



**Rosehill & Camellia Recycled Water
Scheme**

Due Diligence Report

**Proposed discharge of recycled water
to land and water during network
dewatering**

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Contents

1	Introduction.....	1
2	Background.....	1
2.1	Distribution network dewatering	1
2.2	Project approval requirements	2
2.3	Consultation with the Office of Environment and Heritage	2
2.4	Consultation with the relevant local councils	3
3	Water Quality Impact Assessment.....	3
3.1	Discharge volumes, rates and frequencies	3
3.2	Recycled water quality	4
3.2.1	<i>Proving test and recycled water quality results.....</i>	<i>5</i>
3.3	Quality of the receiving waters	7
3.4	Consideration of water quality objectives	8
3.5	Primary contact water quality considerations	9
3.6	Residual chlorine.....	10
3.7	Overall potential for impact	10
4	Management and mitigation options	10
5	Conclusion	11
Attachment A	Results for key quality parameters obtained during the 10 day proving test	
Attachment B	Results for expanded quality parameters obtained during the 10 day proving test	

1 Introduction

The Rosehill Recycled Water Scheme (RRWS) is a water recycling project in western Sydney. From time to time the recycled water distribution network of the RRWS will need to be dewatered. It is proposed that the recycled water within the network could be discharged directly to land and/or the stormwater system, within minimal potential impact to down gradient receiving waters and the environment in general.

The Environment Assessment for the Project described and assessed discharges of recycled water from the network directly to sewer under trade waste agreements. The proposed environmental discharges of recycled water are therefore likely subject to a formal modification process in accordance with section 75W of the NSW *Environmental Planning and Assessment Act 1979*.

This Due Diligence report assesses the proposal and the potential environmental impacts which could result from this discharges of recycled water to the environment. This report supports an application to modify the Minister's conditions of approval in this regard and will assist the NSW Department of Planning and Infrastructure in determining the modification application.

2 Background

The Rosehill Recycled Water Scheme (RRWS) is a water recycling scheme in Western Sydney. The scheme involves a recycled water treatment plant (RWTP) at Fairfield, which treats secondary treated sewage effluent sourced from the Liverpool to Ashfield Pipeline (LAP) via microfiltration and reverse osmosis to produce high quality recycled water for industrial and irrigation purposes. The effluent from the water recycling plant will be discharged directly to sewer under a trade waste agreement with Sydney Water Corporation (SWC), as described in the Environmental Assessment for the Project, and is not considered further in this document.

The RWTP is connected to customers in the Smithfield/Wetherill Park and Rosehill/Camellia areas via a 20 km long underground recycled water distribution network (pipeline). The distribution network is located predominantly in road reserves and public land in the Fairfield, Holroyd, Parramatta and Bankstown local government areas. It is this distribution network that is the focus of this document. No changes are proposed concerning the location of the distribution network and associated components.

AquaNet Sydney Pty Limited (AquaNet) is the proponent for the project, which is approved under Part 3A of the *Environmental Planning and Assessment Act 1979* (the EP&A Act). Construction of the water recycling plant and the network is now complete and the final stages of commissioning are nearing completion.

The RWTP and distribution network are not scheduled activities under *Protection of the Environment Operations Act 1997* (the POEO Act). Accordingly, environmental protection licences are not required for the construction and operation of the RRWS.

2.1 Distribution network dewatering

From time to time it will be necessary to dewater sections of the recycled water distribution network (pipeline). This would usually occur if pipeline maintenance and repair work is required in response to a strike and puncture of the pipeline (during excavation) or in the event of a pipeline failure or essential repairs that requires the pipeline to be physically opened. To facilitate the maintenance and repair works it would be necessary to dewater the pipeline between the two nearest isolation valves,

which are installed at intervals throughout the distribution network. The dewatering operation would occur at the lowest scour (dewatering) point on the pipeline section.

In the Environmental Assessment for the RRWS it was envisaged that recycled water would be discharged from the network directly to sewer under appropriate trade waste agreements with Sydney Water Corporation (SWC). Due to a number of reasons, including the potential for cross-contamination and associated health risks, discharge of recycled water during network dewatering via direct connection to the sewer under trade waste agreements was determined to be inappropriate. Instead of direct connections to the sewer, surface hydrant connection points have been constructed at regular intervals along the distribution network to facilitate dewatering.

Under the current arrangements recycled water from the network would be collected in tankers (or similar) during dewatering and taken away, either for use or disposal at an appropriate facility. It is proposed, however, that given the high quality of the recycled water that it could be discharged to appropriately stable and vegetated surfaces (subject to agreement by the relevant landowner) or to the nearest entry point to the local stormwater system without any adverse environmental impact.

2.2 Project approval requirements

The discharge of recycled water during network dewatering to land is not specifically addressed in the Minister's Conditions of Approval (MCoA) for the RRWS. It is, however, consistent with the water's intended use for irrigation purposes. Discharge of recycled water from the network to land during dewatering is therefore consistent with the MCoA in this regard.

MCoA 1.1 requires that the Proponent carry out the Project generally in accordance with the assessment documents on which the approval was based. It is noted that the current proposal to discharge of recycled water from the distribution network to the environment is not described and assessed in the listed documents and therefore not part of the Approved Project. It is requested that this condition be modified to include a reference to this Due Diligence report which describes and assesses the proposed environmental discharge of recycled water. In this way the proposal would become part of the Approved Project.

MCoA 2.29 for the RRWS requires that the Proponent complies *with section 120 of the Protection of the Environment Operations Act 1997* which prohibits the pollution of waters.

The discharge of recycled water from the distribution network to the stormwater would be consistent with MCoA 2.29, provided that the discharge does not result in water pollution.

This report has been prepared to assess the potential for water pollution due to discharge recycled water to the local stormwater system and to assist the relevant government agencies and local councils to consider this proposal. Concurrence with and approval from DOPI and the appropriate regulatory authorities as required will be sought before any discharge of recycled water from the distribution network to stormwater.

2.3 Consultation with the Office of Environment and Heritage

Water pollution is defined very broadly in the *Protection of the Environment Operations Act 1997* (the POEO Act) to mean any change, whether it be physical, chemical or biological, to the receiving waters. Under this broad definition, even the release of clean water to a polluted and contaminated water body could potentially meet the definition of pollution.

The Office of Environment and Heritage (OEH) was contacted to discuss this proposal, in particular how 'water pollution' would be defined in the context of the proposed release of high purity recycled water to the environment. OEH stated the specific guidance on the definition of water pollution in this

instance would not be provided and that it is up to the person proposing to discharge the water to satisfy themselves that the activity would not result in material harm to the environment (a due diligence approach).

Under section 147 of the POEO Act material harm is defined as actual or potential harm to the environment that is not trivial.

OEH also stated that (as described in Section 6(2) of the POEO Act) when the activity/operation is not subject to an environmental protection licence and the proponent is not a government body, the relevant local council is the appropriate regulatory authority. As the proponent AquaNet is not a government body and there is no environmental protection licence for the project, the relevant councils are the appropriate regulatory authority for any discharges of recycled water from the distribution network.

2.4 Consultation with the relevant local councils

The local government areas (LGAs) through which the distribution network traverses include Fairfield, Holroyd and Parramatta. An earlier revision of this report was provided to the relevant local councils for review and comment. The councils subsequently requested that the Project be modified to include the proposal as part of the Approved Project before they would provide a formal response to the proposal.

While the distribution network does pass through parts of Bankstown LGA, there are no scour points in locations are either inside or that would that drain into that LGA. Consequently, no consultation has occurred or is proposed with Bankstown council on this matter.

3 Water Quality Impact Assessment

3.1 Discharge volumes, rates and frequencies

In the event that pipeline dewatering is required the section to be dewatered would be isolated by closing the two adjacent isolation valves. Dewatering would then usually occur at the pipeline scour point attached to the lowest valve. While the isolation valves are routinely located around 1 km apart, it is unlikely that water would need to be discharged from the entire pipeline section. Typically less than around 25-30% of the total swept volume of the pipeline section would need to be discharged.

The largest swept volume of a pipeline section is around 193 m³. This would equate to a maximum discharge volume of less than 60 m³. In practice, however, dewatering discharge volumes would typically be much less.

The dewatering operation would typically be carried out using a standard small (~5 hp) flexible drive water pump connected to the scour hydrant. Typical pumping rates would be around 1 m³/min. At this pumping rate it would take around 1 hour to dewater the maximum discharge volume. The hose from the pump would typically be directed over paved surfaces (or other suitably stable surfaces) towards the nearest entry point to the local stormwater system to prevent any scour or erosion issues.

The likely pumping rates would result in flows in the local stormwater systems well within the carrying capacity of those systems. There would be no flooding impacts due to network dewatering, provided that the water is discharged during dry weather.

Similarly, the volumes released during dewatering would be well within the carrying capacities of the downstream receiving waters (namely Prospect Creek and Duck Creek) which cope with much larger flow volumes during wet weather. The volumes released during dewatering of the recycled water

distribution network would not significantly contribute to total flows or result in flooding or other hydraulic impacts.

