



Programmed Facility Management

In Partnership with

Rottneest Island Authority

**Annual Drinking Water Report to  
the *Department of Health* by the  
*Rottneest Island Authority*  
*July 2010 – June 2011***





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## Introduction

Rottnest Island is located 19 kilometres west of Fremantle, Western Australia and is 11 km long and 4.5 km at its widest point. The total land area measures 1,900 hectares. The island is an A-Class Reserve and is a popular destination for local, interstate and international tourists. The total number of visitors is 300,000 to 500,000 per annum. The number of people on the island is highly variable due to seasonal variations with approximately 250 permanent residents.

The Rottnest Island Authority (RIA) is responsible for the management of all utilities, including the production and distribution of drinking water to the island's residents and visitors. Drinking water is supplied to approximately 396 residential and 12 non-residential connections, owned and maintained by the RIA. Water supply facilities include fresh and saline groundwater bores, a desalination plant, water storage tanks and a network of pipes. The system is managed by Programmed Facility Management under contract.

The primary source of water for the island is a number of saltwater beach bores where it is pumped to a desalination plant and the remainder sourced from a fresh groundwater aquifer. The Rottnest Island Task Force was established in December 2003 and implementation of their recommendations commenced in 2004. Part of this program included a minor upgrade to the desalination plant in 2006, and refurbishment of water storage tanks to increase the quantity of water produced and to improve water quality.

The desalination plant enables drinking water to be produced at all times, however the volume produced requires a balance between the cost of generation and the impact on the environment. The desalination plant can produce up to 180,000 kL/year (average 493kL/day) and the freshwater bores ~47,500kL/year (average 137kL/day). 2010 – 2011 total annual water production was 200,152k/L.

### History

Drinking water supplies to Rottnest Island date back as far as the 1830's, when water was collected in wells and from natural soaks to supply the island's penal settlement. In 1911, the newly formed West Australian Tourism Department built rainwater tanks to collect water from the roofs of buildings. Underground tanks were also constructed to store rainwater to areas like the hotel, which while not in use still exist today. Accommodation which had water supplied would often have two taps, one for delivering fresh water from the rainwater tank and one for delivering salt water which would be used in the shower and toilets.

In 1937, the Military took up occupation on Rottnest and built the bitumen water catchment area on Mt Hershel which fed large storage tanks. This water catchment area remained in use until 2010 when it was decommissioned. During World War II fresh water was also carted from the mainland to supply the troops stationed on the island.

Historical evidence shows that bores were drilled to source water from the Wadjemup fresh water lens as early as the war. In 1976, the Wadjemup Bore field was developed and some 30 freshwater production bores were drilled in the following years of which 29 are still in operation.

The desalination plant was installed in 1995 and upgraded in 2006 to produce current quality and quantities.

## Commitment to Drinking Water Quality Management

Goals and strategies in the Rottnest Island Management Plan relevant to drinking water are:

- Rottnest Island's environment and heritage are conserved and enhanced as a model of sustainability
- The RIA conducts its business responsibly and in a way that is sustainable and beneficial to the Island.

An Asset Management Plan has been provided by Programmed Facility Management to demonstrate their strategic plan to manage the life cycle of drinking water supply (hydraulic) assets within their control and responsibility at Rottnest Island. The desired level of service contained within the plan is to reduce the number of reactive works and incidents and ensure that all assets that require water supply are fed continuously.

The Rottnest Island Authority will supply water that is safe for all visitors, businesses and residents to drink and that complies with the directions on drinking water quality made by the Minister for Health.

## Drinking Water Quality Management

Industry best practice on water quality management is provided through the Australian Drinking Water Guidelines (ADWG) 2004. This outlines the management structure and parameters for both health related and aesthetic water quality properties.

A key aspect of the ADWG is a risk management approach from the water source to consumption, by ensuring there is a monitoring program in place with appropriate sampling points throughout the system. This will ensure a true representation of the water quality of the distribution system.

The RIA engaged consultants to undertake a Hazard Identification and Risk Assessment of the drinking water supply system with the results being presented through the Rottnest Island Drinking Water Quality Plan.



