



ROTTNEST IS

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Facility Management

Programmed Facility Management

For the

Rottnest Island Authority

**Quarterly Drinking Water Report to the
Department of Health by the Rottnest Island
Authority
April – June 2019**





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1. Water Provider Information

Rottnest Island Authority Contact Details	
Name of Company	Rottnest Island Authority
Company Address	1st Floor E – Shed, Victoria Quay, Fremantle WA 6160
Company Phone	Ph. (08) 9432 9300 Fax (08) 9432 9301
Company Website	www.rotnnestisland.com
Company Email	enquiries@rotnnestisland.com
Executive Director	Michelle Reynolds
Manager, Major Contracts	Eamonn Williams
Utilities Manager (PFM)	Orrin Neale

1.1. System Information

1.1.1. Consumers

The water demand on Rottnest Island is related to tenancy and is highly seasonal, being low in winter and high in summer. Historical data indicates that over 770,000 visits are typically made to Rottnest Island on a yearly basis, with 47,510 total visitor numbers recorded for April 2019, 31,422 in May 2019 and 20,461 in June 2019.

The number of beds on Rottnest Island for guests is approximately 2,150, with the average length of stay being 3.5 nights. In addition to this, there are approximately 250 permanent residents on Rottnest Island, which also fluctuates in accordance with high and low seasons.

1.1.2. Distribution System & Water Supply

The Rottnest Island distribution system is relatively small, consisting of approximately 22km of mains. Water is located from 15 freshwater bores located in the Wadjemup bore field and five saline (seawater) bores located in the Longreach bore field.

The freshwater bores make up approximately 15% of the water source for Rottnest Island and have not been used for potable water consumption since February 2017. The freshwater bores are utilised only as a supplementary contingency water supply for the golf course irrigation.

Water abstracted from the saline bores feed into the desalination plant, where reverse osmosis occurs. The desalinated water is then disinfected through a dual chlorination system, which ensures the provision of safe drinking water to Rottnest Island customers.

The water demand on Rottnest Island is highly seasonal, and the monthly consumption can range from approximately 14,000kL in July to 22,000kL in January.

The combined storage capacity of the drinking water infrastructure on Rottnest Island is 14,000kL and this volume provides approximately 22 days of water storage in peak periods.

Remote locations outside the main settlement, such as the outer island ablutions, the Research House (2 Stables Road), Wadjemup Lighthouse and surrounding area, are supplied with water via a tanker. The supplied water in these areas is deemed not suitable for drinking and warning signs are posted accordingly.



Image 1 Example of Public Signage

1.1.3. Sampling Schedule & Procedure

Potable water sampling is carried out in accordance with the Australian Drinking Water Guidelines (ADWG) and is scheduled in accordance with the Rottnest Island Drinking Water Quality Management Plan dated April 2017.

To respond to emerging trends, and to further ensure the safety of the drinking water quality, further monitoring or adjustment of the schedule has occurred. Additional or adjusting testing parameters can be in response to a risk assessment, new information or industry best practice and guidance, post-incident, or to adhere to specialist recommendations such as the Department of Health or Water Corporation.

There are eight sampling locations across the potable water distribution network and since 2017, a comprehensive monitoring schedule of Tank 4 and Tank 7 has been added to the sampling regime and continues to be monitored weekly. The data associated with Tank 4 and 7 do not form part of the statistical data provided for analysis in this quarterly report.

Furthermore, additional sample locations associated with the island's drinking fountains has been included in the schedule for specified parameters, to meet the requirements set out in the Australian Drinking Water Guidelines. These sample locations and criteria form part of the monthly monitoring schedule.

In November 2017, the sampling regime was updated to test for other minerals and metals and the additional testing parameters identified the presence of Bromate in the potable water distribution system. Initial levels were found to be above the Australian Drinking Water Guidelines. In response to the identified presence of Bromate, an action plan has been implemented to monitor the results.

The initial findings resulted in the formation of a specialist working group that implemented a series of proposed corrective actions to address and mitigate this issue. As a result of the findings and implemented controls, the monitoring for Bromate has now been added to the regular monitoring schedule of Rottnest Island's distribution sample points, and continues to be reviewed by the working group.