It is noted also that during operation of the distribution network dewatering of the distribution water network would only be required in the event of a pipeline strike/rupture or if a particular maintenance/repair activity requires the section of pipeline to be empty. Such activities would not be routine and it is anticipated that dewatering would be required very infrequently (if at all) during network operation.

Some discharge of recycled water would also be required during charging of the network with recycled water during final commissioning. In this process the hydrotest water currently within the network, which was sourced from potable waters supplies, would be pushed from the network by recycled water entering the network at from the RWTP. Some mixing would occur at the interface of the two water types and some recycled water would require release to ensure that only 'in specification' recycled water was within the network for delivery to and use by the customers of the scheme.

3.2 Recycled water quality

While the feed water for the recycling process is sourced from secondary treated effluent from the LAP, the recycled water produced is of very high standard. The reverse osmosis and ultrafiltration processes will remove all particulate matter and the majority of dissolved solids and other potential contaminants to produce a recycled water product that is approaching pure/demineralised water quality.

While pathogens, viruses and other microbial elements are removed in the recycling process, the final product will be dosed with around 1 mg/L of chlorine (as hypochlorite) to provide residual protection to the water as it passes through the distribution network. The Fact Sheets provided in Part IV of the *Australian Drinking Water Guidelines 6 2004* (NHMRC, 2003) generally indicate that treatment (disinfection) by chlorination (as occur in the recycling process) is sufficient to inactivate microorganisms in water, provided the turbidity is low. Combined with the membrane treatment technologies (reverse osmosis and ultrafiltration) it is unlikely that any microorganisms would be present in the recycled water.

Typical water quality parameters for the recycled water are outlined in **Table 1**. Typical water quality parameters for potable water produced by the Prospect Water Filtration Plant are also included for comparison.

Table 1 Primary Water Quality Parameters for recycled water

Parameter	Units	Recycled water targets	Typical potable water (Prospect) ¹
Total Dissolved Solids	mg/L	< 50	95 – 129
pH	pH units	6.5 – 8.5	7.8 – 8.1
Chlorine residual	mg/L	1 (as hypochlorite)	1 – 1.52 (as monochloramine)
Turbidity	NTU	< 0.5	0.1

Note 1: Source: 'Water analysis: Prospect East water supply system', obtained from the Sydney Water website: http://www.sydneywater.com.au/WaterQuality/TypicalDrinkingwaterAnalysis/WaterAnalysis_ProspectEast_2011.pdf#Page=1

Water quality measurement equipment has been positioned at the RWTP immediately prior to the final recycled water holding tank and also immediately before the pumping station for the distribution

network. The water quality parameters listed in **Table 1** will be measured and monitored continually and instantaneously via telemetry, to ensure that any 'out of specification' water is not pumped throughout the reticulation network.

The upper limits of other typical water quality parameters for the recycled water, along with the required monitoring frequencies, are presented in **Table 2** and compared to typical potable water quality from the Prospect Water Filtration Plant. Sampling and testing to determine the actual levels of each parameter in the recycled will occur during operation at the frequencies indicated.

Table 2 Comparison of upper water quality limits of recycled water compared to typical potable water data

Parameter	Units	Monitoring Frequency	Recycled water quality (95 th %ile).	Typical potable water (Prospect) ¹
Aluminium	mg/L	Weekly	<20	0.010 – 0.015
Ammonia	mg/L	Weekly	<0.1	0.27 – 0.41
Iron (Soluble)	mg/L	Weekly	<1	0.01 – 0.02
Manganese	mg/L	Weekly	<0.05	0.001 – 0.003
Zinc	mg/L	Weekly	<0.1	Not detected
Biochemical Oxygen demand	mg/L	Weekly	<2	No data
Total nitrogen	mg/L	Weekly	<10	0.38 – 0.75 ²
Total Phosphorous	mg/L	Weekly	<2	0.007 – 0.009
E.Coli Coliforms	CFU per 100mL	Weekly	<1 in 100mL	None
Total Coliforms	CFU per 100mL	Weekly	<10 in 100mL	No data
Virus	Organisms per 50L	Weekly	<1 in 50L	No data
Parasites	Organisms per 50L	Monthly	<1 in 50L	No data
Temperature	°C	N/A	No limit	14 – 24

Note 1: Source: 'Water analysis: Prospect East water supply system', obtained from the Sydney Water website: http://www.sydneywater.com.au/WaterQuality/TypicalDrinkingWaterAnalysis/WaterAnalysis_ProspectEast_2011.pdf#Page=1

Note 2: Total nitrogen range present is the sum of the lower and upper range values for ammonia, nitrate and nitrite

While the upper (95th percentile) limits shown for the recycled water are higher than the typical values for potable water from the Prospect Water Filtration Plant, it is noted that actual levels would not necessarily reach those levels.

3.2.1 Proving test and recycled water quality results

To assess the performance of the water recycling plant and to determine if is appropriate to commence supplying recycled water for use a 10 day proving test was completed, during which the water recycling plant at Fairfield was operated for a full 10 day period producing 'in-specification' recycled water at maximum plant output rate (20ML/day).

The proving test was run as a closed cycle with all recycled water produced by the plant pumped back into the Liverpool to Ashfield Pipeline (effluent) under agreement with SWC. During the test there was no output of recycled water to the distribution network or discharges to the environment.

Certain key water quality parameters were monitored instantaneously and continually throughout the 10 day proving test via SCADA and telemetry. The results for each day are provided at **Attachment A**. A summary of average values measured over the entire proving test period is provided below in **Table 3**.

Table 3 Average water quality results for key constituents in the recycled water measured during the proving test

Recycled Water	Units	Average values(over 10 days)
Quantity	kL/day	17,626
Conductivity - Maximum	µS/cm	23.3
Conductivity - Average	µS/cm	20.9
Conductivity - Minimum	µS/cm	19.6
pH - Maximum	pH units	7.3
pH - Average	pH units	7.1
pH - Minimum	pH units	6.7
Free Chlorine - Maximum	mg/L	1.4
Free Chlorine - Average	mg/L	1.3
Free Chlorine - Minimum	mg/L	0.95
Turbidity - Maximum	NTU	0.09
Turbidity - Average	NTU	0.02
Turbidity - Minimum	NTU	0.01
Ammonia - Maximum	mg/L	0.07
Ammonia - Average	mg/L	0.05
Ammonia - Minimum	mg/L	0.04
Total Organic Carbon - Maximum	mg/L	0.23
Total Organic Carbon - Average	mg/L	0.17
Total Organic Carbon - Minimum	mg/L	0.07

Note: Data provided by Veolia Water Australia who operate the RWTP

Some minor aberrations in recycled water quality did occur during the proving test period (see red text in Attachment A) relating to minimum pH and free chlorine levels. Summaries of these occurrences are provided below:

- On 19/08/11 the recycling plant was shut down between 16:04 and 18:30 due to low free chlorine readings. The minimum pH value was recorded at 16:16 during the plant shutdown period. The minimum free chlorine value was recorded at 16:30 during the plant shutdown period. Both values occurred when the plant was not in operation.
- On 21/08/11 between 09:46 and 09:47 the free chlorine meter in the recycled water storage tank dropped from a normal reading of 1.1 mg/L to 0.69 mg/L for less than a 60 second period. The instrument reading returned to within specification immediately and remained in spec for remainder of the day.

The issues were subsequently addressed and fixed and the proving test was run for an extra day as a result.

Sampling and laboratory analysis was also carried out on recycled water samples collected during proving test for a much wider range of potential constituents, including microorganisms. Full results sheets from this sampling and testing are included as **Attachment B**. A summary of typical results is included in **Table 4** below and compared to typical water quality results for potable water from Prospect East Water Filtration Plant. It is noted that no microorganisms were detected in the recycled water

Table 4 Typical water quality results for recycled water determined by laboratory analysis

Parameter	Units	Recycled water sample date				Prospect East potable results ¹
		5/08/2011	15/08/2011	22/08/2011	24/08/2011	
Alkalinity	mg CaCO ₃ /L	3.4	4.3	2.8	4	29-36
Hardness	mg CaCO ₃ /L	<5	<5	<5	<5	45-58
Turbidity	NTU	0.07	0.06	0.05	0.05	0.1
Total dissolved solids	mg/L	<10	39	18	16	95 - 129
Aluminium	mg/L	<0.01	<0.01	<0.01	<0.01	0.01 - 0.015
Calcium	mg/L	0.06	<0.01	0.02	0.02	10.7 - 14.3
Iron	mg/L	<0.01	<0.01	<0.01	<0.01	0.010 - 0.020
Manganese	mg/L	<0.001	<0.001	<0.001	<0.001	0.001 - 0.003
Zinc	mg/L	<0.005	<0.005	<0.005	<0.005	Not detected
Ammonia	mg/L	<0.01	<0.01	<0.01	<0.01	0.27 - 0.41
Total Nitrogen	mg/L	0.61	0.33	0.48	0.38	0.11 - 0.32
Total Phosphorous	mg/L	0.004	0.002	<0.002	0.002	0.007 - 0.009
Organics ²	mg/L	Not detected	Not detected	Not detected	Not detected	Not detected

Note 1: Source: 'Water analysis: Prospect East water supply system', obtained from the Sydney Water website: http://www.sydneywater.com.au/WaterQuality/TypicalDrinkingWaterAnalysis/WaterAnalysis_ProspectEast_2011.pdf#Page=1

Note 2: Full range analysed and tested for, including chlorinated, polynuclear aromatics and aromatic hydrocarbon)

From the results it can be seen that the plant is generally performing as designed and consistently producing high quality recycled water. In addition the water quality results for the recycled water generally indicate lower constituent values than for the potable water. On the basis of the proving test results it was determined that the plant is ready to provide recycled water to industry for use as process water and for irrigation.