# Foreward

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

This report is compiled as a measure of compliance with the Australian Drinking Water Guidelines and for RIA customers, as a way of letting them know about the RIA's ongoing commitment to supplying the highest quality drinking water possible.

The RIA contracts Programmed Facility Management to operate and manage the water utility and services on Rottnest Island. Programmed have in place highly experienced Hydraulics personnel and appreciates the assistance of the WA Department of Health and Aquaterra Pty Ltd Water & Environment Consultants. This group ensures that the RIA has in place and maintains the practices and processes needed to ensure high levels of drinking water quality, while being open and transparent to the community.

The RIA identifies water quality as one of its Key Performance indicators with a target to achieve 100 per cent microbiological compliance each month. To achieve this, the RIA through Programmed Facility Management have identified and implemented operator training, risk management plans, monitoring plans, disaster recovery plans, and source protection.

I would like to thank the RIA Staff and Programmed Facility Management for their ongoing efforts in relation to water quality, and which is reflected in this year's Annual Water Quality Report results.

A handwritten signature in blue ink, appearing to read "Greg Ellson", with a long horizontal flourish extending to the right.

Greg Ellson  
A/CHIEF EXECUTIVE OFFICER

28 June 2012

## 1.0 Water provider information

Rottnest Island Authority Contact Details	
<b>Name of Company</b>	Rottnest Island Authority
<b>Company Address</b>	1st Floor E – Shed, Victoria Quay, Fremantle WA 6160 <a href="http://www.whitepages.com.au/wp/search/redirect.jhtml?url=">http://www.whitepages.com.au/wp/search/redirect.jhtml?url=</a>
<b>Company Phone</b>	Ph (08) 9432 9300      Fax (08) 9432 9301
<b>Company Website</b>	<a href="http://www.rottnestisland.com">www.rottnestisland.com</a>
<b>Company Email</b>	<a href="mailto:enquiries@rottnestisland.com">enquiries@rottnestisland.com</a>
<b>Chief Executive Officer</b>	Paolo Amaranti
<b>Facility, Operations &amp; Manager</b>	Desiree Kerr
<b>Compliance &amp; Utilities Manager (PFM)</b>	Ryan Benson

## 1.1 System Information

### 1.1.1 Consumers

The water demand is related to tenancy and is highly seasonal, being low in winter and high in summer. The average annual visitation over the past five years is 500,000 people with a low season average of 11,167 visitors/month (June) and a high season average of 50,437 visitors/month (January).

The number of beds on the island for guests totals 2,150 with the average length of stay being 3.5 nights. In addition there are approximately 250 permanent residents on the island, which will also fluctuate in accordance with peak and low periods. This does not include visitors arriving by private vessels who generally stay onboard.

### 1.1.2 Distribution System & Water Supply

The Rottnest Island distribution system is relatively small, consisting of approximately 20 km of mains which deliver to 396 dwellings, 9 shops and 3 public drinking fountains.

Drinking water is currently sourced from 29 freshwater bores\* and five saltwater (seawater) bores located in the sand dunes of Longreach Bay. The freshwater bore field produces approximately 25%



of the island's water while the saltwater bores feed into the desalination plant producing the other 75% of required water.

\*The freshwater bores are shut down for winter months, as water quantity requirements are lower than the summer period (less visitors on the island) and it allows the bores to recharge.

Water from the saltwater bores is filtered prior to the desalination plant to remove particle matter such as sand where it is then fed into mixing tanks with water from the freshwater bores. The mixed water is transferred and disinfected through the primary and secondary chlorine pump stations.

The combined storage capacity is 14,000kL which is able to maintain at least 17 days water storage. The water demand is highly seasonal, with the monthly consumption ranging from 7,000 kL in June to 24,000kL in January.

The islands bitumen catchment runoff collection system was decommissioned in 2010 pending a review on storage tanks and maintenance requirements. No water from rainfall collection was used for drinking purposes.

There a several remote locations such as toilets, Wadjemup lighthouse and Research House outside the settlement areas are all supplied water via tanker, however is not suitable for drinking and is sign posted accordingly.



