commitment to water quality will be maintained by:

1. Complying with legislative and regulatory requirements regarding drinking water quality. Liaising and cooperating with the Department of Health, relevant regulators and key stakeholders
2. Managing drinking water quality using a risk-based approach where all potential risks, from source to tap are identified and controlled to mitigate any threat to drinking water quality.
3. Aerating, filtering and disinfecting drinking water to improve water quality and prevent contamination. Then routinely sampling the quality of drinking water at adopted sampling points for laboratory analysis.
4. Tabling water sample test results in a central data base, analysing the data for trends in quality and by applying corrective action and procedures if required.
5. Improving our awareness of customers' understanding and expectations regarding drinking water quality. Welcoming customer feedback on water quality issues and responding effectively to meet customers' concerns and needs.

OUR COMMITMENT

6. Providing publicly available information and reports on the quality of the drinking water supply and associated issues, thus gaining the confidence and respect of customers, regulators and the water industry.
 7. Keeping at the forefront of and contributing to drinking water quality standards, innovations and regulations aligned with industry best practice.
 8. Establishing and regularly reviewing appropriate contingency and incident response plans.
 9. Taking part in research and development programs and studies aimed at better understanding and improving drinking water quality.
 10. Having an effective and continuously improving water quality management system that is reviewed and audited routinely to assure a safe and acceptable water supply.
 11. Providing adequate training and communicating to all employees to ensure that they are aware of and committed to Busselton Water's drinking water quality policy.
- DATE: 21st November 2011 BOARD RES: BWB 454

This policy is highly visible, continually communicated and understood and implemented by all employees.

Research, Development and Training

A Business Continuity Plan was developed during 2011-2012 and included the following incident plans:

- Crisis Communication Plan
- Water Quality/Water Availability Incident Response Plans
- Network Disaster Recovery Plan
- Emergency Response Plan for the Administration Office and Plant 1, 2 and 3
- Records Management Disaster Recovery Plan

Busselton Water utilises the Water Corporation, which delivers training in accordance with the National Water Industry Training package. The majority of Busselton Water staff now possess Certificate II or III in Water Industry Operations.