3.3 Quality of the receiving waters

It is proposed that recycled water from the distribution pipeline could be discharged onto the paved surfaces of the local road network, or other suitably stable surfaces. The water would follow the local topography and entering the local stormwater system. The discharged recycled water would then flow through a collection of underground stormwater pipes, open stormwater channels, vegetated drainage lines and creeks before ultimately ending up in the natural and altered waterways of each respective catchment.

The areas through which the distribution pipeline generally fall in the following catchments:

- Georges River (including Prospect Creek, St Elmo's Drain, Burns Creek and Orphan School Creek); and,
- Parramatta River/Sydney Harbour (including Duck Creek).

All the receiving waters in the catchments traversed by the distribution network are heavily affected by urbanisation. A more detailed discussion of the waterways and drainage infrastructure directly affected by the project is provided in Section 5.5 of the Environmental Assessment for the project.

Only Prospect Creek, which extends from Smithfield to Fairfield, contains potential aquatic habitat. The other drainage lines in the vicinity of the distribution pipeline (namely Burns Creek, St Elmo's Drain and Duck Creek) provide only secondary or no potential aquatic habitat.

No specific water quality monitoring has been carried out in these watercourses to ascertain ambient water quality. As these watercourses are heavily affected by urbanisation, however they would be expected to contain high nutrient loads, high turbidity, limited light penetration, hydrocarbons and other contamination and potentially viruses, parasites and other pathogens. The ability of such waters to so support healthy ecological processes and provide viable aquatic habitat is limited. As demonstrated in Section 3.2 the recycled water to be discharged would be of a much higher (cleaner) standard than the water in the watercourses. Water monitoring is usually conducted when the levels of contaminants in the effluent are in excess of those found in the receiving waters in order to set appropriate discharge limits. As the quality of the recycled water is generally expected to be better than the quality of the receiving waters, no water quality monitoring is considered necessary in this instance.

3.4 Consideration of water quality objectives

The water quality objectives for the Georges River catchment (including Prospect Creek) and Parramatta River, which are adopted from *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Conservation Council, 2000) (the ANZECC Guidelines), are outlined in **Table 3**.

Table 5 Aquatic ecosystems indicator numerical criteria (trigger values) for lowland rivers

Indicator	Numerical criteria (trigger values)
Total phosphorus	25 µg/L
Total nitrogen	350 µg/L
Chlorophyll-a	5 µg/L
Turbidity	6–50 NTU
Salinity (electrical conductivity)	125–2200 µS/cm
Dissolved oxygen	85–110%
pH	Lowland rivers: 6.5–8.5
Temperature	See ANZECC 2000 Guidelines, Table 3.3.1.
Chemical contaminants or toxicants	See ANZECC 2000 Guidelines, Chapter 3.4 and Table 3.4.1. Biological assessment indicators

Source: ANZECC Guidelines 2000

It is noted that the receiving waters in the catchments affected by the recycled water distribution network would be unlikely to meet all the numerical trigger values specified in **Table 3** above. A discussion of the likely and the proposed discharge to stormwater are discussed in relation to the water quality on objectives below.

Based on the above, the quality of the recycled water would be within the pH range and well below the turbidity trigger values for lowland rivers.

The testing results for total dissolved solids outlined in **Table 3** indicate salinity (electrical conductivity) levels lower than but roughly equivalent to the lower limit of the salinity trigger values.

The high levels phosphorous and nitrogen levels potentially present in the treated effluent feedstock to the RWTP are removed by the recycling process. The water quality results obtained from the proving test outlined in **Table 4** indicate that Total Nitrogen and Total Phosphorous levels are below the ANZECC trigger values outlined in **Table 5**.

No specific testing was carried out for chlorophyll-a. The nature of the recycling process (membrane filtration), however, is such that it is unlikely that the recycled water would have anything other than trace levels of chlorophyll-a.

Dissolved oxygen levels of the recycled water would vary, depending on the length of time the water had been sitting in the storage tanks at the RWTP and inside the distribution pipeline. Dissolved oxygen is not a water quality parameter that would be measured in the recycle water. The RWTP, however, does not involve any oxygen depleting processes or substances which would lead to the production of oxygen depleted recycled water. Also, during the discharge the water would be exposed to the atmosphere. As the discharged water would follow the local topography and pass through the local stormwater systems, the levels of dissolved oxygen would increase and equalise with ambient saturation levels. It is unlikely that there would be any significant impact to biological processes in the receiving waters due to low dissolved oxygen in the discharged recycled water.

The data presented in **Table 2** indicates that typical levels of dissolved oxygen in water leaving the Prospect Water Filtration Plant 107 – 128% saturation. The levels of dissolved oxygen in the recycled water leaving the RWTP would be expected to be in a similar range, as the water in the holding tanks are exposed to the atmosphere.

The temperature of the recycled water to be discharge would be similar to that of potable water (between 14^o and 24^o C from **Table 2**) and of rain water. As the water passes through the stormwater system it would equalize with ambient temperatures. When the discharged water reaches the receiving waters, it is unlikely that temperatures differences would be sufficient to result in significant changes to biological processes. Any temperature differences would rapidly dissipate due to mixing and dispersion. It is unlikely that there would be any adverse impacts to receiving waters due to temperature differences between the discharged recycled water and the receiving waters.

As the recycling process uses reverse osmosis to specifically remove dissolved solids from the effluent feedstock and the levels of total dissolved solids in the recycled water are be very low and generally less than typical values for potable water (refer to Table 4). While not all the chemical constituents listed in Table 3.4.1 of the ANZECC Guidelines where specifically tested for it is likely that the levels would be less than the relevant trigger values.

3.5 Primary contact water quality considerations

It is noted that the watercourses into which any discharge recycled water would end up are not generally used for primary contact recreational activities. An assessment of human exposure and health considerations regarding primary contact has nonetheless been carried out.

Guidelines for Managing Risks in Recreational Water (NHMNR, 2008) (the guideline) has been reviewed in relation to the proposal. Chapter 5 of the guideline deals with potential of contamination of waters by faecal matter from humans and animals. The feed water from the water recycling

process is sourced from secondary treated effluent that would likely contain levels of faecal matter and associate microorganisms. Microorganisms, however, are not able to pass through the membranes used in the recycling process. As a result and as indicated in the water quality results from the proving test, there are unlikely to be any microorganisms present in the recycled water. Exposure to recycled water discharged into the environment, therefore, poses no direct threat to human health in this regard.

Chapter 9 of the guideline deals with potential chemical hazards. The *Australian Drinking Water Guidelines* (NHMRC, 2004) are referred to in relation to human exposure as ingestion is the most significant and sensitive exposure pathway. Many of the potential contaminants of concern outlined in Table 9.3 of the guideline were specifically tested for in the recycled water. It is noted however that the quality of the recycled water is generally of a higher standard than potable water (refer to **Table 4**). In light of the water quality results for the recycled water exposure to recycled water discharge into the environment is unlikely to pose any threat whatsoever to human health.

Based on the above it is likely that infrequent discharges of recycled water to the environment would meet primary contact considerations and requirements.

3.6 Residual chlorine

The only potential contaminant present in the recycled water in excess of naturally occurring levels in the receiving waters would be chlorine. Chlorine will be added to the recycled water to provide residual protection for the recycled water while it is in the distribution network. The typical levels for chlorine, as indicated in Table 3 are between 1 and 1.4 mg/L. To put this into context, typical residual chlorine levels in potable water from the Prospect Water Filtration Plant are 1 to 1.3 mg/L. As such, the levels of chlorine in the recycled water to be discharged would typically be at similar levels to chlorine levels in potable water.

The chlorine in both potable water and the recycled water has the potential to interact with biological processes in the receiving waters. Given the volumes of the recycled water that would be discharged and the low levels of residual chlorine, however, it is likely that any residual chlorine would become deactivated very quickly on contact with the receiving waters. It is therefore unlikely that the chlorine present in discharged recycled water would not significantly affect any biological processes in the receiving waters or result in any environmental harm.

3.7 Overall potential for impact

Based on the above it is considered that the likelihood for potential or actual harm to the environment due to discharge of recycled water to stormwater during dewatering of the distribution network is negligible. On this basis, discharge of recycled water from the distribution network to stormwater would not constitute water pollution within the meaning of the POEO Act. It is noted, however, that this conclusion needs to be supported by the Department of Planning and Infrastructure and the relevant local councils.