### 1.1.3 Sampling Schedule & Procedure

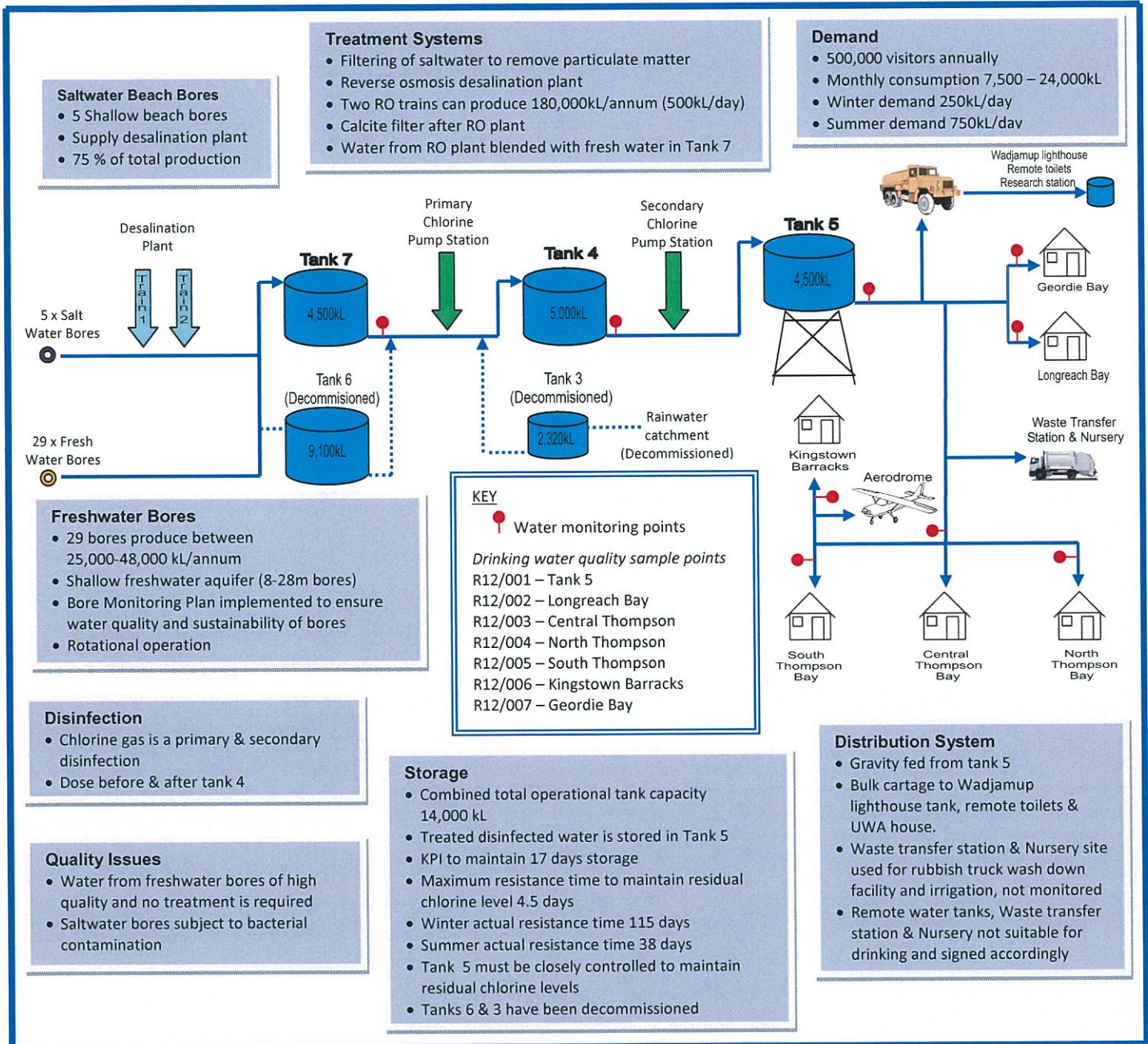
The sampling schedule has been set out in the Drinking Water Quality Plan for Rottnest Island prepared by Aquaterra Water & Environment Consultants.

