




**SGSP Rosehill Network Pty Limited**

**Water Quality Management Plan**

Date: 11 December 2017

Revision	Date	Revision Details	Prepared by	Checked by
0	22 Dec 2010	Draft for review	Arthur McAuley Linda Gyzen Colin Thompson	Ed Gaykema Peter Hankin Peter Bowden
1	12 April 2011	Update	Colin Thompson Linda Gyzen	Peter Hankin
2	12 June 2012	Update	Colin Thompson	Peter Hankin
3	26 June 2014	Update SGSPRN	Colin Thompson	Paul Matthews
4	25 March 2015	Remove LB, Alcoa and IRIS	Colin Thompson	Paul Matthews
5	6 June 2016	Minor updating	Colin Thompson	Paul Matthews
6	11 December 2017	Update to Quality Control Points	David Vaughan	Paul Matthews

	Title:	Name:	Signature:	Date:
<b>Approval</b>	Business Manager SGSP Rosehill Network Pty Limited	David Vaughan		<b>11/12/2017</b>
<b>Endorsement and Acceptance</b>	Network Commercial Manager	Caroline McGeechan		<b>15/12/2017</b>

<b>INTRODUCTION .....</b>	<b>5</b>
ROSEHILL SCHEME OVERVIEW.....	5
<b>1. RESPONSIBLE USE AND MANAGEMENT OF RECYCLED WATER QUALITY .....</b>	<b>7</b>
1.1 RECYCLED WATER QUALITY POLICY .....	7
1.2 EXPERTISE IN PRODUCING AND MAINTAINING WATER QUALITY.....	7
1.3 REGULATORY REQUIREMENTS.....	8
1.3.1 STANDARDS, CODES AND LEGISLATION .....	8
1.3.2 REGULATORY COMPLIANCE .....	8
1.4 STAKEHOLDER ENGAGEMENT .....	8
1.4.1 SYDNEY WATER.....	9
1.4.2 CUSTOMERS.....	9
1.4.3 VEOLIA.....	9
1.4.4 GOVERNMENTAL AGENCIES.....	9
1.4.5 OTHER STAKEHOLDERS.....	10
<b>2. ANALYSIS OF THE RECYCLED WATER SYSTEM .....</b>	<b>10</b>
2.1 SOURCE AND USES OF RECYCLED WATER .....	10
2.1.1 SOURCE OF WATER .....	10
2.1.2 RECYCLED WATER QUALITY.....	10
2.1.3 END USES.....	11
2.1.4 ROUTES OF EXPOSURE.....	12
2.1.5 RECEIVING ENVIRONMENTS.....	12
2.1.6 UNINTENDED AND UNAUTHORISED USES.....	13
2.2 RECYCLED WATER SYSTEM.....	13
2.2.1 KEY CHARACTERISTICS.....	13
2.2.2 SYSTEM ANALYSIS.....	14
2.2.3 REVIEW OF SYSTEM ANALYSIS.....	16
2.3 RISK ASSESSMENT AND HAZARD IDENTIFICATION.....	16
2.4 RECYCLED WATER QUALITY DATA .....	18
2.4.1 DATA COLLECTION.....	18
2.4.2 EXCEEDANCES.....	18
2.4.3 ASSESSMENT OF DATA AND TREND ANALYSIS .....	18
<b>3. PREVENTATIVE MEASURES FOR WATER QUALITY MANAGEMENT .....</b>	<b>19</b>
3.1 PREVENTATIVE MEASURES .....	19
3.1.1 MULTIPLE BARRIER APPROACH.....	19
3.1.2 ADDITIONAL PREVENTATIVE MEASURES .....	20
3.1.3 DOCUMENTATION .....	20
3.2 CRITICAL CONTROL POINTS .....	21
<b>4. OPERATIONAL PROCEDURES AND PROCESS CONTROL.....</b>	<b>21</b>
4.1 OPERATIONAL PROCEDURES .....	21
4.1.1 OPERATIONAL OVERVIEW.....	21
4.1.2 DOCUMENTATION.....	23
4.2 OPERATIONAL MONITORING .....	23
4.2.1 MONITORING EQUIPMENT .....	23
4.2.2 MONITORING PROTOCOLS .....	24
4.3 OPERATIONAL CORRECTIONS .....	24
4.4 OPERATIONAL EQUIPMENT .....	25
4.4.1 EQUIPMENT PERFORMANCE.....	25
4.4.2 EQUIPMENT MONITORING AND MAINTENANCE .....	25
4.5 MATERIALS AND CHEMICALS .....	25

<b>5. VERIFICATION OF RECYCLED WATER QUALITY .....</b>	<b>26</b>
5.1 RECYCLED WATER QUALITY MONITORING .....	26
5.1.1 CHARACTERISTICS TO BE MONITORED .....	26
5.1.2 SAMPLING PLAN .....	26
5.1.3 DATA IS REPRESENTATIVE AND RELIABLE.....	26
5.1.4 DOCUMENTATION AND TRAINING.....	27
5.2 RECYCLED WATER USERS .....	27
5.2.1 ENQUIRY AND RESPONSE FOR CUSTOMERS.....	27
5.2.2 CUSTOMER SATISFACTION AND COMMUNICATION.....	28
5.3 RECYCLED WATER QUALITY REPORTING .....	28
<b>6. MANAGEMENT OF INCIDENTS AND EMERGENCIES .....</b>	<b>28</b>
6.1 COMMUNICATIONS .....	28
6.2 RESPONSE PLANS.....	29
6.3 TRAINING AND TESTING .....	29
6.4 INVESTIGATION AND REVIEW .....	29
<b>7. OPERATOR, CONTRACTOR AND USER AWARENESS .....</b>	<b>30</b>
7.1 RECYCLED WATER QUALITY AWARENESS.....	30
7.1.1 OPERATOR AND CONTRACTOR AWARENESS .....	30
7.1.2 END USER AWARENESS.....	30
7.2 TRAINING RECORDS.....	31
<b>8. COMMUNITY AWARENESS AND INVOLVEMENT .....</b>	<b>31</b>
8.1 ASSESS REQUIREMENTS .....	31
8.2 COMMUNITY CONSULTATION STRATEGY.....	31
8.3 USER CONSULTATION STRATEGY .....	31
8.4 BENEFITS AND UNAUTHORISED USE .....	32
8.4.1 UNAUTHORISED USE.....	32
8.4.2 BENEFITS OF RECYCLED WATER USE.....	32
<b>9. VALIDATION, RESEARCH AND DEVELOPMENT .....</b>	<b>32</b>
9.1 VALIDATION PROCESSES .....	32
9.2 CHANGE IN CONDITIONS AND NEW EQUIPMENT .....	32
9.3 CONTINUOUS IMPROVEMENT.....	33
<b>10. DOCUMENTATION AND RECORDS.....</b>	<b>33</b>
10.1 DOCUMENTATION OF RECYCLED WATER QUALITY MANAGEMENT .....	33
10.2 RECORDS MANAGEMENT SYSTEM.....	34
10.3 INTERNAL AND EXTERNAL REPORTING .....	34
<b>11. EVALUATION AND AUDIT.....</b>	<b>34</b>
11.1 COLLECTION AND EVALUATION OF DATA .....	34
11.2 INTERNAL AND EXTERNAL AUDITING .....	34
11.2.1 AUDIT PROTOCOLS .....	34
<b>12. REVIEW AND CONTINUAL IMPROVEMENT.....</b>	<b>35</b>
12.1 IDENTIFYING A NEED FOR CHANGE.....	35
12.2 CONTINUAL IMPROVEMENT TO PLANS AND PROCESSES.....	35
12.3 EFFECTIVENESS OF IMPROVEMENT PROCESSES .....	36
<b>APPENDIX A – ABBREVIATIONS AND DEFINITIONS.....</b>	<b>36</b>

## Introduction

This SGSP Rosehill Network Pty Limited (SGSPRN) Water Quality Management Plan (WQMP) has been developed for the network component of the Rosehill Recycled Water Scheme (Rosehill Scheme) which is being delivered under Water Industry Competition Act (WICA) Network Operator's Licence number 09\_002.