4 Management and mitigation options

Currently, the approved operational environmental management plan (OEMP) for the distribution network does not include provisions for discharges of recycled water from within the network to land and water. During dewatering, the OEMP requires that the recycled water be collected and taken away for appropriate use or disposal (as liquid waste). This management option is particularly onerous and impractical given the quality results for the recycled water and not commensurate with

the low level of environmental risk associated with the proposed infrequent discharges recycled water to the environment.

Based on the analysis and assessment provided in this document the discharge of recycled water from within the network could occur in certain circumstances with minimal impact to the environment, provided that certain controls are implemented.

The following additional environmental mitigation measures are proposed for inclusion in the OEMP to address discharge of recycled water to land and water:

Additional environmental mitigation measure 1

Discharge of water from within the distribution network can occur to land and water provided that:

- *there is no evidence that the recycled water is 'out of specification'; and,*
- *the water is discharged in a manner than does not result in scour or erosion.*

The relevant local council would be notified of all discharges as required.

Additional environmental mitigation measure 2

To avoid the potential for localised flooding, no planned discharges of recycled water from the network would occur during times of wet weather or when the local stormwater system is otherwise operating at or near capacity.

It is considered that these additional environmental management measures are sufficient to appropriately manage the proposed discharge of recycled water from the network and ensure no environmental harm occurs. Subject to review and concurrence from the relevant local councils, the OEMP will be updated accordingly and provided to DoPI for review and approval.

5 Conclusion

Based on:

- the intended use of the recycled water (irrigation)
- the recycling process and the likely quality of the recycled water,
- the environment into which the water would be released and
- likely discharge volumes and frequencies,

it is unlikely that the occasional discharge of recycled water from the distribution network to land and water in the manner specified in this document would result in actual or potential environmental harm to the aquatic ecosystems of the receiving waters. It is considered, therefore that the proposed discharges during dewatering would not constitute water pollution and can therefore proceed (subject to concurrence from the relevant local councils and DoPI).

Attachment A Results for key quality parameters obtained during the 10 day proving test

Rosehill Recycled Water Scheme

Recycled Water Quality Results - 10 day proving test at Fairfield RWTP

Performance Test Start Date 14/08/2011
Performance Test Finish Date 24/08/2011

Recycled Water	14/08/2011	15/08/2011	16/08/2011	17/08/2011	18/08/2011	19/08/2011	20/08/2011	21/08/2011	22/08/2011	23/08/2011	24/08/2011	Averages
Limits												
Quantity (ML)	20	21,353	21,264	20,952	20,938	21,278	19,598	16,799	12,128	11,924	16,438	17,626
Recycled Water Tank Level - Maximum		51.08	46.24	44.05	46.39	56.55	53.63	47.28	66.8	55.21	47.49	51.7
Conductivity (uS/cm) - Maximum		21.84	21.84	21.91	21.85	21.5	29.54	28.46	19.84	22.56	23.66	23.3
Conductivity (uS/cm) - Average		20.41	21.24	21.37	21.29	20.85	20.41	20.42	18.57	20.68	22.24	20.9
Conductivity (uS/cm) - Minimum		19.43	20.59	20.97	20.93	20.34	16.93	17.75	17.39	18.83	21.32	19.6
pH - Maximum	9	7.43	7.40	7.42	7.36	7.27	7.29	7.23	7.65	7.12	7.22	7.3
pH - Average	6.5 to 8.5	7.35	7.34	7.32	7.26	7.21	7.05	7	7.1	6.92	6.95	7.1
pH - Minimum	6	7.29	7.25	7.27	7.13	6.92	4.9	6.57	6.79	6.69	6.59	6.7
Free Chlorine (mg/L) - Maximum	5	1.32	1.36	1.34	1.40	1.42	1.43	1.32	1.36	1.44	1.47	1.39
Free Chlorine (mg/L) - Average	1	1.26	1.28	1.28	1.31	1.3	1.25	1.11	1.22	1.26	1.36	1.27
Free Chlorine (mg/L) - Minimum	0.7	1.10	1.20	1.17	1.22	1.08	0.28	0.97	0.69	0.87	0.93	0.95
Turbidity (NTU) - Maximum	2	0.07	0.08	0.06	0.09	0.05	0.25	0.04	0.14	0.07	0.06	0.1
Turbidity (NTU) - Average	0.5	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.02
Turbidity (NTU) - Minimum		0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0	0.01
Ammonia (mg/L) - Maximum	1	0.05	0.04	0.05	0.05	0.05	0.2	0.07	0.06	0.06	0.06	0.07
Ammonia (mg/L) - Average		0.04	0.04	0.04	0.05	0.05	0.06	0.05	0.05	0.05	0.06	0.05
Ammonia (mg/L) - Minimum		0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.04
TOC (mg/L) - Maximum	5	0.20	0.19	0.23	0.22	0.19	0.32	0.25	0.22	0.22	0.26	0.23
TOC (mg/L) - Average		0.16	0.16	0.17	0.18	0.15	0.16	0.16	0.17	0.18	0.19	0.17
TOC (mg/L) - Minimum		0.13	0.01	0.13	0.02	0.13	0.01	0.01	0.01	0.14	0.01	0.07

**Attachment B Results for expanded quality parameters obtained during
the 10 day proving test**

Analytical Report 84415



Monitoring Services

Delivery Address: Sydney Water Corporation
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West Ryde NSW 2114
Tel : (02) 9800 6827
Fax : (02) 9800 6741

Issue Date: 23/08/2011
Issued By : Julia Bartlett
Customer Liaison Officer

Attention: Colin Thompson
Customer: SPI Rosehill Network Pty Limited
Customer ID: ZSPI_RH

Address: Axxess Park
321 Ferntree Gully Road Mt Waverley VIC 3149
Telephone: 02 9397 9388
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CONTENTS

1. NATA Signatories
2. Sample Summary
3. Analytical results
4. Comments
5. Laboratory QC results

NATA SIGNATORIES

Elizabeth Buczak, Clean & Waste Water Laboratory Supervisor
Kathryn Gamble, Microbiology Analyst
Kristine Mobberley, Organics Laboratory Supervisor
Halley Bambridge, Organics Analyst

Greg Stonehouse, Metals Laboratory Coordinator
Asia Fahad, Nutrients Laboratory Coordinator
Kiran Joshi, Organics Senior Analyst



Accreditation No.: 63 Chemical testing
Accreditation No.: 610 Biological testing

Accredited for compliance with ISO/IEC 17025



SAMPLE SUMMARY

<u>Client Sample ID</u>	<u>Sample Number</u>	<u>Sampling Procedure</u>	<u>Date Sampled</u>	<u>Date Received</u>	<u>Date Authorised</u>	<u>Description</u>
FAIR	L11054338	1	05/08/2011	05/08/2011	22/08/2011	

Sampling procedures

- 1 Samples analysed as received.
- 2 Samples collected as per FSG procedures SAWI 076 / 079 / 070, Excluding Oil & Grease which is collected as per clients instructions.
- 3 Samples collected as per FSG procedures SAWI 076 / 079 / 070.

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Client Sample ID	FAIR								
Sample Number	L11054338								
ORGANICS									
TC001WLL : Inhouse - Based on USEPA 8081B(Continued)									
4,4-DDE	ug/L	<0.01							
4,4-DDT	ug/L	<0.01							
Aldrin	ug/L	<0.01							
Dieldrin	ug/L	<0.01							
Endosulfan Sulphate	ug/L	<0.01							
Endrin	ug/L	<0.01							
Heptachlor	ug/L	<0.01							
Heptachlor Epoxide	ug/L	<0.01							
Hexachlorobenzene	ug/L	<0.01							
Lindane (gamma-BHC)	ug/L	<0.01							
Methoxychlor	ug/L	<0.01							
Total Chlordane	ug/L	<0.01							
alpha-BHC	ug/L	<0.01							
alpha-Chlordane	ug/L	<0.01							
alpha-Endosulfan	ug/L	<0.01							
beta-BHC	ug/L	<0.01							
beta-Endosulfan	ug/L	<0.01							
delta-BHC	ug/L	<0.01							
gamma-Chlordane	ug/L	<0.01							
TC003WLL : Inhouse - Based on USEPA 8082A									
PCB TOTAL	ug/L	<0.1							
TC0050WLL : Inhouse									
Atenolol*	ng/L	<5							

* Indicates NATA accreditation does not cover the performance of this service

Client Sample ID	FAIR								
Sample Number	L11054338								
ORGANICS									
TC0050WLL : Inhouse(Continued)									
Caffeine*	ng/L	<10							
Carbamazepine*	ng/L	<5							
Dilantin*	ng/L	<5							
Estriol*	ng/L	<5							
Estrone*	ng/L	<5							
Ethinylestradiol*	ng/L	<5							
Ibuprofen*	ng/L	<10							
Mestranol*	ng/L	<10							
Naproxen*	ng/L	<10							
TCEP*	ng/L	<10							
b-Estradiol*	ng/L	<10							
TC010317PW : Inhouse - Based on USEPA 3510C									
OC/PCB Preparation in Liquid Samples	N/A	Done							
OP Preparation in Liquid Samples	N/A	Done							
TC012WLL : Inhouse - Based on USEPA 8260B									
(m+p)-Xylenes	ug/L	<1							
1,1,1,2-Tetrachloroethane	ug/L	<1							
1,1,1-Trichloroethane	ug/L	<1							
1,1,2,2-Tetrachloroethane	ug/L	<1							
1,1,2-Trichloroethane	ug/L	<1							
1,1-Dichloroethane	ug/L	<1							
1,1-Dichloroethene	ug/L	<1							