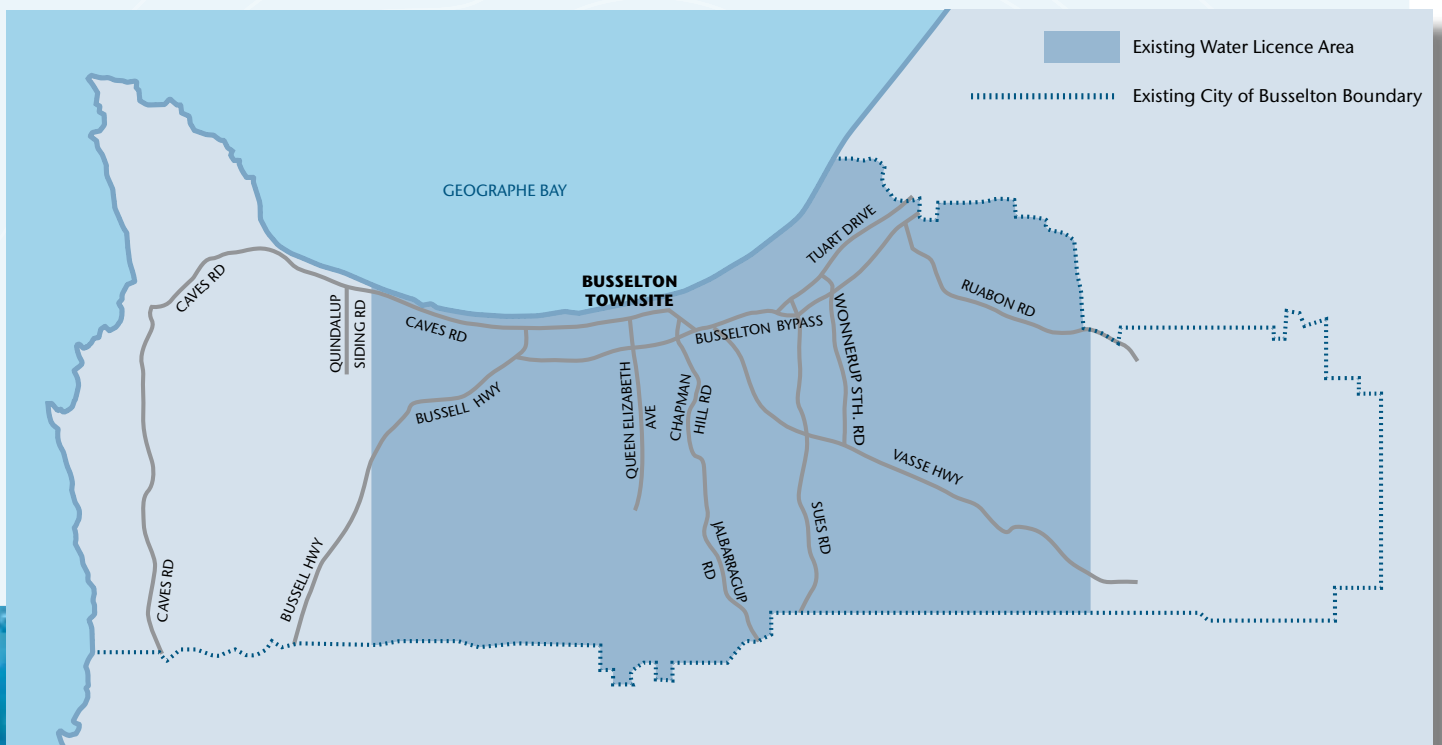
OUR COMMITMENT

Staff attended relevant training courses and conferences including National forums such as OzWater and a course conducted by IWES on the practical implementation of the ADWG (2004).

OUR LICENCE AREA

Busselton Water is an independent water authority that supplies drinking water within the City of Busselton and close environs such as Port Geographe, Siesta Park, Vasse and Wonnerup.

Busselton Water also supplies bulk water to the Water Corporation to supplement the resources required to meet the demand on their system.



OUR COMMITMENT

OUR CUSTOMERS

We strive to deliver excellence in customer service and continue to improve our existing levels of customer satisfaction. Each year an independent survey is undertaken to assist with that improvement, along with a robust complaints handling process that has achieved exemplary audit results.

Busselton Water actively encourages customers to contact us when their expectations are not met, thus Busselton Water uses complaints to grow its business. There is a growing surge of energy being directed towards effective complaints handling for research and the potential for improving services and products.

Busselton Water encourages its customers to express by letter, phone call or personal visitation, any concerns which do not meet expectations and is committed to provide a response in a timely and professional manner. The customer care software module introduced late this year will further increase efficiencies in the management of complaints.

During the year Busselton Water recorded a total of 286 concerns reported by customers, compared to 45 in the previous year. This increase was not unexpected as issues relating to discoloured water, taste and odour are common in a newly chlorinated water supply. The majority of these concerns were reported during the three month implementation phase that commenced in mid-April 2012 and complaints had significantly declined by mid-June.

A total of 96.8% of customer complaints were resolved within the time frame permitted in Busselton Water's Operating Licence.