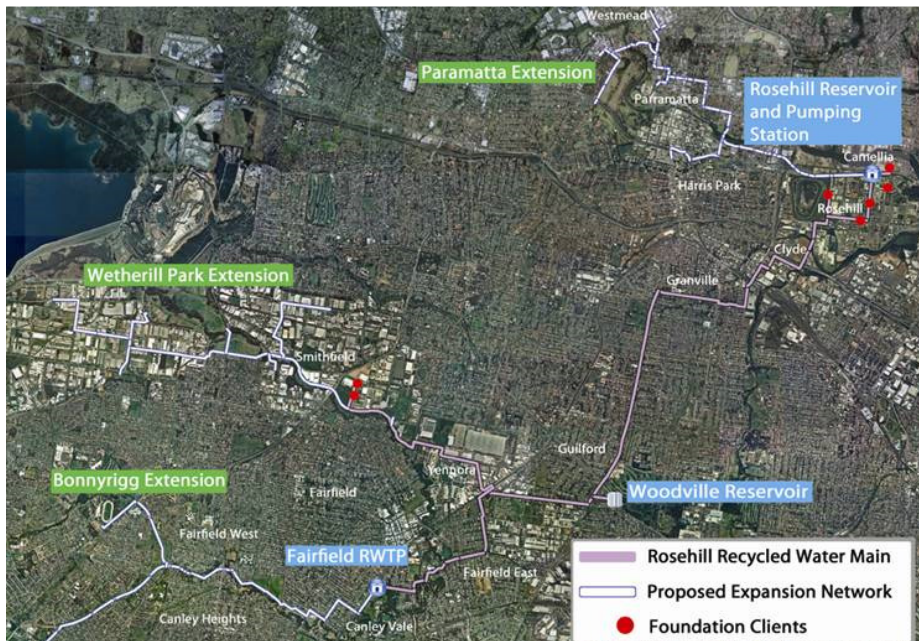
This WQMP addresses the 12 elements of the framework for the management of recycled water quality and use, as detailed in the Australian Guidelines for Water Recycling.

## Rosehill Scheme Overview

AquaNet Sydney Pty Limited (AquaNet) is the proponent of the Rosehill Scheme which involves:

- Extracting secondary treated effluent from Sydney Water Corporation's (Sydney Water's) Liverpool to Ashfield Pipeline (LAP);
- Treating the effluent to produce **high quality** recycled water in a Recycled Water Plant (Veolia Plant) at Fairfield;
- Transporting recycled water from the Plant, through a distribution network (SGSPRN Network) to customers in the municipalities of Auburn, Bankstown, Fairfield, Holroyd, Liverpool and Parramatta local government areas (Customers).

The proposed scope of the Rosehill Scheme Network is shown in the figure below.



The Rosehill Scheme is underpinned by a 20 year (2011) Project Agreement between AquaNet and Sydney Water and will deliver up to 25 million litres of recycled water per day to Customers.

Under the Project Agreement:

- AquaNet supplies recycled water to seven foundation customers at the customer meter (Sydney Water has retail contracts with these seven customers for the supply of recycled water)
- Sydney Water treats the effluent to secondary level to comply with a effluent specification in the Project Agreement (Sydney Water collects effluent in the Liverpool and Glenfield catchments in line with their trade waste contracts)
- Sydney Water supplies up to 32ML per day via the LAP to the Plant

AquaNet is delivering the Rosehill Scheme through two major subcontracts for the Plant and Network as follows:

Plant Agreement: Veolia Water Australia Pty Ltd (Veolia) is responsible for owning, designing, constructing, maintaining and operating the Plant under this 20 year (2011) agreement with AquaNet. Veolia holds Network Operator's Licence 09\_001 for the Plant component of the Rosehill Scheme and has submitted a separate Water Quality Management Plan.

Pipelines Agreement: SGSPRN is responsible for owning, designing, constructing, maintaining and operating the Network under this 20 year (2011) agreement with AquaNet.

The contractual structure of the Rosehill Scheme is depicted in Figure 2

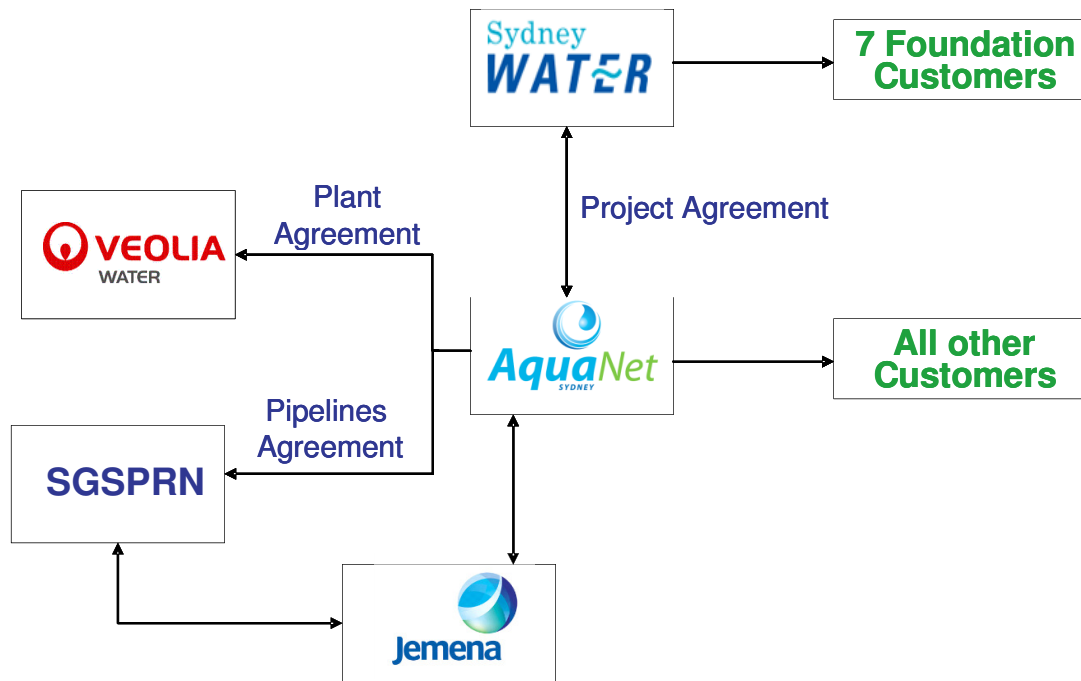


Figure 2 Rosehill Scheme Contract Structure

SGSPRN is wholly owned by Jemena Limited (Jemena), and Jemena, through its various subsidiaries, provides the resources, skills and expertise required for SGSPRN to deliver the Network component of the Rosehill Scheme.

## **1. Responsible Use and Management of Recycled Water Quality**

### **1.1 Recycled Water Quality Policy**

Jemena has developed a Recycled Water Quality Policy in line with the Australian Guidelines for Water Recycling. The policy outlines Jemena's commitment to the providing a safe and reliable source of recycled water that meets the recycled water Quality Specification.

The policy is accessible to all Jemena employees on the Jemena intranet.

### **1.2 Expertise in producing and maintaining water quality**

Responsibility for the design, management and operation of the Rosehill Scheme is with Veolia Water Australia (Veolia) and SGSPRN.

AquaNet has contracted with Veolia, a world leader in water treatment, to produce and supply recycled water meeting the agreed specification to the Network.

SGSPRN's priority is to ensure that the recycled water quality received from the Plant is maintained as it travels through the Network to the Customers. SGSPRN has utilised the resources of Jemena, which has extensive experience in delivering large pipeline infrastructure projects across Australia, to manage construction and management of the Network:

- Design - To ensure that the design of the Network would deliver the required quality, Jemena employed Parsons Brinkerhoff (PB), a highly experienced water industry design consultant, to complete the detailed Network design and associated hydraulic modelling.
- Construction - Jemena employs highly experienced contractors such as CLM Infrastructure Pty Ltd to install the Network, Tasman Tanks to install the reservoirs and KSB to supply the pumps.
- Operation—SGSPRN utilises Jemena's existing and highly experienced SCADA team to monitor the Network and on line recycled water quality parameters and operate and maintain the Network. Where appropriate, SGSPRN uses specialised resources for some aspects of Network operation eg some water quality testing is be conducted by a NATA accredited laboratory



Sydney Water and AquaNet engaged an independent verifier, Kellogg Brown & Root Pty Limited (KBR), to ensure that the design and construction of the Rosehill Scheme was delivered according to the specifications that form part of the Project Agreement.

## **1.3 Regulatory Requirements**

### **1.3.1 Standards, Codes and Legislation**

Below is a list of Australian and International Standards used in the design and operation of the Network. This list is not exhaustive.

Design and operation is undertaken in accordance with:

- IPART Audit Guideline-Water Licence Audits Sept 2009
- Water Industry Competition Act 2006 (WICA)
- National Water Quality Management Strategy. Australian Guidelines for Water Recycling: Managing Health and Environmental Requirements (Phase 1) 2006NRMMC, EPHC, AHMC
- WSA 03-2002 Water Supply Code of Australia (Supplement) Dual Water Supply Systems
- NSW Code of Practice for Plumbing and Drainage
- AS 2845.1: 2010 Water Supply Backflow
- ISO4064 – Measurement of water flow in fully charged conduits – meters for cold potable and hot water
- Department of Planning Part 3A approval

### **1.3.2 Regulatory Compliance**

The Jemena Technical Compliance and Audit group maintain and oversee the Jemena Compliance and Risk System (JCARS) which contains regulatory obligations that are assigned to key personnel responsible for each obligation. Compliance to each obligation is tracked and reported to senior management for review.