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Client Sample ID	FAIR								
Sample Number	L11054338								
ORGANICS									
TC012WLL : Inhouse - Based on USEPA 8260B(Continued)									
1,2-Dichloroethane	ug/L	<1							
1,2-Dichloropropane	ug/L	<1							
Benzene	ug/L	<1							
Bromodichloromethane	ug/L	<1							
Bromoform	ug/L	<3							
Carbon Tetrachloride	ug/L	<1							
Chlorobenzene	ug/L	<1							
Chloroform	ug/L	2							
Dibromochloromethane	ug/L	<1							
Ethyl benzene	ug/L	<1							
Methylene Chloride	ug/L	<1							
Styrene	ug/L	<1							
Tetrachloroethene	ug/L	<1							
Toluene	ug/L	<1							
Trichloroethene	ug/L	<1							
Vinyl Chloride	ug/L	<1							
cis 1,2 Dichloroethene	ug/L	<1							
m-Dichlorobenzene	ug/L	<1							
o-Dichlorobenzene	ug/L	<1							
o-Xylene	ug/L	<1							
p-Dichlorobenzene	ug/L	<1							
trans 1,2 Dichloroethene	ug/L	<1							
TC015WLL : Inhouse - Based on USEPA 8270C									

* Indicates NATA accreditation does not cover the performance of this service

Sydney WATER Monitoring Services

* Indicates NATA accreditation does not cover the performance of this service

Client Sample ID	FAIR									
Sample Number	L11054338									
ORGANICS										
TC050PW : Inhouse										
Pharmaceutical Prep Water Samples*	N/A									
TC15PW : Inhouse - Based on USEPA Method 3510C										
Organic Scan Prep. for Liquid Samples*	N/A									

COMMENTS

Sample ID
L11054338

Comment Level
Method

Method
TC015WLL

Test
-

Comment

The Volatile Organic Scan performed on the sample did not indicate the presence of any organic compounds, above the method detection limit, according to the method TC015.

The Semi volatile Organic Scan performed on the sample indicated the presence of Benzothiozole above the method detection limit, according to the method TC015.
Identification was done using NIST library. The best matching compound was reported for each identified peak

Analysis
WC62NS

Analysis Requirements

This method is not NATA accredited for saline matrix.

* Indicates NATA accreditation does not cover the performance of this service

LABORATORY QC RESULTS

N/A - Not Applicable
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference
 SPIKE/Positive Control - Addition of a known amount and concentration

CHEMISTRY

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
WC0221 Chloride	<0.1 mg/L	N/A	70 mg/L	360 mg/L	355 mg/L	N/A	98 %	QC Spike RPD 66.5 - 73.5 mg/L 80 - 120 % N/A
WC17NS CBOD5	<2 mg/L	N/A	214 mg/L	7 mg/L	7 mg/L	N/A	N/A	QC Spike RPD 180 - 240 mg/L N/A N/A
WC59NS COD	<10 mg/L	N/A	51 mg/L	15 mg/L	16 mg/L	1 mg/L	N/A	QC Spike RPD 45.4 - 55.2 mg/L N/A <37 mg/L

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CHEMISTRY

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
WC62NS Total Dissolved Solids	<10 mg/L	N/A	290 mg/L	620 mg/L	608 mg/L	12 mg/L	N/A	QC 272 - 325 mg/L Spike N/A RPD <31 mg/L

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METALS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TM64TML Total Aluminium	<10 ug/L	<10 ug/L	106 ug/L	10 ug/L	12 ug/L	18.18 %	104 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %
TM64TML Total Calcium	<10 ug/L	<10 ug/L	1090 ug/L	N/A	N/A	N/A	N/A	QC Spike RPD 800 - 1200 ug/L N/A N/A
TM64TML Total Iron	<10 ug/L	<10 ug/L	110 ug/L	22 ug/L	23 ug/L	4.44 %	104 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %
TM64TML Total Manganese	<1 ug/L	<1 ug/L	103 ug/L	<1 ug/L	<1 ug/L	0.00 %	98 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %

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METALS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TM64TML	<5 ug/L	<5 ug/L	107 ug/L	N/A	N/A	N/A	N/A	QC Spike RPD 80 - 120 ug/L N/A N/A
Total Zinc								

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MICRO

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
MI28	<1 Orgs / 100mL	N/A	(Pos) 120 Orgs / mL (Neg) <1 Orgs / mL	<1 Orgs / 100mL	<1 Orgs / 100mL	*Accepted	N/A	QC 20-200 Orgs / mL Spike N/A RPD N/A Neg QC N/A
<i>E. coli</i>								
MI28	<1 Orgs / 100mL	<1 Orgs / 100mL	(Pos) 330 Orgs / mL (Neg) <1 Orgs / mL	<1 Orgs / 100mL	<1 Orgs / 100mL	*Accepted	N/A	QC 20-200 Orgs / mL Spike N/A RPD N/A Neg QC N/A
Total Coliforms								

Criteria for Duplicate Samples

(Pos) Positive Daily Control, (Neg) Negative Daily Control.

RPD calculated where both duplicates fall between: Membrane Filtration - 20 and 80 cfu/plate.

Heterotrophic Plate Count - 30 and 300 cfu/plate.

* Colliert RPD Accepted where upper and lower confidence limits overlap otherwise RPD is rejected

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NUTRIENTS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
NU40 Ammonia NH3 -N Low Level	<0.01 mg/L	<0.01 mg/L	0.20 mg/L	<0.01 mg/L	<0.01 mg/L	0.0 mg/L	100 %	QC Spike RPD 0.18 - 0.22 mg/L 80 - 120 % <0.03 mg/L
NU57 Total Nitrogen	<0.05 mg/L	<0.05 mg/L	0.99 mg/L	0.46 mg/L	0.46 mg/L	0.0 mg/L	98.0 %	QC Spike RPD 0.9 - 1.1 mg/L 80 - 120 % <0.4 mg/L
NU57 Total Phosphorus	<0.002 mg/L	<0.002 mg/L	0.050 mg/L	0.013 mg/L	0.013 mg/L	0.0 mg/L	102 %	QC Spike RPD 0.045 - 0.055 mg/L 80 - 120 % <0.005 mg/L

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ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC012WLL (m+p)-Xylenes	<1 ug/L	<1 ug/L	94 % Recovery	<1 ug/L	<1 ug/L	N/A	95 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC012WLL 1,1,1,2-Tetrachloroethane	<1 ug/L	<1 ug/L	N/A	N/A	N/A	N/A	N/A	QC Spike RPD N/A N/A N/A
TC012WLL 1,1,1-Trichloroethane	<1 ug/L	<1 ug/L	N/A	<1 ug/L	<1 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A
TC012WLL 1,1,2,2-Tetrachloroethane	<1 ug/L	<1 ug/L	N/A	<1 ug/L	<1 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A

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ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC012WLL 1,1,2-Trichloroethane	<1 ug/L	<1 ug/L	N/A	<1 ug/L	<1 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A
TC012WLL 1,1-Dichloroethane	<1 ug/L	<1 ug/L	N/A	<1 ug/L	<1 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A
TC012WLL 1,1-Dichloroethene	<1 ug/L	<1 ug/L	N/A	<1 ug/L	<1 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A
TC012WLL 1,2-Dichloroethane	<1 ug/L	<1 ug/L	N/A	<1 ug/L	<1 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A

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ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC012WLL 1,2-Dichloropropane	<1 ug/L	<1 ug/L	N/A	<1 ug/L	<1 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A
TC001WLL 4,4-DDD	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	0.00 %	N/A	QC Spike RPD N/A N/A <30 %
TC001WLL 4,4-DDE	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	0.00 %	N/A	QC Spike RPD N/A N/A <30 %
TC001WLL 4,4-DDT	<0.01 ug/L	<0.01 ug/L	95.0 % Recovery	<0.01 ug/L	<0.01 ug/L	0.00 %	126 %	QC Spike RPD 70 - 130 % 50 - 130 % <30 %

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ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC001WLL Aldrin	<0.01 ug/L	<0.01 ug/L	111 % Recovery	<0.01 ug/L	<0.01 ug/L	0.00 %	96 %	QC Spike RPD 70 - 130 % 50 - 130 % <30 %
TC001WLL alpha-BHC	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	0.00 %	N/A	QC Spike RPD N/A N/A <30 %
TC001WLL alpha-Chlordane	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	0.00 %	N/A	QC Spike RPD N/A N/A <30 %
TC001WLL alpha-Endosulfan	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	0.00 %	N/A	QC Spike RPD N/A N/A <30 %