2. Performance Summary

Water Quality Meeting the <i>Australia Drinking Water Guidelines v.3.5 2018</i>			
April - June 2019			
	¹ No. of Analyses Completed	No. of Analyses Within Guidelines	No. of Non-conformances to Guidelines
Microbial			
Bacterial (<i>E.coli</i>)	59	59	0
Thermotolerant Coliforms	59	59	0
Thermophilic Amoebae	27	27	0
Amoeba (Thermophilic <i>Naegleria</i>)	27	27	0
Chemical & Physical			
Health	221	218	3
Aesthetic	281	233	48
Radiological			
Gross Alpha	Sample taken March 2019 results received in May 2019		
Gross Beta	Sample taken March 2019 results received in May 2019		

¹ As screened against respective guideline – health / aesthetic. Results from Tank 4, Tank 7 and drinking fountains are excluded from this table.

3. Microbial Performance

During the April – June 2019 reporting period, there were no reported exceedances of Microbial Health against the Australian Drinking Water Guidelines in the potable water distribution system.

3.1. Microbial – Compliance Summary

Rottnest Island Distribution System April – June 2019				
Microbial Characteristic	Memorandum of Understanding Compliance Criteria	No. of Analyses	No. of Analyses Complying with Memorandum of Understanding	% Compliance
Bacterial				
E.coli	Non Detect	59	59	100%
Thermotolerant Coliforms	Non-Detect	59	59	100%
Amoeba				
Thermophilic Amoebae	Non Detect	27	27	100%
Thermophilic Naegleria	Non Detect	27	27	100%

3.2. Microbial – Exception Notifications

Microbial Water Quality Exceptions April - June 2019						
Population Served	Date	Microbial Characteristic	Memorandum of Understanding Alert Level	Remedial Action	Department of Health Notified	Close Out Date
Nothing to report						

3.3. Microbial Incident Specific Information

There were no reported exceedances for Microbial Health in the potable water distribution system over the period.

4. Chemical: Health Related Performance

During the April to June 2019 reporting period, there were three samples returned with exceedances of Chemical Health parameters in the potable water distribution system. Details are outlined in section 4.3.

4.1. Chemical: Health Related - Compliance Summary

Rottnest Island Distribution System April - June 2019					
Health Characteristic	Australian Drinking Water Guidelines (mg/L)	¹ No. of Analyses	No. of Analyses Complying with Australian Drinking Water Guidelines	% Compliance with Australian Drinking Water Guidelines	Max Value of Analysis (mg/L)
Antimony (Sb)	0.003	4	4	100%	<0.005
Bromate	0.02	104	101	97%	0.025
Cadmium (Cd)	0.002	4	4	100%	<0.0002
Chlorine Total (Cl) <i>(in house testing Total Residual)</i>	5	45	45	100%	1.34
Copper (Cu)	2	4	4	100%	0.010
Fluoride (F)	1.5	1	1	100%	<0.5
Lead (Pb)	0.01	4	4	100%	<0.001
Manganese (Mn)	0.5	27	27	100%	<0.039
Nickel (Ni)	0.02	4	4	100%	<0.001
Nitrate (NO ₃) (Nitrate as nitrate)	50 mg-NO ₃ /L	7	7	100%	<0.02
Nitrite (NO ₂)	3 mg-NO ₂ /L	7	7	100%	<0.5
Trihalomethanes (THMs)	0.25	10	10	100%	0.017

¹ As screened against respective guideline – health / aesthetic. Results from Tank 4, Tank 7 and drinking fountains are excluded from this table. In-house chlorine testing which occur at additional locations each week are also excluded from this table.

4.2. Chemical: Health Related - Exception Notifications

Chemical: Health Related Water Quality Exceptions April – June 2019						
Population Served	Date	Chemical Characteristic	Memorandum of Understanding Alert Level	Remedial Action	Department of Health Notified	Close Out Date
99,393	April 2019	Bromate	Level 2	Bromate Action Plan	Yes	On going

*Based on RIA total daily visitors for the period includes Ferry (excluding Island workers) Boats and Planes

4.3. Chemical: Health Related Incident Specific Information

During quarter April - June, there were three exceedances of routine monitoring parameters set in the Memorandum of Understanding (MOU) and agreed between the RIA and DoH for Rottnest Island. These exceedances identified Bromate exceeding the ADWG of 0.02 mg/L as detailed:

1. Sample Date 05 April 2019 – Distribution Points:
 - a. R12/004 (North Thomson) reported a reading of 0.021 mg/L; and
 - b. R12/006 (Kingstown Barracks) a reading of 0.025.