The sampling points are R12/001, R12/002, R12/003, R12/004, R12/005, R12/006 and R12/007 as shown in table 1 – Diagram of Rottnest Island Water Distribution System.

The sampling procedure is carried out in accordance with Programmed Facilities Management *Work Method Statement - TPL-PFM-ROT-HYD-7.01 Drinking Water Sampling procedure*.



**Table 1 – Diagram of Rottneest Island Water Distribution System**





## 2.0 Microbial performance

### 2.1 Microbiological – Compliance Summary

No. of Sample Bacterial Analyses	<u>Total Coliforms</u>		<u>E.coli</u>	
	Failures	% Compliance	Failures	% Compliance
82	0	100%	0	100%

No. of Sample Amoebae Analyses	<u>Thermophilic Amoeba</u>		<u>Thermophilic Naegleria</u>	
	Failures	% Compliance	Failures	% Compliance
78	1	98.7%	0	100%

### 2.2 Microbiological Incident Specific Information

A failure is defined as the detection of any *E.coli* or any thermophilic *Naegleria*. There was one instance of thermophilic amoeba detected throughout the year as reported in the April – June 2011 Quarterly Drinking Water Report to the Department of Health. Subsequent samples taken showed no indication of thermophilic amoeba.

Note: *Escherichia coli* – (*E.coli*) is a bacteria found in the colon of human beings and animals that may be a serious contaminant when found in the food or water supply.

Thermophilic *Naegleria* – In routine or investigative analyses, presence of any Thermophilic *Naegleria* (able to grow at 42°C or above) is evidence that conditions are suitable for *Naegleria fowleri* should it be introduced. If samples include any Thermophilic *Naegleria*, remedial action should be taken immediately without waiting for specific identification.

## 3.0 Chemical – health related performance

### 3.1 Chemical – Health Related – Chart

Rottneest Island Distribution System 2010 - 2011					
Health Characteristic	ADWG Compliance Guideline Maximum Value (mg/L)	Number of Analyses	Number of Analyses Complying with ADWG	% Compliance with ADWG	Maximum Value of Analysis (mg/L)
Nitrate (NO <sub>3</sub> )	50	39	39	100%	5.9
Nitrite (NO <sub>2</sub> )	3	39	39	100%	0.1
Fluoride (F)	1.5	4	4	100%	0.5
Copper (Cu)	2	38	38	100%	0.02
Cadmium (Cd)	0.002	20	20	100%	<0.002
Manganese (Mn)	0.5	13	13	100%	<0.005
Nickel (Ni)	0.02	18	18	100%	<0.005
Lead (Pb)	0.01	39	38	97%	0.016
Boron (B)	4	6	6	100%	1.0
Antimony (Sb)	0.003	12	12	100%	0.001
Trihalomethanes THMs	0.25	27	27	100%	0.062

Note: Trihalomethanes THMs – may be present in drinking water as a by-product of disinfection using chlorination.

Fluoride – is naturally occurring in the water supply to Rottneest & is not added to the drinking water.

### 3.2 Chemical - Health Related - Incident Specific Information

There was one incident of lead levels detected above the guidelines (0.01mg/L) of 0.016mg/L at one sampling point throughout this reporting period. Subsequent sampling showed no further detection.

Note: Test samples taken throughout the reporting period of January – March 2011, indicated Boron levels in the seawater bores were above acceptable standards of 4 mg/L being 4.9, 5.1, 5.1mg/L. These samples were not taken at the distribution sampling points. Samples were taken from the distribution system in the following quarter which showed that the levels were well within acceptable levels.