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ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC012WLL Benzene	<1 ug/L	<1 ug/L	107 % Recovery	<1 ug/L	<1 ug/L	N/A	105 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC001WLL beta-BHC	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	0.00 %	N/A	QC Spike RPD N/A N/A <30 %
TC001WLL beta-Endosulfan	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A
TC012WLL Bromodichloromethane	<1 ug/L	<1 ug/L	119 % Recovery	10 ug/L	9 ug/L	10.53 %	108 %	QC Spike RPD 70 - 130 % 50 - 130 % <30 %

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ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC012WLL Bromoform	<3 ug/L	<3 ug/L	108 % Recovery	<3 ug/L	<3 ug/L	0.00 %	95 %	QC Spike RPD 70 - 130 % 50 - 130 % <30 %
TC012WLL Carbon Tetrachloride	<1 ug/L	<1 ug/L	N/A	<1 ug/L	<1 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A
TC012WLL Chlorobenzene	<1 ug/L	<1 ug/L	99 % Recovery	<1 ug/L	<1 ug/L	N/A	97 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC012WLL Chloroform	<1 ug/L	<1 ug/L	123 % Recovery	37 ug/L	36 ug/L	2.74 %	117 %	QC Spike RPD 70 - 130 % 50 - 130 % <30 %

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ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC012WLL cis 1,2 Dichloroethene	<1 ug/L	<1 ug/L	N/A	N/A	N/A	N/A	N/A	QC Spike RPD N/A N/A N/A
TC001WLL delta-BHC	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	0.00 %	N/A	QC Spike RPD N/A N/A <30 %
TC017WLL Demeton-S-Methyl	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	72.0 %	QC Spike RPD N/A 50 - 130 % N/A
TC017WLL Diazinon	<0.1 ug/L	<0.1 ug/L	101 % Recovery	<0.1 ug/L	<0.1 ug/L	N/A	91.0 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A

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ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC012WLL Dibromochloromethane	<1 ug/L	<1 ug/L	109 % Recovery	2 ug/L	2 ug/L	0.00 %	98 %	QC Spike RPD 70 - 130 % 50 - 130 % <30 %
TC017WLL Dichlorvos	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	66.0 %	QC Spike RPD N/A 50 - 130 % N/A
TC001WLL Dieldrin	<0.01 ug/L	<0.01 ug/L	107 % Recovery	<0.01 ug/L	<0.01 ug/L	0.00 %	124 %	QC Spike RPD 70 - 130 % 50 - 130 % <30 %
TC017WLL Dimethoate	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	74.0 %	QC Spike RPD N/A 50 - 130 % N/A

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ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC017WLL Disulfoton	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	71.0 %	QC Spike RPD 50 - 130 % N/A
TC017WLL E.P.N	<0.1 ug/L	<0.1 ug/L	96.0 % Recovery	<0.1 ug/L	<0.1 ug/L	N/A	93.0 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC001WLL Endosulfan Sulphate	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A
TC001WLL Endrin	<0.01 ug/L	<0.01 ug/L	107 % Recovery	<0.01 ug/L	<0.01 ug/L	0.00 %	122 %	QC Spike RPD 70 - 130 % 50 - 130 % <30 %

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ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC017WLL Ethoprop	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	81.0 %	QC Spike RPD 50 - 130 % N/A
TC017WLL Ethyl azinphos	<0.1 ug/L	<0.1 ug/L	98.0 % Recovery	<0.1 ug/L	<0.1 ug/L	N/A	93.0 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC012WLL Ethyl benzene	<1 ug/L	<1 ug/L	92 % Recovery	<1 ug/L	<1 ug/L	N/A	92 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC017WLL Ethyl chlorpyrifos	<0.1 ug/L	<0.1 ug/L	100 % Recovery	<0.1 ug/L	<0.1 ug/L	N/A	78.0 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A

* Indicates NATA accreditation does not cover the performance of this service

ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC017WLL Fenitrothion	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	81.0 %	QC Spike RPD 50 - 130 % N/A
TC017WLL Fensulfothion	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	84.0 %	QC Spike RPD 50 - 130 % N/A
TC017WLL Fenthion	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	81.0 %	QC Spike RPD 50 - 130 % N/A
TC017WLL Fonofos	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	81.0 %	QC Spike RPD 50 - 130 % N/A

* Indicates NATA accreditation does not cover the performance of this service

ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC001WLL gamma-Chlordane	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	0.00 %	N/A	QC Spike RPD N/A N/A <30 %
TC001WLL Heptachlor	<0.01 ug/L	<0.01 ug/L	108 % Recovery	<0.01 ug/L	<0.01 ug/L	0.00 %	109 %	QC Spike RPD 70 - 130 % 50 - 130 % <30 %
TC001WLL Heptachlor Epoxide	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	0.00 %	N/A	QC Spike RPD N/A N/A <30 %
TC001WLL Hexachlorobenzene	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	0.00 %	N/A	QC Spike RPD N/A N/A <30 %

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ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC017WLL Isazophos	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	106 %	QC Spike RPD 50 - 130 % N/A
TC001WLL Lindane	<0.01 ug/L	<0.01 ug/L	108 % Recovery	<0.01 ug/L	<0.01 ug/L	0.00 %	115 %	QC Spike RPD 70 - 130 % 50 - 130 % <30 %
TC017WLL Malathion	<0.1 ug/L	<0.1 ug/L	83.0 % Recovery	<0.1 ug/L	<0.1 ug/L	N/A	99.0 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC012WLL m-Dichlorobenzene	<1 ug/L	<1 ug/L	79 % Recovery	<1 ug/L	<1 ug/L	N/A	77 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A

* Indicates NATA accreditation does not cover the performance of this service

ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC001WLL Methoxychlor	<0.01 ug/L	<0.01 ug/L	N/A	<0.01 ug/L	<0.01 ug/L	0.00 %	N/A	QC Spike RPD N/A N/A <30 %
TC017WLL Methyl azinphos	<0.1 ug/L	<0.1 ug/L	N/A	<0.5 ug/L	<0.5 ug/L	N/A	107 %	QC Spike RPD N/A 50 - 130 % N/A
TC017WLL Methyl chlorpyrifos	<0.1 ug/L	<0.1 ug/L	100 % Recovery	<0.1 ug/L	<0.1 ug/L	N/A	64.0 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC012WLL Methylene Chloride	<1 ug/L	<1 ug/L	N/A	<1 ug/L	<1 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A

* Indicates NATA accreditation does not cover the performance of this service

ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC017WLL Mevinphos	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	92.0 %	QC Spike RPD 50 - 130 % N/A
TC012WLL o-Dichlorobenzene	<1 ug/L	<1 ug/L	82 % Recovery	<1 ug/L	<1 ug/L	N/A	79 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC012WLL o-Xylene	<1 ug/L	<1 ug/L	103 % Recovery	<1 ug/L	<1 ug/L	N/A	99 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC017WLL Parathion	<0.1 ug/L	<0.1 ug/L	93.0 % Recovery	<0.1 ug/L	<0.1 ug/L	N/A	75.0 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A

* Indicates NATA accreditation does not cover the performance of this service

ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC003WLL PCB TOTAL	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	0.00 %	68.0 %	QC Spike RPD N/A 50 - 130 % N/A <30 %
TC012WLL p-Dichlorobenzene	<1 ug/L	<1 ug/L	73 % Recovery	<1 ug/L	<1 ug/L	N/A	73 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC017WLL Phospholan	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	98.0 %	QC Spike RPD N/A 50 - 130 % N/A
TC012WLL Styrene	<1 ug/L	<1 ug/L	86 % Recovery	<1 ug/L	<1 ug/L	N/A	82 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A

* Indicates NATA accreditation does not cover the performance of this service

ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC012WLL Tetrachloroethene	<1 ug/L	<1 ug/L	N/A	<1 ug/L	<1 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A
TC012WLL Toluene	<1 ug/L	<1 ug/L	94 % Recovery	<1 ug/L	<1 ug/L	N/A	92 %	QC Spike RPD 70 - 130 % 50 - 130 % N/A
TC001WLL Total Chlordane	<0.01 ug/L	N/A	N/A	<0.01 ug/L	<0.01 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A
TC012WLL trans 1,2 Dichloroethene	<1 ug/L	<1 ug/L	N/A	N/A	N/A	N/A	N/A	QC Spike RPD N/A N/A N/A

* Indicates NATA accreditation does not cover the performance of this service

ORGANICS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TC012WLL Trichloroethene	<1 ug/L	<1 ug/L	N/A	<1 ug/L	<1 ug/L	N/A	N/A	QC Spike RPD N/A N/A N/A
TC017WLL Trithion	<0.1 ug/L	<0.1 ug/L	N/A	<0.1 ug/L	<0.1 ug/L	N/A	89.0 %	QC Spike RPD N/A 50 - 130 % N/A
TC012WLL Vinyl Chloride	<1 ug/L	<1 ug/L	N/A	N/A	N/A	N/A	N/A	QC Spike RPD N/A N/A N/A