2. Sample Date 09 April 2019 – Distribution Points:
 - a. R12/006 (Kingstown Barracks) a reading of 0.023.

The exceedances were managed by the Bromate Action Group, who reviewed the Bromate Action Plan. Controls included reinstating the flushing regime, which resulted in no further exceedances above the Australian Drinking Water Guidelines.

5. Chemical: Aesthetic Performance

5.1. Chemical: Aesthetic – Compliance Summary

During the April - June 2019 reporting period, there were 48 sample exceedances of Chemical Aesthetic parameters in the potable water distribution system, details are outlined in section 5.2.

Rottneest Island Distribution System April - June 2019					
Aesthetic Characteristic	Australian Drinking Water Guidelines (mg/L unless stated)	¹ No. of Analyses	No. of Analyses Complying with Australian Drinking Water Guidelines	% Compliance with Australian Drinking Water Guidelines	Max Value of Analysis (mg/L)
Aluminium (Al)	0.2	3	3	100%	0.05
Ammonia (NH ₃)	0.5	10	10	100%	0.05
Chloride (Cl ⁻)	250	4	4	100%	180
Chlorine Free Residual (Cl) <i>(in house testing)</i>	0.6	45	0	0%	1.17
Colour	15 (HU)	7	7	100%	<2
Copper (Cu)	>1	4	4	100%	0.010
Hardness (CaCO ₃)	200	1	1	100%	17
Iron (Fe)	0.3	27	24	89%	0.57
Manganese (Mn)	0.1	27	27	100%	0.10
pH	6.5 – 8.5	31	31	100%	7.8
Sodium (Na)	180	104	104	100%	140
Sulphate	250	2	2	100%	19
Sulphide (H ₂ S)	0.05	3	3	100%	<0.01
TDS	600	2	2	100%	450
Turbidity	5 (NTU)	7	7	100%	<1
Zinc (Zn)	3	4	4	100%	0.051

¹ As screened against respective guideline – health / aesthetic. Results from Tank 4, Tank 7, investigative samples and drinking fountains are excluded from this table. In-house chlorine testing which occurs at additional locations each week are also excluded from this table.

5.2. Chemical: Aesthetic - Incident Specific Information

There were two instances where analytical results exceeded the aesthetic guidelines for chemical and physical properties, these are summarised below:

Iron: There were three recorded exceedances of Iron in the distribution system at location R12/008. These occurred on 16 April 2019 with a reading of 0.57mg/L, 15 May 2019 with a reading of 0.42mg/L and 11 June 2019 with a reading of 0.51mg/L.

Where Iron has a taste threshold of approximately 0.3 mg/L in water which may cause a less favourable taste and odour to be present, however there were no customer complaints during the period.

Chlorine (free): During the quarter, 45 out of 45 recorded samples were reported with chlorine values above the Australian Drinking Water Guidelines Aesthetic limit of 0.6mg/L.

The Australian Drinking Water Guidelines state that chlorine has an aesthetic odour threshold of 0.6mg/L, however the reported concentrations exceeding this threshold do not pose any health risks, as values are below the specific health guideline value of 5.0mg/L.

The results for exceeding the Aesthetic limit were found across multiple distribution sampling points over the three month period, however no results were close to the Health limit with the maximum value of 1.17mg/L reported at R12/008 on 23 April 2019.

Whilst impacts to aesthetic quality of drinking water may occur due to greater concentrations of chlorine, it is important to note that adequate disinfection is paramount for the provision of safe drinking water.

No complaints were recorded during the April to June period with regards to chlorine related aesthetic.

6. Radiological Performance

Eight radiological samples were tested during reporting period January, February, and March, however results were received in the following reporting period in May 2019.

6.1. Radiological – Compliance Summary

Rottnest Island Distribution System January - March 2019				
Radiological Characteristic	Memorandum of Understanding Compliance Criteria	No. of Analyses	No. of Analyses Complying with Memorandum of Understanding	% Compliance
Gross Alpha	< 0.5 Bq/L	8	8	100%
Gross Beta	< 0.5 Bq/L	8	3	38%

An exceedance in Gross Beta was identified at five out of eight sampling locations as a result of scheduled testing which occurred in Quarter Three (January, February, March). In response to these exceedances, further testing for radium 226 and 228 occurred at all sample locations, as recommended by the Australian Drinking Water Guidelines (ADWG). The results for this testing are due in July 2019.