The WICA Water Reporting Manual (as updated from time to time) specifies the regulatory reporting requirements by SGSPRN. The reporting requirements are immediate (with respect to reportable incidents) and annual. SGSPRN uses these guidelines as a basis for formal regulatory reporting.

The annual report (which forms part of the WICA Water Reporting Manual) is prepared and signed off by the SGSPRN directors. Actions are tracked in JCARS to ensure all requirements are actions and reported.

## **1.4 Stakeholder Engagement**

Engagement of key stakeholders is managed as described in the following sections.



The list of key stakeholders, in particular, government agencies, is reviewed on an annual basis.

### **1.4.1 Sydney Water Corporation (SWC)**

Formal engagement with Sydney Water is through a quarterly Project Control Group Meeting and monthly reporting, both of which form part of the Project Agreement.

Protocols have also been established to make sure issues are communicated:

- Between Sydney Water, AquaNet and Veolia with respect to quality and quantity of effluent available to the project.
- Between Sydney Water and AquaNet with respect to water quality and supply issues for foundation customers.
- Communication Protocol-WTOC0068-V3-Protocol A.doc

### **1.4.2 Customers**

Formal customer engagement is through a quarterly report covering water quality, a monthly invoicing process and a communication protocol that forms part of the Recycled Water Supply Agreements.

### **1.4.3 Veolia**

Formal engagement with Veolia is through monthly reporting, this forms part of the Plant Agreement.

For example, to enable better management the production of recycled water quantity and quality, Veolia has direct visibility of the Network assets (storage tank levels, quality results) where appropriate. Similarly, SGSPRN has direct visibility of Plant performance (number of reverse osmosis units available, quality results) for use to enable better management the Network assets.

### **1.4.4 Governmental Agencies**

Formal engagement of NSW Government Agencies in relation to the Rosehill Scheme is in accordance with the regulatory reporting requirements in Attachment B.

In relation to the Network Operator Licence, IPART (as the administrator of WICA) passes on SGSPRN submissions and applications to the NSW Office of Water and the NSW Department of Health for comment. SGSPRN therefore does not have a formal relationship with these agencies even though they are significant stakeholders.

SGSPRN has a relationship with Local Governments through the placement of pipes in council roads under WICA, through leasing and/or easements over land and through supply of recycled water to council facilities. Engagement of Local Government is in accordance with the requirements of the land access agreements and recycled water supply agreements.

### 1.4.5 Other Stakeholders

Engagement with remaining Rosehill Scheme stakeholders is on an informal basis and as required basis and through the website which includes a SGSPRN component.

## 2. Analysis of the Recycled Water System

### 2.1 Source and Uses of Recycled Water

#### 2.1.1 Source of Water

The Rosehill Scheme sources secondary effluent from the Sydney Water Liverpool to Ashfield Pipeline (LAP). The LAP contains secondary effluent sourced from SWC Liverpool and Glenfield Recycled Water Plants (RWP). The catchments of these RWP's include both domestic and industrial waste water covered by trade waste agreements. Sydney Water monitors the catchment through Trade Waste licences and monitoring.

The Plant treats the secondary effluent from the LAP to produce high quality recycled water to meet the Quality Specification before it is loaded into the recycled water storage tank on the Plant site.

SGSPRN sources recycled water from the Plant recycled water Storage tank.

#### 2.1.2 Recycled Water Quality

The Rosehill Scheme has been designed to continuously meet the following recycled water Quality Specification in the table below.

Parameter	Units	Target	Limit to Trigger Product Failure
Total Dissolved Solids	mg/L	<50	≥ 60
pH	pH units	6.5 to 8.5	<6.0, >9.0
Chlorine Residual	mg/L	1	<0.7, >5.0
Turbidity	NTU	<0.5	≥ 2

This is achieved using three online Water Quality Monitoring Units (WQMUs), as quality control points, which are linked to the SCADA control system. The WQMUs monitor the parameters in the table above and if the recycled water is out of specification the supply is terminated. To aid this process early warning levels have been set to prompt intervention if recycled water quality is approaching the Product Failure level. The accuracy and calibration of the WQMUs is verified by calibrated field instruments.

The recycled water must also meet the target parameters in the table below 95 % of the time.

These tables form the 'Quality Specification' for the 'Recycled Water' produced at the Plant and delivered by SGSPRN to the Customers through the Network

Parameter	Units	Monitoring Frequency	Recycled Industrial Water Quality(95%ile) (95%ile is calculated on 52 week rolling average)
Alkalinity	mg/L (as CaCO <sub>3</sub> )	Monthly	<20
Aluminium	mg/L	Monthly	<0.1
Ammonia	mg/L	Monthly	<1
Iron (soluble)	mg/L	Monthly	<0.05
Manganese	mg/L	Monthly	<0.05
Zinc	mg/L	Monthly	<0.1
Biochemical Oxygen Demand	mg/L	Monthly	<2
TDS	mg/L	Monthly	<55
Turbidity	NTU	Monthly	< 1
Total Nitrogen	mg/L	Monthly	<10
Total Phosphorous	mg/L	Monthly	<2
E.coli Coliforms	CFU per 100mL	Monthly	<1 in 100ml
Total Coliforms	CFU per 100mL	Monthly	<10 in 100ml
Virus	Organisms per 50L	Monthly	<1 in 50L
Parasites	Organisms per 50L	Monthly	<1 in 50L
Total Iron	mg/L	Monthly	<0.5

The above parameters are tested at an external NATA certified laboratory.

### 2.1.3 End Uses

The Rosehill Scheme can supply Recycled Water to industrial, commercial and residential uses for the following authorised uses:

- Cooling tower make-up
- Industrial process
- Wash-down
- Fire fighting
- Irrigation
- Toilet Flushing
- Washing Machine (cold tap)

SGSPRN supplies the recycled water to Customers that have recycled water supply agreements with AquaNet or Sydney Water. The following table is a summary of Customers that have a supply agreement or have indicated an intention to have one in the future. The table includes the intended end use by those customers.

Customer	End use
Visy	Boilers and paper manufacture process water
Visy PET	PET bottle washing
Rosehill racecourse	Irrigation
Boral	Process water for the production of plasterboard and cornice
AB Mauri	Boilers, cooling towers, wash down and waste water cooling
EarthPower	Fertiliser manufacture and power generation
PCC Sporting Fields	Irrigation
PCC Woodville Golf Course	Irrigation
CSR Monier	Tile manufacturing

### 2.1.4 Routes of Exposure

Routes to exposure include airborne spray from cooling towers, fire fighting spray, physical contact with water during manufacturing, inadvertent drinking and contact with finished products.

Exposure by employees, customers or the public from these routes of exposure will not pose a health threat.

### 2.1.5 Receiving Environments

The receiving environments of the Rosehill Scheme include:

- Recycled water customer sites and processes
- The natural environment through irrigation or mains break
- Scour points along the Network that are used to drain or flush the Network during an emergency or a water quality event.

Other end points include air valves and reservoir overflows.

Rosehill Scheme and recycled water customer equipment has been designed and/or modified such that it is suitable for long terms exposure to the Recycled Water.

Recycled water from the Rosehill Scheme will only enter other receiving environments on an infrequent basis, if ever, and will be significantly cleaner than any stormwater that will frequently enter those same environments. SGSPRN has put in place a Recycled Water Release Plan approved by the Department of Planning (and EPA) that enabled SGSPRN to release up to 1M litres of Recycled Water before any approval or reporting is required. (Sanctioned by the EPA)

There is therefore little environmental threat posed by release of the recycled water.

In the event of physical damage to roads and other infrastructure from a high volume release of recycled water through leakage or equipment failure, that damage will be rectified by SGSPRN.

## 2.1.6 Unintended and Unauthorised Uses

Recycled water supply agreements include specific end uses for each customer. Through the supply agreements customers take on the responsibility for ensuring that they restrict recycled water use to these specific uses and take the backflow and cross connection precautions as define by the Water Supply Code of Australia (WSA).

Unintended and unauthorised end uses are most likely to be as a result of accidental cross connection of the Network or Customer recycled water systems with the potable water network. This risk is mitigated through measures such as

- Dial Before You Dig (DBYD) providing advice to anyone working in the vicinity of the Network
- Customer site inductions and signs at the entrance to Customer Sites informing visitors (including plumbers) that recycled water is in use.
- A requirement in the recycled water supply agreements for installation of recycled water systems by customers to comply with the NSW Plumbing and Drainage code.
- Pipeline markers.
- Recycled Water pipe coloured violet and marker tape.