Criteria for Comparing Duplicate Samples

Acceptance Criteria 0 to 30%

Acceptance Criteria of RPD is for >10*PQL

Criteria for Comparing Spike Samples

Acceptance Criteria 50 to 130%

* Indicates NATA accreditation does not cover the performance of this service

Analytical Report 84514



Monitoring Services

Delivery Address: Sydney Water Corporation
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Issue Date: 25/08/2011
Issued By : Julia Bartlett
Customer Liaison Officer

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Customer ID: ZSPI_RH

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Email: colin.thompson@jemena.com.au

CONTENTS

1. NATA Signatories
2. Sample Summary
3. Analytical results
4. Comments
5. Laboratory QC results

NATA SIGNATORIES

Elizabeth Buczak, Clean & Waste Water Laboratory Supervisor
Greg Stonehouse, Metals Laboratory Coordinator
Asia Fahad, Nutrients Laboratory Coordinator

Regina Prasad, Clean & Waste Water Laboratory Coordinator
Dannielle Makings, Microbiology Analyst



Accreditation No.: 63 Chemical testing
Accreditation No.: 610 Biological testing

Accredited for compliance with ISO/IEC 17025

WORLD RECOGNISED
ACCREDITATION

SAMPLE SUMMARY

<u>Client Sample ID</u>	<u>Sample Number</u>	<u>Sampling Procedure</u>	<u>Date Sampled</u>	<u>Date Received</u>	<u>Date Authorised</u>	<u>Description</u>
Maru-Fairfield	L11056330	1	15/08/2011	15/08/2011	25/08/2011	

Sampling procedures

- 1 Samples analysed as received.
- 2 Samples collected as per FSG procedures SAWI 076 / 079 / 070, Excluding Oil & Grease which is collected as per clients instructions.
- 3 Samples collected as per FSG procedures SAWI 076 / 079 / 070.

[illegible]

Client Sample ID		Maru-Fairfield																	
Sample Number		L11056330																	
METALS																			
TM64 TML : USEPA 6020																			
Total Aluminium		mg/L																	
Total Calcium		mg/L																	
Total Iron		mg/L																	
Total Manganese		mg/L																	
Total Zinc		mg/L																	
TMOPENTUB : WTMOPENTUBEInHouse																			
Total Digestion		DONE																	
MICRO																			
MI28 : APHA 9223 B																			
E.coli		Orgs / 100mL																	
Total Coliforms		Orgs / 100mL																	
NUTRIENTS																			
NU40 : APHA 4500-NH3 H																			
Ammonia NH3 -N Low Level		mg/L																	
NU57 : APHA 4500- PH & NO3 I																			
Total Nitrogen		mg/L																	
Total Phosphorus		mg/L																	

<u>COMMENTS</u>			
<u>Sample ID</u>	<u>Comment Level</u>	<u>Method</u>	<u>Test</u>
L11056330	Method	XEML_HOVA	-
<u>Analysis</u>			
<u>Analysis Requirements</u>			
WC62NS	This method is not NATA accredited for saline matrix.		
XEML_HOVA	Analysed by EML Consulting Services QLD NATA Accreditation No.12675		
<u>Comment</u>			
Helminth was analysed by EML, Ref No: 259021			

LABORATORY QC RESULTS

N/A - Not Applicable
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference
 SPIKE/Positive Control - Addition of a known amount and concentration

CHEMISTRY

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
WC0221 Chloride	<0.1 mg/L	N/A	70 mg/L	4.2 mg/L	4.2 mg/L	0.00 %	100 %	QC 66.5 - 73.5 mg/L Spike 80 - 120 % RPD <20 %
WC17NS CBOD5	<2 mg/L	N/A	232 mg/L	<2 mg/L	<2 mg/L	0.00 %	N/A	QC 180 - 240 mg/L Spike N/A RPD <20 %
WC59NS COD	<10 mg/L	N/A	50 mg/L	<10 mg/L	<10 mg/L	0 mg/L	N/A	QC 45.4 - 55.2 mg/L Spike N/A RPD <37 mg/L

CHEMISTRY

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
WC62NS Total Dissolved Solids	<10 mg/L	N/A	300 mg/L	546 mg/L	556 mg/L	10 mg/L	N/A	QC 272 - 325 mg/L Spike N/A RPD <31 mg/L

METALS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TM64TML Total Aluminium	<10 ug/L	<10 ug/L	105 ug/L	<10 ug/L	<10 ug/L	0.00 %	99 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %
TM64TML Total Calcium	<10 ug/L	<10 ug/L	1020 ug/L	9270 ug/L	8680 ug/L	0.76 %	94 %	QC Spike RPD 800 - 1200 ug/L 80 - 120 % <20 %
TM64TML Total Iron	<10 ug/L	<10 ug/L	106 ug/L	<10 ug/L	<10 ug/L	0.00 %	102 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %
TM64TML Total Manganese	<1 ug/L	<1 ug/L	104 ug/L	<1 ug/L	<1 ug/L	0.00 %	99 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %

METALS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TM64TML	<5 ug/L	<5 ug/L	106 ug/L	10 ug/L	10 ug/L	0.00 %	103 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %
Total Zinc								

MICRO

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
MI28	<1 Orgs / 100mL	N/A	(Pos)78 Orgs / mL (Neg)<1 Orgs / mL	<1 Orgs / 100mL	<1 Orgs / 100mL	*Accepted	N/A	QC 20-200 Orgs / mL Spike N/A RPD N/A Neg QC N/A
<i>E.coli</i>								
MI28	<1 Orgs / 100mL	<1 Orgs / 100mL	(Pos)48 Orgs / mL (Neg)<1 Orgs / mL	<1 Orgs / 100mL	<1 Orgs / 100mL	*Accepted	N/A	QC 20-200 Orgs / mL Spike N/A RPD N/A Neg QC N/A
Total Coliforms								

Criteria for Duplicate Samples

(Pos) Positive Daily Control, (Neg) Negative Daily Control.

RPD calculated where both duplicates fall between: Membrane Filtration - 20 and 80 cfu/plate.

Heterotrophic Plate Count - 30 and 300 cfu/plate.

* Colliert RPD Accepted where upper and lower confidence limits overlap otherwise RPD is rejected

NUTRIENTS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
NU40 Ammonia NH ₃ -N Low Level	<0.01 mg/L	<0.01 mg/L	0.20 mg/L	0.35 mg/L	0.35 mg/L	0.00 %	100 %	QC Spike RPD 0.18 - 0.22 mg/L 80 - 120 % <15 %
NU57 Total Nitrogen	<0.05 mg/L	<0.05 mg/L	0.96 mg/L	0.09 mg/L	0.10 mg/L	0.01 mg/L	102 %	QC Spike RPD 0.9 - 1.1 mg/L 80 - 120 % <0.4 mg/L
NU57 Total Phosphorus	<0.002 mg/L	<0.002 mg/L	0.052 mg/L	0.003 mg/L	0.003 mg/L	0.0 mg/L	98.0 %	QC Spike RPD 0.045 - 0.055 mg/L 80 - 120 % <0.005 mg/L

Analytical Report 84699



Monitoring Services

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Analysis contact:

Attention: Colin Thompson
Customer: SPI Rosehill Network Pty Limited
Customer ID: ZSPI_RH

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Email: colin.thompson@jemenana.com.au

CONTENTS

1. NATA Signatories
2. Sample Summary
3. Analytical results
4. Comments
5. Laboratory QC results

NATA SIGNATORIES

Elizabeth Buczak, Clean & Waste Water Laboratory Supervisor
Anita Picton, Microbiology Analyst

David Chouelfati, Metals Laboratory Supervisor
Asia Fahad, Nutrients Laboratory Coordinator



Accreditation No.: 63 Chemical testing
Accreditation No.: 610 Biological testing

Accredited for compliance with ISO/IEC 17025

WORLD RECOGNISED
ACCREDITATION

SAMPLE SUMMARY

<u>Client Sample ID</u>	<u>Sample Number</u>	<u>Sampling Procedure</u>	<u>Date Sampled</u>	<u>Date Received</u>	<u>Date Authorised</u>	<u>Description</u>
Maru-Fairfield	L11056331	1	22/08/2011	22/08/2011	29/08/2011	

Sampling procedures

- 1 Samples analysed as received.
- 2 Samples collected as per FSG procedures SAWI 076 / 079 / 070, Excluding Oil & Grease which is collected as per clients instructions.
- 3 Samples collected as per FSG procedures SAWI 076 / 079 / 070.

COMMENTS

Analysis
WC62NS

This method is not NATA accredited for saline matrix.