1. Sample Date 27 February 2019 – Distribution Points:
 - a. R12/001 (Tank 5) reported a reading of 0.56 Bq/L;
 - b. R12/002 (Longreach) a reading of 0.74 Bq/L;
 - c. R12/005 (South Thomson) a reading of 0.50 Bq/L;
 - d. R12/006 (Kingstown Barracks) a reading of 0.54 Bq/L; and
 - e. R12/008 (2 Stables) a reading of 0.52 Bq/L.

7. Planned Sample Summary

7.1. Planned Sample – Compliance Summary

Planned Samples ¹ April - June 2019								
Microbial			Chemical			Radiological		
Planned ¹	Taken ^{2,3}	% Taken	Planned ¹	Taken ^{2,3}	% Taken	Planned	Taken ^{2,3}	% Taken
86	86	100%	475	475	100%	0	8	800%

¹ A planned sample is defined as being included in the Sampling Schedule for this period.

² Physical number of samples taken for this period.

³ Results from Tank 4, Tank 7, and drinking fountains are excluded from this table. In-house chlorine testing which occur at additional locations each week are also excluded from this table.

As a result of radiological exceedances in Gross Beta, unplanned sampling took place at all locations for radium 226 and 228. Radium 226 and 228 testing is recommended by ADWG and supported by Department of Health.

7.2. Planned Sample - Exception Notifications

Planned Sample Exceptions April - June 2019			
Sampling Point	Date Due	Characteristic	Reason for Missing Sample

8. Customer Complaints

There were no complaints received for the April to June 2019 reporting period.

9. Comments

Bromate management

Context

Bromate testing is usually required in disinfection systems that utilises ultra violet technologies, however this process is not undertaken in the production of drinking water on Rottnest Island.

During the development of risk assessments and Drinking Water Quality Management Plan, the requirement for routine Bromate analysis was not identified. It is believed that Bromate may be



introduced to a drinking water system through its disinfection methodology, such as chemical compounds found in disinfectants (hypochlorites), or may be formed as a result of physical parameters such as heat, aeration and stagnation where source water is high in Bromide. Bromide may react under suitable conditions to form Bromate.

Current Status

The Bromate working group continues to implement the Bromate Action Plan. The flushing regime initiated in January 2018 has been reinstated as part of the corrective action for the recent exceedances, with monitoring of the frequency and volume required balanced with potable water production and consumption volumes.

Drinking Fountain Monitoring Initiative

The Rottnest Island Authority commenced a drinking fountain monitoring initiative in December 2017 following a recommendation from the Department of Health.

Results obtained from the sampling program, supported the Rottnest Island's drinking fountain replacement project, which included the replacement of all existing drinking fountains and the addition of new amenities around the settlement. The final drinking fountain installation was completed in October 2018.

The drinking fountain monitoring program and sampling results are reported separately to the distribution system or network, which are represented in Tables 3.1, 4.1 and 5.1. The drinking fountain results are represented in the below table for the specified period.

There were no water quality exceedances recorded during the quarter.

Rottnest Island Drinking Fountain April – June 2019					
Health Characteristic	Australian Drinking Water Guidelines (mg/L)	No. of Analyses	No. of Analyses Complying with Australian Drinking Water Guidelines	% Compliance with Australian Drinking Water Guidelines	Max Value of Analysis (mg/L)
Antimony (Sb)	0.003	84	84	100%	<0.005
Cadmium (Cd)	0.002	84	84	100%	<0.0002
Copper (Cu)	2	84	84	100%	0.14
Lead (Pb)	0.01	84	84	100%	0.004
Nickel (Ni)	0.02	84	84	100%	0.005
Aesthetic Characteristic	ADWG Guideline (mg/L)	No. of Analyses	No. of Analyses Complying with ADWG	% Compliance with ADWG	Max Value of Analysis (mg/L)
Copper (Cu)	1	84	84	100%	0.14
Zinc (Zn)	3	84	84	100%	0.33