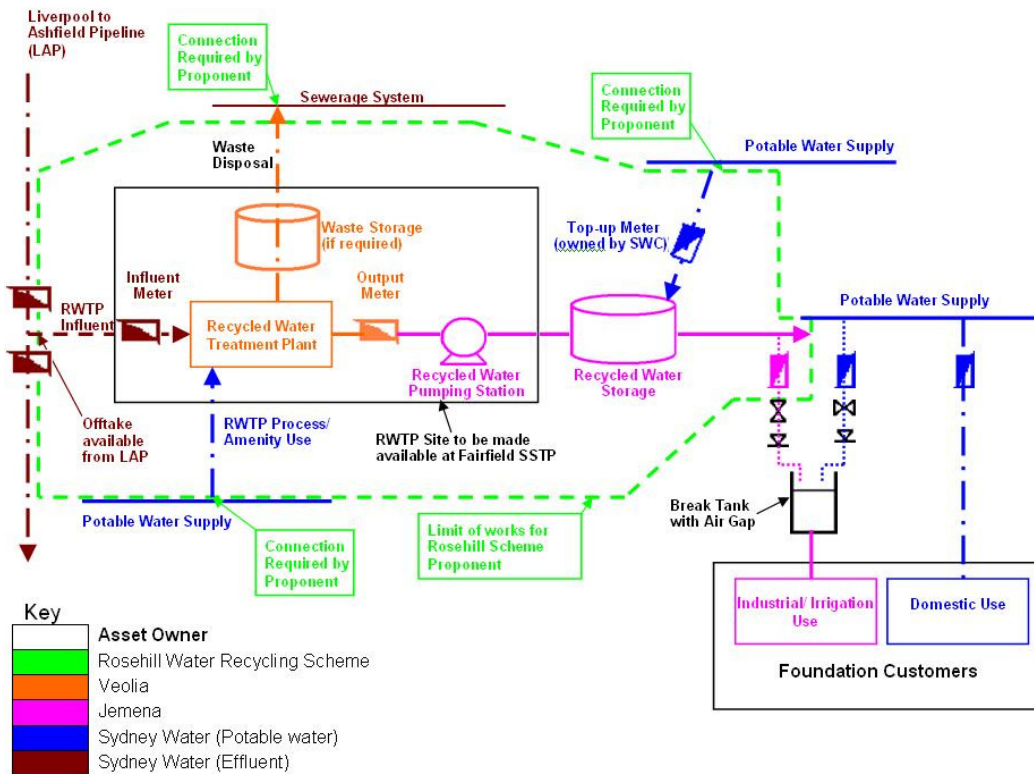
SGSPRN uses licensed plumbers to make new connections to ensure that cross contamination does not occur in the Network.

## 2.2 Recycled Water System

### 2.2.1 Key Characteristics

The Rosehill Scheme has the following key components and is depicted in the general diagram below:

- Effluent collection and treatment by Sydney Water and supply to the LAP
- Effluent monitored and extracted by Veolia from the LAP.
- Plant (including treatment by reverse osmosis, micro filtration, chlorination and other processes)-Veolia Plant.
- Plant trade waste pumped to the Sydney Water sewerage system under licence-Veolia Plant.
- Network (consisting of pipes, reservoirs and pump stations)
- Potable water connection points.
- Customers meter connection.



Key Components of the Network include:

- Pipelines (PVC, PE and Stainless Steel).
- Pump stations (Fairfield and Rosehill).
- Reservoirs (Woodville and Rosehill).
- Online Water Quality monitoring units (Fairfield, Rosehill and Smithfield).
- Isolation valves at approximately 1km intervals.
- Air valves at high points in the pipeline.
- SCADA monitoring and control system.
- Communication systems.
- Potable Water connections.
- Scours at low points approximately every 1km along the pipeline.
- Customer meter sets including back flow protection.

## 2.2.2 System Analysis

Several hazard identification and risk assessment sessions were undertaken throughout the development of the scheme.

### Screening Level Risk Assessment

In 2008, in partial fulfilment of the requirements of the 2006 Australian Guidelines for Water Recycling (AGWR) a screening-level (microbial) risk assessment (SLRA) was

undertaken by Sydney Water to quantify potential health risks associated with recycled water for the proposed recycled water uses of the Rosehill Scheme.

The risk assessment did not identify any human health risks that exceeded the acceptable annual risk benchmark of  $10^{-4}$  (1 additional infection per 10,000 persons per annum), either by the gastrointestinal (ingestion) or respiratory (inhalation) route.

As part of this study a desktop assessment of the required log reductions of microbial pathogens was also undertaken. It was found the predicted log reductions based on the proposed design exceeded those required in the 2006 Australian Guidelines for Water Recycling for industrial, municipal and fire-fighting use, in most cases by many orders of magnitude.

Values of 14 log reduction were estimated for bacteria (target 5.3), 10.55 log for viruses (target 6.5) and greater than 7.25 log reduction for protozoa (target 5.1), ensuring that recycled water was treated fit for its intended application in industry and irrigation as well as fire-fighting.

The SLRA study was undertaken by Dr Michael Storey of Sydney Water, Science and Technology.

### **Preliminary Risk Assessment and Critical Control Point Identification**

Following the SLRA, a Preliminary Risk Assessment was held on the 19<sup>th</sup> September 2008. Attendees included:

- Narelle Berry–IPART
- Jameel Bhana, Lisa Currie, Paul Dixon–Veolia
- Troy Walker, Annalie Roux–Veolia (Western Corridor)
- Kim Hardy, Catherine Stokes–Jemena
- Richard Shuil, Darren Atkins–Sydney Water
- Linda Gyzen–AquaNet
- Samson Tam–Veolia Water Solutions and Technologies (VWS)

A Preliminary Risk Register was developed as an outcome of this workshop.

As part of the workshop held on 19<sup>th</sup> September 2008 preliminary Critical Control Points (CCP's) were also identified.

The preliminary risk assessment and CCP identification were used to engineer controls into the Rosehill Scheme.

### **Final Risk Assessment and confirmation of CCP**

A second series of Risk Assessment and CCP workshops were held in September / October 2010. The purpose of these workshops was to confirm the CCP's within the whole Rosehill Scheme and to identify residual health and environmental risks that have not been eliminated through Plant design.

The first of the workshops was to confirm the CCP's within the scheme.



Attendees included:

- Narelle Berry – IPART
- Phil Narezzi, Andrew Richardson, Kate Simpson – Veolia
- Charles Edmiston, John McGuinness, Ronald Bean, Melanie Blake – VWS&T
- Arthur McAuley, Rajesh Gobel – Jemena
- Colin Thompson – AquaNet
- Ron Bouwman – South West Health

The purpose of the second of the two workshops was to undertake a risk assessment to identify any outstanding health and environmental risks.

Attendees included:

- Narelle Berry – IPART
- Ron Bouwman - South West Health
- Phil Narezzi, Andrew Richardson, Kate Simpson – Veolia
- Charles Edmiston, John McGuinness, Ronald Bean, Melanie Blake – VWS&T
- Rajesh Gobel – Jemena Operations
- Colin Thompson – AquaNet
- Frank Vidovic – Sydney Water