## 4.0 Chemical - aesthetic performance

### 4.1 Chemical - Aesthetic – Chart

Rottneest Island Distribution System 2010 - 2011					
Aesthetic Characteristic	ADWG Compliance Guideline Maximum Value (mg/L)	Number of Analyses	Analyses Complying with ADWG	% Compliance with ADWG	Maximum Value of Analysis (mg/L)
Aluminium (Al)	0.2	13	13	100%	0.02
Chloride (Cl)	250	157	98	63%	350
Colour	15 HU	65	65	100%	3
Hardness (CaCO <sub>3</sub> )	200	14	12	86%	230
Manganese (Mn)	0.1	91	91	100%	<0.005
Iron (Fe)	0.3	82	82	100%	0.2
pH	6.5><8.5 units	156	125	80%	8.9
Sodium (Na)	180	2	2	100%	160
Sulphate (SO <sub>4</sub> )	250	3	3	100%	43
Ammonia (NH <sub>4</sub> )	0.5	35	35	100%	<0.005
TDS	500	4	2	50%	700
Turbidity	5 NTU	62	62	100%	1.3
Hydrogen Sulphide (H <sub>2</sub> S)	0.05	9	9	100%	<0.05
Zinc (Zn)	3	38	38	100%	0.03

Note: HU - Hazen Units is a measurement of discolouration of water.

NTU - Nephelometric Turbidity Units is measured from a calibrated nephelometer which measures light refraction through water.

### 4.2 Chemical - Aesthetic - Incident Specific Information

Chloride levels – 37% of samples taken were outside the prescribed parameters (250mg/L) with the highest levels reaching 350mg/L. The variations in pH have been attributed to the low level of water flow through the system and the requirement to manually dose the chlorine as there is no automotive process in place.

Hardness (CaCO<sub>3</sub>) levels were above the parameters (200mg/L) on two occasions from 14 samples taken through the year. They were from the same sampling point at 230mg/L and 210 mg/L. No

commentary was provide to ascertain why this was the case, however subsequent sample showed they were within the parameters.

pH level – 20% of samples taken where out of the prescribed parameters (6.5 - 8.5) with the highest being 8.9. The distribution system is constructed partly of concrete tanks and cement-mortar lined pipes and as indicated by the *Australian Drinking Water Guidelines 2004*, these can significantly increase the pH. This therefore suggests the one of the reason behind the higher pH levels.

The two values of high Total Dissolved Solids (TDS) was not considered representative of the island's general supply as it was taken from the header tank (5) and further testing took place throughout the distribution, confirming this was the case.

All the above are considered aesthetic parameters and do not have any health related concerns.

## 5.0 Radiological – Performance

### 5.1 Radiological - Performance - Chart

Radiological Testing is undertaken on a Biannual basis (odd years only), with no testing throughout this reporting period. The next analysis is due to be reported in the July 2011 to June 2012 annual report.

Note: Radiological testing - Radium isotopes are formed as a result of radioactive decay of uranium-238 and thorium-232, both of which occur naturally in the environment.

## 6.0 Planned Sample Summary

2010 - 2011								
Microbiological			Chemical			Radiological		
Planned*	Taken	% Taken	Planned*	Taken	% Taken	Planned*	Taken	% Taken
299	320	107%	727	891	122%	0	0	N/A

\*Both Chlorine and Manganese are measured for Health and Aesthetic purposes.



## 7.0 Customer Service

### 7.1 Customer Service Charter

The RIA reviewed its Customer Service Charter in 2010, which sets out the principles terms and conditions upon which the RIA intends to provide water services to its customers in accordance with the License issued to Rottneest Island by the Economic Regulation Authority under the *Water Services Licensing Act 1995*.

The charter informs the customers of Rottneest Island of their rights in accordance with the provision of the license, including service interruptions, levels of service, and complaint procedures.

A copy of the operating license is available on request from the RIA or from the Economic Regulation Authority.

### 7.2 Customer Complaints

The RIA and Programmed Facility Management are committed to handling complaints and enquiries in a courteous and efficient manner.

Programmed Facility Management can be contacted for complaints via the 24 hour call centre on **1300 044 534**.

Alternatively written complaints can be mailed to:  
Rottneest Island Authority  
PO Box 693  
Fremantle WA 6959

Each complaint is assigned unique identification number and delegated to an appropriate person to resolve. Any complaints are monitored continuously to identify any trends and areas for improvement.

In 2010/2011 the RIA only recorded three (3) complaints relating to the water supply system.

## 8.0 Acknowledgements

The Rottneest Island Authority acknowledges the cooperation and assistance provided throughout the year by:

- Programmed Facility Management Pty Ltd.
- Aquaterra Pty Ltd Water & Environment Consultants.
- Department of Health.