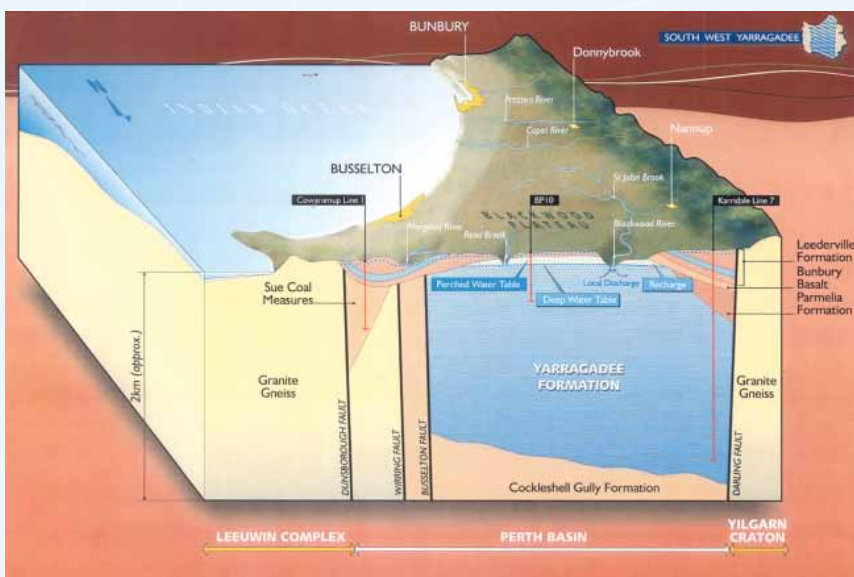
OUR WATER SOURCE

Busselton Water sources water from the Leederville and Yarragadee aquifers within the Perth Basin. These aquifers are concentrated at the surface of the Swan Coastal Plain by a veneer of sand, silt and clay comprising the superficial functions. The Leederville aquifer extends from near surface to between 200 to 275 metres depth and overlies the Yarragadee aquifer. Shale and siltstone confining beds impede groundwater flow between the Leederville and Yarragadee aquifer systems.

Busselton Water has an extraction licence issued by the Department of Water to extract water from the Leederville and Yarragadee aquifers. Busselton Water has nine bores and these have supplied the amount of water that Busselton Water has produced in the last five years.

The Department of Water has created a Source Protection Plan for the Busselton Water Reserve which includes eight bores: Plant 1, Kent Street (BWB 17 and BWB19), Plant 3, Hobson Street (BWB12, BWB16 and BWB20), Plant 2, Queen Elizabeth Avenue (BWB14), Plant 5, Queen Elizabeth Avenue (BWB15 and BWB18). Plant 11, Fairway Drive (BWB21) is not yet included in the plan as the hydrogeological report has not yet been submitted to the Department of Water.

This plan provides a risk assessment of current land use and also actions to secure and protect sources for the future.



Busselton Water uses Rockwater Pty Ltd (Hydrogeologists) to review the plan along with current groundwater results and extraction, to ensure future operational strategies are sustainable in the long term.

OUR WATER SYSTEM

WATER TREATMENT

Busselton Water uses a three step process (physical and chemical) to treat the raw water from the Leederville and Yarragadee aquifers to produce safe drinking water to its customers.

1. Aeration

Raw water is aerated via spray aerators, which oxidise the iron, turning it from soluble into small solids.



2. Filtration

The aerated water is then filtered through the sand filter to remove iron, turbidity and impurities. The filtered water is then collected in a clear well.



3. Disinfection

Chlorine is added to maintain the disinfection level required to preserve microbiological safety before it is pumped into the distribution system.



Distribution

Busselton Water's distribution network delivers drinking water within the City of Busselton and close environs. The network operates as one large, interconnected system. The materials used in the reticulation network have been approved either under Australian Standard AS/NZS 4020: 2005 - (testing of procedures for use in contact with drinking water) or have been identified by the Department of Health as not requiring approval as per the Memorandum of Understanding with the Department of Health.

Strict protocols have been established by Busselton Water to assure the purity of the chlorine used and the safe handling of chlorine at the Treatment Plants.

The distribution network has the following components:

Estimated Population	Approximately 20,000
Total Number of Connections	Approximately 11,000
Total Length of Pipes	301 km
Number of Storage Tanks	5
Chlorine Residual Target	0.5 mg/litre