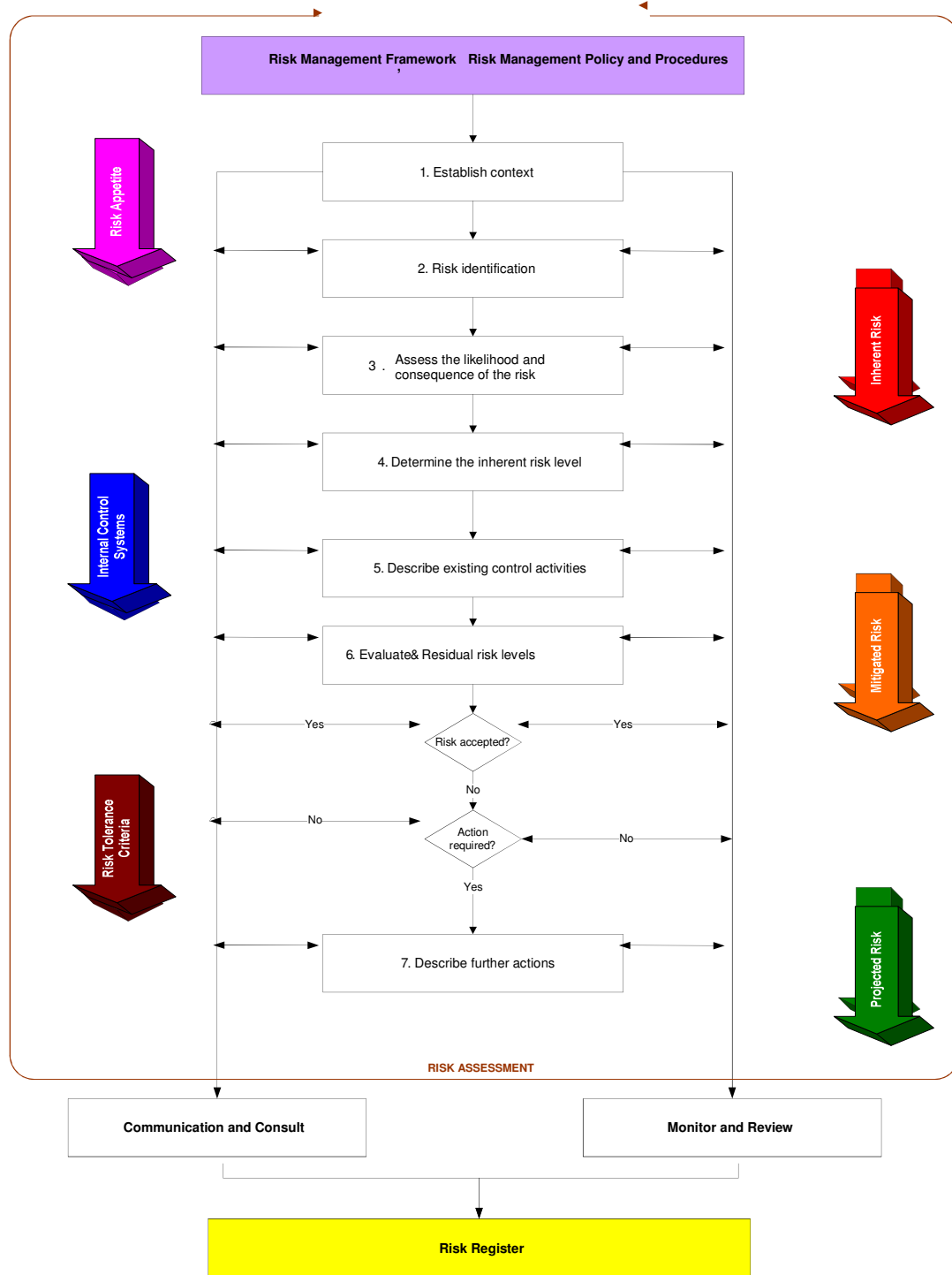
### **2.2.3 Review of System Analysis**

The recycled water system analysis will be reviewed annually in order to identify and incorporate any changes.

The analysis will also be reviewed following any major Network expansion.

## **2.3 Risk Assessment and Hazard Identification**

The methodology for Hazard Assessment and Risk Management is in accordance with PR-VW-ANZ-204 – Risk Management Procedure, which is based on AS4360, the Australian Standard for risk management. As with most risk management methodologies, this procedure requires the identification of hazards and an assessment of the likelihood of their occurrence, potential consequences, and the effectiveness of any control/mitigation measures. The methodology is summarized in the figure on the following page.



## 2.4 Recycled Water Quality Data

### 2.4.1 Data Collection

Recycled water quality data for the Network and the outlet of the Plant is stored in the Jemena OSI PI data management system.

All recycled water quality data for the Plant is collected and stored by Veolia.

During the detailed design phase of the Rosehill Scheme, Veolia conducted a six month pilot plant trial at Liverpool STP and collected extensive data on the quality of the two effluent streams. This data was used to assist in finalising the design of the Plant.

Sydney Water has improved the quality of the secondary treated effluent since the pilot study was undertaken to ensure it meets the specification in the Project Agreement. Veolia and Sydney Water monitor the quality of the effluent to provide an early warning signal to the Plant if there are quality or quantity issues.

### 2.4.2 Exceedances

Any recycled water that does not meet the Quality Specification is not permitted into the Network from the Plant. An online Water Quality Monitoring unit identifies out of specification recycled water which is then recycled within the Plant until it is back in specification.

If for some reason the recycled water quality falls outside the Quality Specification after passage through the Network, the recycled water is disposed of through the scour points and will not be supplied to Customers.

The monthly and annual reporting processes defined in Section 2 provide a summary of recycled water quality exceedance if it occurs.

The Project Agreement sets limits on the quality of effluent that the Plant is required to treat. If the quality of effluent falls outside these parameters, Sydney Water makes potable water available to users without penalty to AquaNet.

Veolia monitors and collects data relating to the quality of influent supplied by Sydney Water to ensure it is treatable by the Plant.

### 2.4.3 Assessment of Data and Trend Analysis

On a live data basis the Plant and Network SCADA systems allows the operators to identify and follow any short term trend and take appropriate corrective action to rectify and recycled water quality issues.

Triggers set on the Water Quality Monitoring units in the Network alert the operators of a trend towards an exceedance point so corrective action can be taken before the exceedance occurs.

Medium and longer term trends in recycled water quality variations during passage through the Network are used to trigger maintenance events.

The trigger points and exceedance levels are specified in the SCADA system and will be periodically updated in accordance with operating experience over time.

### **3. Preventative Measures for Water Quality Management**

#### **3.1 Preventative Measures**

##### **3.1.1 Multiple Barrier Approach**

The Rosehill Scheme uses a multiple barrier approach to manage hazards in recycled water. Under this approach, a number of sequential processes are used, each of which provides a barrier to one or more hazardous parameters. The multiple barrier approach has a number of advantages:

- Within the plant the recycled water needs to pass the quality parameter of each barrier before being passed to the next barrier;
- Reduced performance of one barrier does not result in a total loss of management;
- As a combination, multiple barriers produce less variability in performance than single barriers;

There are several barriers in the Rosehill Scheme to ensure that SGSPRN does not supply recycled water to customers that does not meet the Quality Specification. They are:

- Sydney Water effluent collections are covered by trade waste agreements (Sydney Water responsibility)
- Sydney Water treats the effluent to secondary treated effluent standard (Sydney Water responsibility)
- Effluent may not be allowed into the Plant if the quality falls outside the effluent specification (Veolia responsibility)
- Reverse Osmosis (RO) technology in the Plant is such that contaminants cannot get through the membranes and it is not possible to significantly deviate from the Quality Specification (Veolia responsibility)
- Recycled water that does not meet the Quality Specification is not allowed to transfer from the Plant into the Recycled Water tank. (Veolia responsibility)
- Quality is re-tested as it enters the Network to ensure that it still meets the Quality Specification (SGSPRN Responsibility)
- Recycled water that does not meet the Quality Specification is not delivered to the Customers (end of network testing). (SGSPRN Responsibility)

In all cases SCADA systems are used to monitor water quality and alarms are triggered when quality parameters are drifting towards the limits. This provides

operators with time to take corrective action prior to the recycled water falling outside the Quality Specification.

To minimise the risk of cross connection or contamination with the potable water systems there is also a multiple barrier approach i.e.:

- The metering systems at customer sites consist of either a three way valve system (Approved by Sydney Water) or a break tank system. Both of these systems ensure that there is not physical connection between potable and recycled water systems at the metering point
- A Reduced Pressure Zone Device (PPZD) is installed and regularly tested, with the results reported to Sydney Water.
- Customers are required to use signage and colour coding of recycled water pipes on site and ensure that all work is done by a licensed plumber.
- All reticulation pipelines in the Network are colour coded; marker tape and installed according to WSA guidelines. Pipeline markers were also used.
- Network pipes are registered in Jemena DBYD, Jemena GIS system and Sydney Water mapping systems.

### **3.1.2 Additional Preventative Measures**

A Risk Assessment workshop was held in September / October 2010. The purpose of the workshop was to confirm the preventative measures and barriers within the Plant and Network and to identify any additional design features or operating procedures that should be added as preventative measures.

The first step of the Risk Assessment process was to identify hazards and their existing controls. Following identification, the hazard was assessed with existing controls in place. Based on a risk score was generated which was used to assess the adequacy of existing controls.

Based on the risk calculated in Section 3.2, the adequacy of existing controls were assessed and, where required, additional preventative measures were identified in order to reduce the risk to an acceptable level.

As an example, an alarm was added to the flow meter at Fairfield to detect reverse flow between the Woodville Reservoir and the Recycled Water reservoir at the Plant. The alarm is triggered if there is reverse flow as a result of the non-return valve not working adequately.

### **3.1.3 Documentation**

The water quality risks identified for the Network relate to dead legs of pipe and turnover of water at reservoirs. Reservoirs have their water quality checked through the sampling plan. The only identified dead leg relates to Rosehill race course where water off take may be sporadic and the Woodville reservoir which is regularly cycled.

## 3.2 Critical Control Points

A Critical Control Point (CCP) workshop was held in September / October 2010. The purpose of the workshop was to review the whole scheme and confirm the CCP's within it, create critical limits and to develop response plans if these limits are breached.

After completion of the hazard assessment, each treatment step was assessed for its criticality in controlling a specific health or other hazard.

No CCPs were identified in the Network due the supply to the Network being high quality recycled water.

Quality Control Points (QCP) were identified for the Network; these are the online water quality monitoring points at Fairfield Reservoir, Rosehill Reservoir and Visy site.

Following the identification of CCP's, alert and alarm levels were also developed for the Veolia Plant.

The purpose of an alert level in the Plant is to advise the Plant operator that a quality limit is being approached and that corrective action need to be undertaken to ensure that the limit is not breached. Corrective procedures have been developed for alert levels for each CCP identified. (Refer to Veolia procedures)

Following the identification of QCP's alert and alarm levels were developed for the Network

The purpose of an alarm level in the Network is to advise the Network operator that a Quality critical limit has been reached and that corrective actions must immediately be undertaken. Corrective procedures have been developed for alarm levels for each QCP identified.