LABORATORY QC RESULTS

N/A - Not Applicable
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference
 SPIKE/Positive Control - Addition of a known amount and concentration

CHEMISTRY

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
WC0221 Chloride	<0.1 mg/L	N/A	70 mg/L	112 mg/L	113 mg/L	0.89 %	100 %	QC Spike RPD 66.5 - 73.5 mg/L 80 - 120 % <20 %
WC17NS CBOD5	<2 mg/L	N/A	195 mg/L	<2 mg/L	<2 mg/L	0.00 %	N/A	QC Spike RPD 180 - 240 mg/L N/A <20 %
WC59NS COD	<10 mg/L	N/A	51 mg/L	34 mg/L	35 mg/L	1 mg/L	N/A	QC Spike RPD 45.4 - 55.2 mg/L N/A <37 mg/L

CHEMISTRY

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
WC62NS	<10 mg/L	N/A	294 mg/L	462 mg/L	448 mg/L	14 mg/L	N/A	QC Spike RPD 272 - 325 mg/L N/A <31 mg/L
Total Dissolved Solids								

METALS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TM64TML Total Aluminium	<10 ug/L	<10 ug/L	102 ug/L	12 ug/L	12 ug/L	0.00 %	101 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %
TM64TML Total Calcium	<10 ug/L	<10 ug/L	1080 ug/L	N/A	N/A	N/A	N/A	QC Spike RPD 800 - 1200 ug/L N/A N/A
TM64TML Total Iron	<10 ug/L	<10 ug/L	100 ug/L	13 ug/L	12 ug/L	8.00 %	99 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %
TM64TML Total Manganese	<1 ug/L	<1 ug/L	98 ug/L	<1 ug/L	<1 ug/L	0.00 %	97 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %

METALS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TM64TML	<5 ug/L	<5 ug/L	100 ug/L	N/A	N/A	N/A	N/A	QC Spike RPD 80 - 120 ug/L N/A N/A
Total Zinc								

MICRO

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
MI28	<1 Orgs / 100mL	N/A	(Pos)56 Orgs / mL (Neg)<1 Orgs / mL	<1 Orgs / 100mL	<1 Orgs / 100mL	*Accepted	N/A	QC 20-200 Orgs / mL Spike N/A RPD N/A Neg QC N/A
<i>E.coli</i>								
MI28	<1 Orgs / 100mL	<1 Orgs / 100mL	(Pos)22 Orgs / mL (Neg)<1 Orgs / mL	<1 Orgs / 100mL	<1 Orgs / 100mL	*Accepted	N/A	QC 20-200 Orgs / mL Spike N/A RPD N/A Neg QC N/A
Total Coliforms								

Criteria for Duplicate Samples

(Pos) Positive Daily Control, (Neg) Negative Daily Control.

RPD calculated where both duplicates fall between: Membrane Filtration - 20 and 80 cfu/plate.

Heterotrophic Plate Count - 30 and 300 cfu/plate.

* Colliert RPD Accepted where upper and lower confidence limits overlap otherwise RPD is rejected

NUTRIENTS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
NU40 Ammonia NH ₃ -N Low Level	<0.01 mg/L	<0.01 mg/L	0.20 mg/L	0.37 mg/L	0.37 mg/L	0.00 %	100 %	QC Spike RPD 0.18 - 0.22 mg/L 80 - 120 % <15 %
NU57 Total Nitrogen	<0.05 mg/L	<0.05 mg/L	0.99 mg/L	0.47 mg/L	0.48 mg/L	0.01 mg/L	98.0 %	QC Spike RPD 0.9 - 1.1 mg/L 80 - 120 % <0.4 mg/L
NU57 Total Phosphorus	<0.002 mg/L	<0.002 mg/L	0.051 mg/L	<0.002 mg/L	<0.002 mg/L	0.0 mg/L	98.0 %	QC Spike RPD 0.045 - 0.055 mg/L 80 - 120 % <0.005 mg/L

Analytical Report 84859



Monitoring Services

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Issue Date: 01/09/2011

Issued By : Julia Bartlett

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Customer: SPI Rosehill Network Pty Limited
Customer ID: ZSPI_RH

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Email: colin.thompson@jemenana.com.au

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NATA SIGNATORIES

Elizabeth Buczak, Clean & Waste Water Laboratory Supervisor
Alice Sorokin, Microbiology Senior Analyst

David Choueifati, Metals Laboratory Supervisor
Asia Fahad, Nutrients Laboratory Coordinator



Accreditation No.: 63 Chemical testing
Accreditation No.: 610 Biological testing

Accredited for compliance with ISO/IEC 17025



SAMPLE SUMMARY

<u>Client</u> <u>Sample ID</u>	<u>Sample</u> <u>Number</u>	<u>Sampling</u> <u>Procedure</u>	<u>Date</u> <u>Sampled</u>	<u>Date</u> <u>Received</u>	<u>Date</u> <u>Authorised</u>	<u>Description</u>
Maru-Fairfield	L11056332	1	24/08/2011	24/08/2011	31/08/2011	

Sampling procedures

- 1 Samples analysed as received.
- 2 Samples collected as per FSG procedures SAWI 076 / 079 / 070, Excluding Oil & Grease which is collected as per clients instructions.
- 3 Samples collected as per FSG procedures SAWI 076 / 079 / 070.

ANALYTICAL RESULTS

Client Sample ID		Maru-Fairfield																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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Analysis

WC62NS
This method is not NATA accredited for saline matrix.

LABORATORY QC RESULTS

N/A - Not Applicable
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference
 SPIKE/Positive Control - Addition of a known amount and concentration

CHEMISTRY

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
WC0221 Chloride	<0.1 mg/L	N/A	70 mg/L	70 mg/L	70 mg/L	0.00 %	100 %	QC Spike RPD 66.5 - 73.5 mg/L 80 - 120 % <20 %
WC17NS CBOD5	<2 mg/L	N/A	227 mg/L	350 mg/L	346 mg/L	1.15 %	N/A	QC Spike RPD 180 - 240 mg/L N/A <20 %
WC59NS COD	<10 mg/L	N/A	52 mg/L	630 mg/L	624 mg/L	6 mg/L	N/A	QC Spike RPD 45.4 - 55.2 mg/L N/A <37 mg/L

CHEMISTRY

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
WC62NS Total Dissolved Solids	<10 mg/L	N/A	312 mg/L	986 mg/L	970 mg/L	16 mg/L	N/A	QC Spike RPD 272 - 325 mg/L N/A <31 mg/L

METALS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TM64TML Total Aluminium	<10 ug/L	<10 ug/L	100 ug/L	147 ug/L	135 ug/L	8.51 %	98 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %
TM64TML Total Calcium	<10 ug/L	<10 ug/L	1030 ug/L	N/A	N/A	N/A	N/A	QC Spike RPD 800 - 1200 ug/L N/A N/A
TM64TML Total Iron	<10 ug/L	<10 ug/L	101 ug/L	348 ug/L	346 ug/L	0.58 %	89 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %
TM64TML Total Manganese	<1 ug/L	<1 ug/L	98 ug/L	26 ug/L	26 ug/L	0.00 %	92 %	QC Spike RPD 80 - 120 ug/L 80 - 120 % <20 %

METALS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
TM64TML	<5 ug/L	<5 ug/L	98 ug/L	N/A	N/A	N/A	N/A	QC Spike RPD 80 - 120 ug/L N/A N/A
Total Zinc								

MICRO

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
MI28	<1 Orgs / 100mL	N/A	(Pos) 110 Orgs / mL	<1 Orgs / 100mL	<1 Orgs / 100mL	*Accepted	N/A	QC 20-200 Orgs / mL Spike N/A RPD N/A Neg QC N/A
<i>E.coli</i>			(Neg) <1 Orgs / mL					
MI28	<1 Orgs / 100mL	<1 Orgs / 100mL	(Pos) 14 Orgs / mL	<1 Orgs / 100mL	<1 Orgs / 100mL	*Accepted	N/A	QC 20-200 Orgs / mL Spike N/A RPD N/A Neg QC N/A
Total Coliforms			(Neg) <1 Orgs / mL					

Criteria for Duplicate Samples

(Pos) Positive Daily Control, (Neg) Negative Daily Control.

RPD calculated where both duplicates fall between: Membrane Filtration - 20 and 80 cfu/plate.

Heterotrophic Plate Count - 30 and 300 cfu/plate.

* Colliert RPD Accepted where upper and lower confidence limits overlap otherwise RPD is rejected

NUTRIENTS

Method Analyte	PQL	Blank	QC Control	Duplicate		RPD	Spike Recovery	Acceptance Range
				Result 1	Result 2			
NU40 Ammonia NH ₃ -N Low Level	<0.01 mg/L	<0.01 mg/L	0.20 mg/L	0.14 mg/L	0.13 mg/L	7.41 %	100 %	QC 0.18 - 0.22 mg/L Spike 80 - 120 % RPD <15 %
NU57 Total Nitrogen	<0.05 mg/L	<0.05 mg/L	1.00 mg/L	0.36 mg/L	0.38 mg/L	0.02 mg/L	102 %	QC 0.9 - 1.1 mg/L Spike 80 - 120 % RPD <0.4 mg/L
NU57 Total Phosphorus	<0.002 mg/L	<0.002 mg/L	0.052 mg/L	0.002 mg/L	0.002 mg/L	0.0 mg/L	98.0 %	QC 0.045 - 0.055 mg/L Spike 80 - 120 % RPD <0.005 mg/L