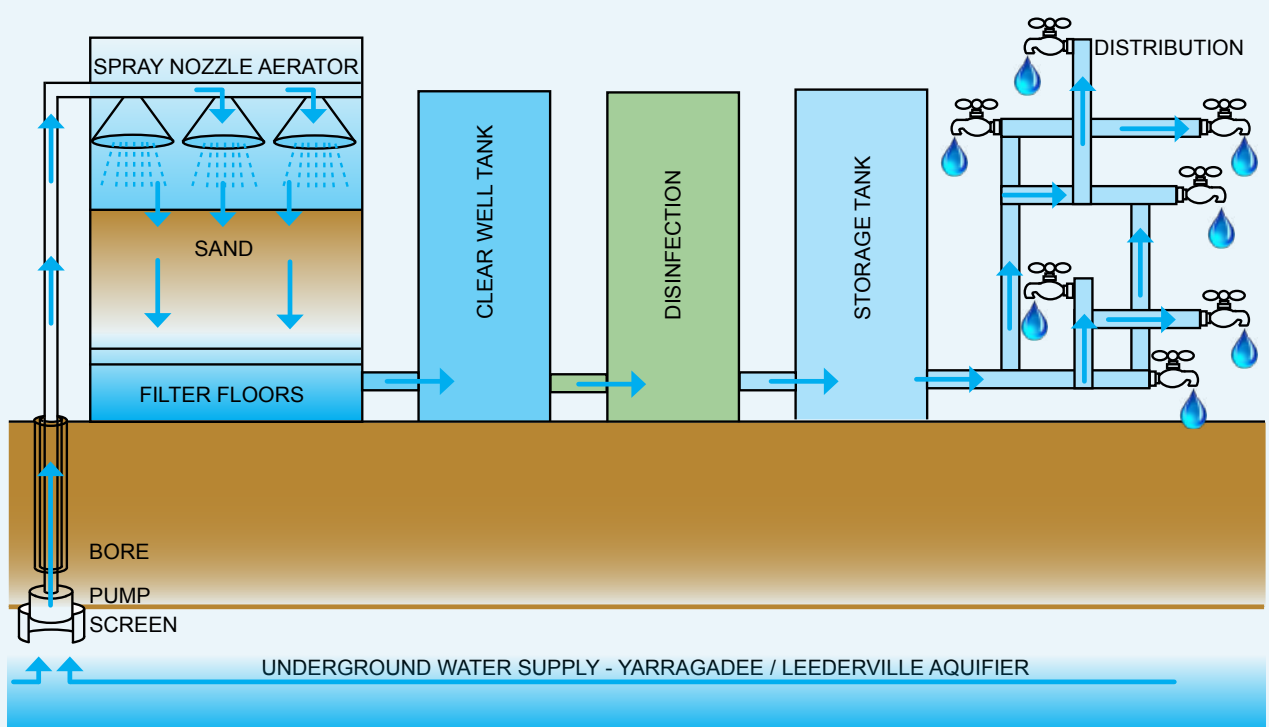
OUR WATER SYSTEM

WATER TREATMENT

Busselton Water has three treatment plants that are designed to treat water from the Leederville and Yarragadee aquifers. The raw water has naturally higher levels of iron which requires treatment to remove.

- Plant 1 – Kent Street, Busselton
- Plant 2 – Queen Elizabeth Avenue, Busselton
- Plant 3 – Hobson Street, Busselton

WATER TREATMENT AND SUPPLY PROCESS



MANAGING OUR WATER SYSTEM

Multi Barrier Approach

Preventing contamination and minimising potential hazards is an essential part of providing our customers with safe drinking water. The ADWG (2004) state that a multi barrier approach is the most effective to ensure the safety of drinking water.

Barriers include:

- Protection of Groundwater
- Water Treatment
- Disinfection of Water
- Backflow Prevention

Busselton Water maintains and operates these multiple barriers, ensuring they are robust and that high quality water is delivered to its customers.

Incident Responses

While every effort is made to prevent water quality incidents from occurring, there will inevitably be times when things go wrong due to equipment failure, human error, extreme weather conditions or unforeseen events. Busselton Water has incident response plans to manage such events with the minimum possible impact on water quality.

In the event of a water quality incident, Busselton Water activates its Incident Response Plan, which is a comprehensive plan to handle water quality events and links to the binding protocols of the Memorandum of Understanding between Busselton Water and the Department of Health.

There were no water quality incidents reported during 2011-2012 except for three Thermophilic *Naegleria* detections in the reticulation network at Hawker Approach (July 2011) and Vernon Track (July and August 2011). The Water Quality Incident Response Plan was activated to manage these incidents to ensure that all stakeholders were informed.

WATER QUALITY PERFORMANCE

Water Quality Monitoring and Testing

Busselton Water has a comprehensive monitoring program which has been reviewed and endorsed by the Department of Health.

Key parameters are monitored by Busselton Water:

- Microbiological – this includes Thermophilic *Naegleria* and *Escherichia coli*.
- Chemical Health – this includes a large range of parameters with health related guideline values in the ADWG (2004).
- Chemical Non-Health (Aesthetic) – this includes a large range of parameters with Non-Health guideline values in the ADWG (2004).
- Radiological Health – monitoring and testing is only required on an annual basis.

Since the introduction of full-time chlorination in April 2012 Busselton Water with the assistance of Hunter Water Australia, developed a flushing and monitoring program that formed part of the introduction of full-time chlorination.

Busselton Water delivered drinking water that complied with the Health Related Criteria set out in the ADWG (2004) in 2011/2012.