## 4. Operational Procedures and Process Control

### 4.1 Operational Procedures

#### 4.1.1 Operational Overview

The processes covering the supply of effluent by Sydney Water and operation of the Plant are detailed in separate Water Quality Management Plans developed by Sydney Water and Veolia.

The Rosehill Scheme Network primarily operates automatically. The pumps switch on and off according to:

- Level settings on the 3ML recycled water reservoir at Fairfield
- Level settings on the 1.3ML recycled water reservoir at Woodville

- Level settings on the 6ML recycled water reservoir at Rosehill
- Supply pressure at Visy , a foundation customers in Smithfield

Water quality is monitored continuously and if there is any deviation from the Quality Specification, then the relevant portion of the Network will be shut down and the affected Customers are requested to switch to the back-up potable water supply located at their site.

The on-line monitoring instruments have been set up to provide early warning if the quality is approaching the trigger level for each parameter so that preventative action can be taken. Recycled water supply will cease if the trigger level is exceeded. The supply of recycled water does not recommence until the Plant has achieved a minimum of 30 minutes of production within the specified limits.

Parameter	Early warning level	Failure trigger
TDS	55	≥60
pH	7-8	<6.0, >9.0
Chlorine residual	0.9-2	<0.7, >5.0
Turbidity	1.0	≥2

If the volume of Recycled Water is not sufficient to meet customer demand due to:

- An influent quality or quantity problem
- A problem with the Veolia Plant operation;
- A problem with SGSPRN Network operation; or
- Damage to the Network

then top-up potable water at the Fairfield, Woodville or Rosehill reservoir can be used to supplement supply.

Note that if top-up potable water is added to the Network to supplement supply then Total Dissolved Solids may not meet the Quality Specification due to the TDS level in potable water being >90. This would not be considered an out of specification event.

If the volume of Recycled Water is not sufficient to meet customer demand due to:

- A Plant shutdown due to supply of effluent being outside the agreed specification with Sydney Water;
- Customers using more than their contracted maximum day requirements;
- The contracted top-up potable water usage limit has been reached or top-up potable water not being available; or
- A full or partial shutdown of the Network due to water quality being outside the Quality Specification,

then customers are requested to switch to the back-up potable water supply located at their site.

In all cases the Recycled Water in the storage reservoirs is used to maintain supply where possible.



The recycled water quality, pressures and storage reservoir volumes and key equipment parameters are monitored to:

- Identify any deviations from the agreed recycled water quality specification;
- Ensure that sufficient recycled water is available to meet customer demand;
- To monitor the performance of key equipment.

Any supply issues identified are dealt with through the agreed operating response or in accordance with the emergency response procedure.

If monitoring identifies deterioration in performance of key equipment, then a site inspection by the maintenance team is initiated.

### **4.1.2 Documentation**

Operational procedures have been developed and compiled into the Operations Manual.

The Operations Manual includes detailed procedures for the operation and maintenance of the Network.

## **4.2 Operational Monitoring**

### **4.2.1 Monitoring Equipment**

The Network utilises the existing Jemena Supervisory Control and Data Acquisition (SCADA) System. Located at the North Sydney (NS) Control Centre, the SCADA System is also used to monitor and operate regulated gas assets in NSW, and is therefore subject to stringent data management and integrity conditions.

The SCADA system is comprised of three main components, a SCADA master station, Remote Telemetry Units (RTU's) and a communication system.

The SCADA master station is operated by the NS Control Centre. The Control Centre is operated 24 hours a day, 7 days a week, and an SCADA Administration team provides 24 hours a day, 7 days a week support ensuring system availability.

The SCADA master station performs a number of functions from gathering field data, storing this data, generating alarms, controlling valves and displaying information screens located within the Control Centre.

Given the importance of the SCADA master station there are a number of built-in redundancies to ensure 99.9% availability of the system. Redundancies also include peripheral equipment required to operate the Control Centre. This includes an uninterruptible power supply and generator backup for extended loss of power supply.

The system is mirrored on the Jemena SCADA system in Melbourne to provide complete reliability and can be operated via Melbourne if required. This ability is regularly tested through simulations and real incident management.

A number of communication systems link SCADA Master Station to field equipment, and vice versa. These systems are both wire and wireless. Systems include IPWAN, ADSL and Next G. Redundancy has been included in the design of communications system with the sites using a number of technologies to ensure the performance of the SCADA system.

### 4.2.2 Monitoring Protocols

The SCADA system will report Alarms when water specification is approaching critical limits, or if equipment is not performing correctly. Please refer to the Emergency Response section of this document for response information.

On-line monitoring within the Network is carried out to verify process performance for internal process control and optimisation and to verify contractual compliance. To this end, on-line monitoring is carried out as shown in the table below.

Network Online Monitoring		
Fairfield Reservoir Inlet	Details are provided in the Plant Operations Plan	
Fairfield Plant outlet	Turbidity	Monitor
	pH	Monitor
	Total Dissolved Solid	Monitor
	Free Chlorine residual	Monitor
Camellia Reservoir outlet	Turbidity	Monitor
	pH	Monitor
	Total Dissolved Solid	Monitor
	Free Chlorine residual	Monitor
Customer Connection Point (Visy)	Turbidity	Monitor
	pH	Monitor
	Total Dissolved Solid	Monitor
	Free Chlorine residual	Monitor
Rosehill and Woodville	Tank storage depth	Monitor
Foundation Customers	Customer usage	Monitor
Pump Stations	Pressure outlet	Monitor
Pump Stations	Pump bearing temperature	Monitor
Pump Stations	Pump Bearing Vibration	Monitor

### 4.3 Operational Corrections

When recycled water does not meet the Quality Specification, the affected area of the Network will be shut down and potable water is used to supplement the supply to affected Customers. Potable water is used according to the procedures set out in 4.1.

If the recycled water quality event is as a result of a Sydney Water effluent or Veolia Plant issue, then the Network remains shut down until verification is received that the problem has been corrected and the Plant has been able to continuously produce recycled water within the Quality Specification for a period of 30 minutes.

In the event that the recycled water quality event is due to a Network issue, an investigation will be initiated and recycled water supply will not recommence until the problem has been identified and corrected.

The Jemena Response Centre is responsible for directing the isolation of the affected area, implementation of all communication in accordance with the established operating protocols, an initiation of any Network investigation. Sydney Water or Veolia contact the Jemena Response Centre when a problem is identified in processes prior to the recycled water entering the Network.

In all cases the Jemena Response Centre ensures that Network Storages are used to maintain supply of Recycled water where possible.

## **4.4 Operational Equipment**

### **4.4.1 Equipment performance**

SCADA monitors the Networks many inputs to manage tank levels, number of pumps in use or pump speed and recycled water delivery pressures to ensure adequate customer supply pressure.

Each pump station has three variable drive pumps with initial demand is met by a single pump. As demand grows a second pump will be brought into service. Actual demand can be balanced by varying the pump speed. At any time two pumps are sufficient to meet the Network demand under their control, the third pump is a standby unit. The pumps are rotated to keep all pumps serviceable and at similar operating hours.

The Woodville reservoir has duplicate level control systems and in built logic to manage out of range data events.

Manual isolation valves are periodically operated to ensure they remain functional.

### **4.4.2 Equipment Monitoring and Maintenance**

SCADA monitors the pump bearing temperature and flag an alarm if it gets out of specification. Sump pumps are also monitored as an indication of water leaks in the pump station. Maintenance will be done to the manufacturer's specification.

Periodic visual inspection of the pump stations and greasing is also undertaken.

Monitoring equipment is periodically calibrated.

## **4.5 Materials and Chemicals**

Network materials were selected to conform to the "Products and Materials Information and Guidance" WSA 03-2002.

All chemical use is managed upstream of the Network with evaluation and approval procedures contained in the Veolia Water Quality Management Plan.

## 5. Verification of Recycled Water Quality

### 5.1 Recycled Water Quality Monitoring

#### 5.1.1 Characteristics to be Monitored

The characteristics to be monitored in the Rosehill Scheme are defined by the Project Agreement between AquaNet and Sydney Water and form the sampling plan.

#### 5.1.2 Sampling Plan

Three on-line monitoring units are installed at Fairfield plant, Rosehill reservoir and Smithfield.

These units continuously monitor the recycled water in the Network for the parameters in the table below.

Parameter	Units	Target	Limit to Trigger Product Failure
Total Dissolved Solids	mg/L	<50	≥ 60
pH	pH units	6.5 to 8.5	<6.0, >9.0
Chlorine Residual	mg/L	1	<0.7, >5.0
Turbidity	NTU	<0.5	≥ 2

Water samples from Fairfield Pump station, Rosehill Reservoir/Pump Station and Smithfield sample point are analysed at the NATA laboratory (TDS and Turbidity). These results are used to check that the WQMU in the Network are accurate. Calibrated field instruments are used to check Chlorine and pH instruments.

The Recycled Water Sampling Plan located in the ECMS specifies the 95%ile levels on a 12 month rolling average of other parameters in the recycled water. They are also monitored by Veolia at the Plant. If at any time, AquaNet, Veolia or SGSPRN becomes aware of an exceedance in any of these parameters Veolia or SGSPRN initiates actions to return the parameter to below the 95%ile level.

#### 5.1.3 Data is Representative and Reliable

To ensure that data is representative and reliable, water quality monitoring results at the outlet of the Plant are compared to the Network units. If one instrument shows results that are inconsistent with the other monitoring units in the Plant and Network then the issue is investigated.

An external NATA certified laboratory analyses samples from the Network according to the following table.

Analyte	Frequency
Alkalinity	Monthly
Aluminium	Monthly
Ammonia	Monthly
Chloride	Monthly
Iron	Monthly
Manganese	Monthly
Zinc	Monthly
Calcium	Monthly
Hardness	Monthly
TDS	Monthly
Turbidity	Monthly
BOD	Monthly
Total Nitrogen	Monthly
Total Phosphorus	Monthly
E coli	Monthly
Total Coliforms	Monthly
Viruses (6)	Twice Yearly
Parasites (cryptosporidium & giardia)	Twice Yearly
Pharmaceuticals	Twice Yearly
PCP's (pentachlorophenols)	Twice Yearly
Pesticides	Twice Yearly
THM's (trihalomethane)	Twice Yearly
Helminths	Twice Yearly

#### 5.1.4 Documentation and training

All recycled water quality results are kept in the Jemena OSI PI data management system.

SGSPRN has outsourced recycled water quality analysis to an industry specialist (NATA laboratory). To the extent that staff will be taking, storing and delivering samples as part of this work, the staff has been trained in doing the testing.

## 5.2 Recycled Water Users

### 5.2.1 Enquiry and Response for Customers

Sydney Water conducted a training and awareness forum for foundation customers in September 2010. The forum included Jemena, Veolia and specialists in implementation of recycled water guidelines.

Further one on one enquiry and response meetings are conducted between AquaNet and a potential customer during the process of negotiating recycled water supply agreements.

AquaNet has also updated the website to provide Customers and other Stakeholders with recycled water quality and other Rosehill Scheme information.

## 5.2.2 Customer Satisfaction and Communication

A Rosehill Recycled Water Scheme quarterly report covering water quality is provided to Customers. Customer participation in the Rosehill Scheme is optional. The Rosehill Scheme is dependent on Customers continuing to use Recycled Water as the source of revenue for the Scheme.

Regular communication with Customers is in accordance with the agreed terms of the recycled water supply agreement.

Any feedback from individual Customers is considered seriously by SGSPRN/AquaNet and improvements implemented to the extent that they are commercially viable and fit in with requirements of the other Customers.

## 5.3 Recycled Water Quality Reporting

Internal and external reporting is in accordance with the requirements of the Project Agreement and the customer protocols established between Sydney Water, AquaNet and the Customers.

Rapid communication is in accordance with the various communication protocols between AquaNet and SWC, Veolia and Customers described in section 1.4 of this WQMP.

# 6. Management of Incidents and Emergencies

## 6.1 Communications

Communication with regulatory agencies in the event of an incident or emergency relating to water quality is in accordance with the WICA Water reporting requirements.

In the event of any incident that public health or safety could be impacted by a Plant or Network incident or by recycled water that does not meet the Quality Specification being delivered to Customers, SGSPRN will immediately notify:

- IPART;
- The Minister administering the Public Health Act 1991;
- The Minister administering WICA;
- AquaNet (retailer); and
- Sydney Water (retailer and public utility to which SGSPRN infrastructure is connected)

Jemena will provide a briefing on the incident and a proposed media strategy which will be implemented by the Jemena Media Liaison representative when agreed. The media strategy will be dependent on the severity of the incident and the number of parties likely to be impacted.

## 6.2 Response Plans

This scheme has a comprehensive set of incident response plans which provide detailed instructions on how to respond to various different operational incidents.

The plans have been developed using the risk and hazard analysis described in section 2 as a basis for developing the scenarios.

At a high level the response strategy is to isolate the problem area and cease recycled water flow or supply as required. Back-up or top-up potable water is supplied to Customers while the incident is investigated and resolved.

Supply does not recommence until the problem is rectified and in the case of a plant water quality issue until recycled water meets the Quality Specification for a continuous 30 minute period.

In the event of an incident, the Response centre will contact SGSPRN and an Incident Control Manager will be appointed. SGSPRN participate in decisions regarding water supply interruption and will initiate stakeholder communication according to the communication protocols listed in section 1.4.

The Incident Control Manager will utilise water technicians to assess and control the site and provide information back to the Response Centre. If appropriate the technicians will isolate sections of the Network.

## 6.3 Training and Testing

Emergency response will be conducted by trained Jemena emergency response team.

Simulations are conducted to ensure Jemena's preparedness for managing unplanned (emergency) activity on assets that are managed and/or maintained by Jemena.

The simulations are useful both in terms of testing the response procedures and ensuring that the relevant personnel are trained appropriately and are familiar with the response plans.

## 6.4 Investigation and Review

The Jemena incident management system (IMS) will be utilised for reporting and managing of significant recycled water quality incidents. Incidents are recorded on the database and followed up with investigations.

The follow up will include a review of the risk and hazard analysis detailed in section 2 and if required, modifications will be made to the analysis and the operating plans to minimise the chance of the incident recurring.



Information is gathered from all personnel involved in the incident by carefully working through the whole scenario to ensure the correct sequence of events is recorded. All events within the incident are recorded chronologically.

In the case of a serious incident, where potential exists for public health related issues, prosecution or litigation, an assessment will be made to determine whether a formal investigation will be undertaken.

Minor incidents will be used to generate a work order to correct the problem (eg water leaking from an air valve).

## **7. Operator, Contractor and User Awareness**

### **7.1 Recycled Water Quality Awareness**

#### **7.1.1 Operator and Contractor Awareness**

The Network uses some specialist water quality measurement equipment. The operation and maintenance of this equipment is carried out by specialist external parties. Contractors have been chosen on the basis of their specialised skills and training. Training for Jemena personnel has been provided by the contractors to the extent that the Jemena personnel are involved in this work.

Jemena is responsible for ensuring all people working on Network construction or maintenance/repair activities have an appropriate level of training consistent with their responsibilities. Where possible all training development and delivery is aligned to national training standards.

The Jemena Training Department employs both internal and external training resources to support the necessary training programs. The use of external resources ensures that there is an adequate level of support at times when the training requirements are beyond the capability of internal resources.

A recycled water quality awareness module has been developed and provided to new operators of the Rosehill Scheme as part of that training.

#### **7.1.2 End User Awareness**

Customers are provided with the following information as part of the process to finalise a recycled water supply agreement and connect them to the Rosehill Scheme:

Recycled water quality specification, approved end uses list and a RO Water Briefing paper (technical paper on RO recycled water), its uses and precautions needed in relation to materials being used.

## 7.2 Training Records

A central record of all personnel, their current accreditations and any need for updating their training is maintained by the relevant contractor or Jemena Training Department.

# 8. Community Awareness and Involvement

## 8.1 Assess Requirements

Potential customers are consulted on a one-on-one basis including a description of the project, potential recycled water uses and the Quality Specification. Customers confirm agreement with the Quality Specification and the terms of supply through execution of their recycled water supply agreement.

Community involvement in the Rosehill Scheme with respect to recycled water quality is limited to:

- Interested community groups such as schools or clubs-general information
- Neighbours of the Rosehill Scheme facilities-facilities visits, results of noise monitoring
- Members of the community affected by incidents where the recycled water from the scheme is being released into public areas due to damage or equipment failure.-information sheets, scheme brochure or insurance claims

## 8.2 Community Consultation Strategy

Before construction of the Rosehill Scheme, extensive community consultation was undertaken to inform the community of the scope and purpose of the scheme and the likely impact of the construction and operating phases. This took the form of community forums and submission of plans to council.

Ongoing community consultation is centred around the effect of the Rosehill Scheme on neighbours and education for interested community groups.

In the case of any incidents or emergencies community involvement will be in accordance with the regulatory reporting requirements listed in section 6.1 of this WQMP.

## 8.3 User Consultation Strategy

SGSPRN, through AquaNet, ensures that Customers are actively involved in water quality issues through the initial water quality education process that forms part of the recycled water supply agreement negotiation process and through the regular quarterly reporting that forms part of the recycled water supply agreements.

Individual Customers have limited ability to influence a change in the Quality Specification, however constructive suggestions are taken on board and all

Customers will be consulted before any proposed change to the Quality Specification by the Rosehill Scheme proponents.