WATER QUALITY RESULTS

Memorandum of Understanding – Drinking Water Quality Report

HEALTH - 1 July 2011 to 30 June 2012

CHARACTERISTIC	UNITS	ADWG (Health)	Non-Compliance (Health)	No. Samples	% Compliance (Health)	Max. Value
CHEMICAL (TREATED WATER)						
Carbon Tetrachloride	mg/L	0.003	0	19	100	<0.0005
Fluoride	mg/L	1.5	0	19	100	0.4
Sulphate	mg/L	500	0	19	100	16
CHEMICAL (DISTRIBUTED WATER)						
Antimony	mg/L	0.003	0	28	100	0.001
Cadmium	mg/L	0.002	0	28	100	<0.0001
Chromium	mg/L	0.5	0	28	100	<0.0002
Copper	mg/L	2	0	77	100	0.011
Fluoride	mg/L	1.5	0	28	100	0.5
Lead	mg/L	10	0	77	100	<0.001
Manganese	mg/L	0.5	0	28	100	<0.005
Nickel	mg/L	20	0	28	100	<0.001
Nitrate	mg/L	50	0	77	100	0.62
Nitrite	mg/L	3	0	77	100	<0.05
Total Trihalomethanes*	mg/L	0.25	0	35	100	0.026
MICROBIOLOGICAL (DISTRIBUTED WATER)						
<i>Escherichia coli</i>	CFU/100mL	0	0	363	100	
Thermophilic <i>Naegleria</i>	org/250mL	Not Detected	3	363	99.2	
<i>Naegleria fowleri</i>		Not Detected	0	3	100	

*Max. detection level for Total Trihalomethanes = 0.026 mg/L

mg/L - Milligrams per litre

OUR WATER QUALITY

Memorandum of Understanding – Drinking Water Quality Report AESTHETIC– 1 July 2011 to 30 June 2012

CHARACTERISTIC	UNITS	ADWG (Aesthetic)	Non- Compliance (Aesthetic)	No. Samples	% Compliance (Aesthetic)	Max. Value
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CHEMICAL (TREATED WATER)

Chloride	mg/L	250	0	19	100	100
Hardness	mgCaCO ₃ /L	200	0	19	100	100
Iron (soluble)	mg/L	0.3	0	252	100	0.017
Iron (total)	mg/L	0.3	0	252	100	0.13
pH*	-	6.5 – 8.5	1	251	99.6	8.6
Sodium	mg/L	180	0	19	100	64
Sulphate	mg/L	250	0	19	100	16

CHEMICAL (DISTRIBUTED WATER)

Ammonia	mg/L	250	0	77	100	0.044
Copper	mg/L	1	0	77	100	0.011
Hydrogen Sulphide	mg/L	0.05	0	77	100	<0.05
Iron (soluble)	mg/L	0.3	0	345	100	0.039
Iron (total)	mg/L	0.3	0	345	100	0.22
Manganese	mg/L	0.1	0	28	100	<0.005
pH*	-	6.5 – 8.5	5	345	98.5	8.6
Turbidity	NTU	5	0	56	100	1.2
Zinc	mg/L	3	0	56	100	0.097

TREATED WATER (RADIOLOGICAL RESULTS)

SAMPLE POINT		RADIUM 226 Bq/L	RADIUM 228 Bq/L
PLANT 1		<MDL	0.190±0.033
PLANT 2	Tank 1	0.210±0.045	0.206±0.034
	Tank 2	<MDL	0.247±0.169
PLANT 3		<MDL	0.172±0.076
PLANT 4		0.352±0.044	<MDL
ADWG 2004 Limit		0.5	0.5

MDL - Minimal detection level

mg/L - Milligrams per litre

NTU - Nephelometric Turbidity Units

Bq/L - Becquerel per litre

*The high pH results were isolated events of no health significance and did not adversely affect disinfection efficiency.

Memorandum of Understanding - Drinking Water Calculation 1 July 2011 - 30 June 2012

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

1. Datasets presented and used for analysis in this report are those from Busselton Water's Water Quality Monitoring Program which have been classified as assessable. This program has been endorsed by the Department of Health.
2. Treated Water results are from those samples taken from the Water Treatment Plant delivery line or the Water Treatment Plant clear water tanks or reservoirs.
3. Distributed Water results are from those samples taken in Busselton Water's distribution network system.





BUSSELTON **WATER**

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