Ongoing communication with Customers is in accordance with communication protocol that forms part of the recycled water supply agreements.

## **8.4 Benefits and Unauthorised Use**

### **8.4.1 Unauthorised Use**

All recycled water equipment in the Rosehill Scheme and on Customer sites is clearly and permanently labelled with safety signs that follow the current version of the AS/NZS 1319.

Recycled water pipe work has colour coding that conforms to the guidelines for recycled water in the NSW Code of Practice for Plumbing and Drainage 2006. Signs advising of the use of recycled water on site and induction training help prevent unauthorised use. These measures ensure that Customers employees, site visitors and other stakeholders are aware that the recycled water is 'not for drinking'.

In addition, Customers take responsibility for ensuring that recycled water is used only for authorised purposes as a condition of the recycled water supply agreement. The authorised uses are clearly stated in the customer Supply Agreement.

### **8.4.2 Benefits of Recycled Water Use**

The Rosehill Scheme is an innovative project which both Jemena and Veolia are actively marketing in public forums and seminars and through brochures and company websites. Any opportunity to promote the Rosehill Scheme is welcomed by Jemena and Veolia.

Listing of the benefits of recycled water use forms part of all promotional opportunities.

## **9. Validation, Research and Development**

### **9.1 Validation Processes**

The Rosehill Scheme data collection and monitoring systems have been developed in accordance with the hazard analysis summarised in section 2 of this WQMP. The performance of the Rosehill Scheme and its effectiveness in controlling the hazards is validated through trend and performance assessment of this data.

### **9.2 Change in Conditions and New Equipment**

The risk analysis and hazard assessments will be reviewed at least on an annual basis. Additional assessments will be conducted when a significant change in

conditions occurs or when a significant change in equipment is implemented. (eg Network expansion or new customer connection)

### **9.3 Continuous Improvement**

Veolia has conducted extensive pilot plant trails to gain an understanding of the effluent quality and to ensure that the Plant design is well suited to reliably deliver recycled water to the Quality Specification.

From a Network perspective, SGSPRN monitor's the following items during operation of the Network to determine whether the operational procedures are adequate in reliably delivering Recycled Water to Customers:

- Water quality at Network end points/dead legs
- Water quality at reservoir outlets to confirm adequate reservoir turn over
- Water quality results from external laboratories compared to on-line data

## **10. Documentation and Records**

### **10.1 Documentation of Recycled Water Quality Management**

Documentation relating to recycled water quality management includes

- Recycled Water Sampling Plan
- Water quality testing procedures
- Water quality testing results
- Water sampling procedures
- Risk assessments and hazard Identification
- Reviews of risk assessments hazard identification and the WQMP
- Incidents and corrective actions taken
- Records of emergency response exercises, the actions arising and the completion of those actions.
- NATA certified laboratory
- Data relating to water quality is stored in the Jemena OSI PI data system

All other documentation will be stored in the ECMS the Jemena document control system

Both these systems are fully backed up by the Jemena IT Department. SGSPRN management is responsible for ensuring that the systems contain the most current version of relevant documents.

## 10.2 Records Management System

All employees inputting to and utilising the records management systems described above are trained in the use of the system through the process described in 7.1 of this WQMP.

Documentation is reviewed annually and at other times as specified in this WQMP.

## 10.3 Internal and External Reporting

The Project Agreement and recycled water supply agreements with customers specify the procedure for external reporting of recycled water quality performance. Sydney Water reports are monthly and customer reports are quarterly.

An annual report will also be prepared for IPART in accordance with WICA guidelines.

# 11. Evaluation and Audit

## 11.1 Collection and Evaluation of Data

Water quality data is collected through the SCADA system for online monitoring systems and from laboratory results for other samples. The data is summarised on a monthly basis and reported to Sydney Water as required by the Project Agreement.

The data is used to assess adverse trends and action taken to address trends where possible before the recycled water quality moves outside the Quality Specification.

If the adverse trend in recycled water quality is as a result of a long term change in effluent quality, the Project Agreement has a mechanism to negotiate Plant modifications to enable treatment of the changed effluent quality such that the Quality Specification is maintained.

Any trend in recycled water quality will also be reviewed as part of the annual risk assessment.

## 11.2 Internal and External Auditing

### 11.2.1 Audit Protocols

The Jemena Technical Compliance and Audit group conduct internal audits as per a yearly planner that includes all assets operated and maintained by Jemena. This includes key regulatory audit submission dates and internal audits deemed necessary on a risk based approach. Jemena will implement appropriate measures to rectify any non-compliance and to ensure continuing Network safety and reliability

Regulatory and internal audit results are addressed and dealt with by relevant Steering Committees that have been developed to focus on issues raised during audits. The committees consists of the key stake holders that have responsibility for the Asset life cycle management and ongoing operational and maintenance of the asset.

The WQMP auditing and revision program includes:

- Regulatory audit of the WQMP
- Follow up action and further improvements
- Review and update of the WQMP

SGSPRN will lodge the WQMP and a report from the nominated auditor with IPART.

Written reports on the findings of the audit will be provided to SGSPRN managers for review to ensure the continual improvement of the WQMP and the risk management documentation.

## **12. Review and Continual Improvement**

### **12.1 Identifying a Need for Change**

The recycled water Quality Specification that is supplied by the Rosehill Scheme forms part of long term contracts with Customers.

The effectiveness of the management system can be directly measured by delivery of recycled water meeting the Quality Specification to all Customers on a consistent basis at a reasonable cost. To the extent that this measure is not achieved, a management system review will be initiated by SGSPRN management.

The need to initiate change may also be initiated by customers in terms of the Quality Specification being unsuitable. Any proposed change to the Quality Specification must be agreed by all stakeholders (including regulatory authorities) and a formal consultation process would be initiated to achieve this.

Finally, a need for change may result from changes in Law, Legislation or Australian Standards. The Jemena regulatory compliance section will advise SGSPRN when such changes occur and SGSPRN senior management will initiate change as appropriate.

The need for change may also be signalled by a significant change to a customer demand.

### **12.2 Continual Improvement to Plans and Processes**

All processes and procedures for the Rosehill Scheme that relate to recycled water quality form part of the WQMP. The WQMP will be reviewed annually to identify potential improvements and modifications to the processes and procedures.

Suggestions for improvements and modifications are also welcomed by SGSPRN management from key stakeholders, Jemena employees or Jemena contractors.

SGSPRN management evaluates all suggestions and implement those that improve the effectiveness and efficiency of Rosehill Scheme operation. The primary measure is whether the improvement will enhance the ability to deliver Recycled Water to all Customers on a consistent basis at a reasonable cost.

Any change is implemented and communicated through the training and communication processes that form part of this WQMP.

### **12.3 Effectiveness of Improvement Processes**

The effectiveness of the improvement processes will be measured by the performance of the Rosehill Scheme and through the annual review of the risk analysis and hazard identification process.

## **Appendix A – Abbreviations and Definitions**

### **Abbreviations**

AGRW:	2006 Australian Guidelines for Water Recycling
AquaNet:	AquaNet Sydney Pty Limited
CCP:	Critical Control Point
DECCW:	Department of Environment Climate Change and Water
HAZOP:	Hazard and Operability study
IMS:	Incident Management System
Jemena:	Jemena Limited
KBR:	Kellogg Brown & Root Pty Ltd
KPI:	Key Performance Indicators
LAP:	Liverpool Ashfield Pipeline
MF:	Micro Filtration
MSDS:	Material Safety Data Sheet
NATA:	National Association of Testing Authorities
PB:	Parsons Brinkerhoff
QCP:	Quality Control Point
RO:	Reverse osmosis
Rosehill Scheme:	Rosehill Recycled Water Scheme
RTU:	Remote Telemetry Unit
SCADA:	Supervisory Control and Data Acquisition
SGSPRN:	SGSP Rosehill Network Pty Limited
RWP:	Recycled Water Plant
Sydney Water:	Sydney Water Corporation
Veolia:	Veolia Water Australia Pty Ltd
WICA:	Water Industry Competition Act
WQMP:	Water Quality Management Plan



---

## Definitions

Word/s	Definitions
Back-up Water	Potable water supplied by Sydney water at the Customer site
Customer	Customer located in the municipalities of Auburn, Bankstown, Fairfield, Holroyd, Liverpool and Parramatta local government areas and using Recycled Water from the Rosehill Scheme
Network	The Rosehill Scheme distribution network that delivers Recycled Water from the Plant to the Customers owned by SGSPRN
Plant	The Rosehill Scheme Recycled Water Plant at Fairfield owned by Veolia Water Australia
Quality Specification	The water quality parameters set out in 2.1.2
Recycled Water	Recycled water produced by the Rosehill Scheme that meets the Quality Specification
Top-up Water	Potable water supplied by SWC to SGSPRN for supply to Customers through the Network