



**Kangaroo Island Council
Community Wastewater
Management Scheme
(CWMS)**

**Environmental
Management
Plan**

July 2019



Document History and Status

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1 INTRODUCTION

The Kangaroo Island Community Wastewater Management System (CWMS) Environmental Management Plan (EMP) has been developed to assist the Kangaroo Island Council with ongoing wastewater and recycled water quality management. Wastewater and recycled water quality management is an essential component in ensuring Council's commitment to safeguarding public and environmental health.

The Plan covers all CWMS managed and operated by the Kangaroo Island Council. This monitoring plan also addresses Environment Protection Authority (EPA) and the Department of Health (DH) guidelines and requirements of the EPA License (EPA 1516). The implementation of this Plan and the proposed monitoring schedules is crucial to ensure adherence to any license requirements and to satisfy Council's general environmental duty under the Environment Protection Act 1993. The results obtained may need to be reported to the EPA and DH where required.

This Plan does not form any part of Asset Management Planning for the scheme. The management of Assets appropriate to the required operation of the schemes and the contingency plans for operation of the schemes are provided to the Office of the Technical Regulator and DH under separate legislative requirement, within the Recycled Water Management Plan (RWMP) and Safety, Reliability, Maintenance and Technical Management Plan (SRMTMP), which will be available from Kangaroo Island Council on request, or at www.kangarooisland.sa.gov.au

1.1 Location

Kangaroo Island Council's CWMS infrastructure is located outlying each of the main townships of Kingscote, Parndana and American River. At the time of writing, a new CWMS scheme is being developed for the township of Penneshaw and is likely to be commissioned and operable in 2016. As the scheme is commissioned, the required DH approvals and EPA requirements and Technical Regulator reporting requirements will be confirmed and will be entered into this plan by way of revision.

Kingscote:

The Kingscote CWMS Lagoons are located at Section 169 HP110800, CT6031/192, Burdon Drive in the Hundred of Menzies, accessed from Estuary Road. The site is generally low lying (<10m AHD) within the estuarine regions of the Cygnet River and Nepean Bay, with its surrounding low lying saltmarsh flats experiencing inundation due to both rainfall and tidal influence, particularly during winter months.

The Scheme receives primary treated wastewater from the Kingscote STEDS type network and comprises a secondary treatment and tertiary chlorination plant and three (3) lagoons, all used for post treatment storage and provide for further natural UV treatment and settlement of stored wastewater.

The location of the Kingscote CWMS lagoons and plant may need to be revisited in the not too distant future to investigate its suitability into the future with respect climate change adaption and environmental sustainability. Alternative sites may require substantial investment into new infrastructure and is unlikely to be realised in the short term.

Parndana:

The Parndana CWMS Lagoons are located at Lot 13 and Lot 8 FP6496 and , CT6031/192 and CT5836/133, Playford Highway in the Hundred of Seddon. The site is situated in the centre of Kangaroo Island at approximately 150m elevation above sea level. The site is geologically affected by seasonal groundwater movement, which runs into the first order branch of 'Capsize Creek' north of Parndana township.

The Scheme receives primary treated water from the STEDS type network and comprises only a final stage chlorination plant and facultative and storage lagoons which provide for further natural UV treatment and settlement of stored wastewater.

American River:

The American River CWMS Lagoons are located at Lot 3 DP78106, CT6021/191, Redbanks Road in the Hundred of Haines. The site is situated at approximately 90m elevation above sea level. The site does not encounter groundwater movement. No Leak detection is installed at this site.

The Scheme receives sewerage and effluent from the American River CWMS, which is primarily a full sewer scheme, although it has one isolated area (<50 allotments exist, with little likelihood of further re-division at the time of writing) which are serviced by STEDS type network.

The scheme comprises primary full sewerage treatment facility with chlorination plant and with treatment and storage lagoons. American River township is not currently serviced by reticulated mains water supplies and therefore the plant does not receive or retain high volumes of wastewater.

Penneshaw:

The Penneshaw CWMS Lagoons are located at Lot 8 DP111399, CT6177/506, Government Road, Accessed via Binney's Track in the Hundred of Dudley. The site is situated at approximately 160m elevation above sea level. The site does not encounter groundwater movement.

The Scheme will receive sewerage and effluent from the Penneshaw CWMS, which is a dedicated full sewer scheme. The scheme is approaching commissioning in late 2016.

Location plans and details and detailed site plans delineating critical features of the scheme including plant, storage, and testing / monitoring points are set out in the various appendices for each CWMS site.

1.2 Background

The method for which effluent is to be disposed of within a community is dependent on a number of factors. The permeability of the soil is particularly influential as soakage effluent disposal systems rely on the soils ability to absorb the effluent. Therefore if the effluent is not adequately absorbed then runoff will occur. This runoff has the potential to pollute water ways and generally create unhygienic conditions.

Kangaroo Island soils have low permeability. To avoid possible ground water pollution Septic Tank Effluent Disposal Scheme (STEDS) have been established for Council's CWMS in the townships of Kingscote and Parndana with more modern hybrid pressure / gravity sewer type CWMS established in American River and Penneshaw.

STEDS type schemes provide a means of disposing on-site treated effluent via a system of gravity drains that connect to the overflow of individual septic tanks within each property and carry the effluent water to a common treatment and disposal facility.

The full sewer type CWMS dispose of all liquid and solid wastes from properties without the waste being treated by on-site septic tank. The Sewer CWMS collect all untreated effluent via combinations of gravity drainage and pressurised (property pumped) systems into CWMS infrastructure, carrying sewerage to a common treatment and disposal facility.

The CWMS drainage networks typically consists of a system of gravity mains and rising mains that pump effluent via pumping stations located throughout the system. The effluent ultimately feeds into the scheme's treatment system where it is treated, stored and then distributed to appropriate irrigation areas.

1.3 Purpose

The purpose of this document is to establish the environmental management measures required including providing adequate information to Council to for the ongoing water quality management of its CWMS on Kangaroo Island. The

plan stipulates the locations, methodology and frequency in which water quality monitoring should take place. The adherence to this plan will also ensure Council is meeting relevant EPA and DH guidelines where applicable. As such this document should be read by all staff involved with the management and operation of Council's CWMS schemes.

2 WATER QUALITY MONITORING

Water quality monitoring is to be carried out by suitably qualified personnel provided with appropriate tools and equipment and personal protective equipment (e.g. disposable gloves, closed shoes, protective glasses etc). Sampling should be carried out in accordance with AS/ NZS 5667.

Sample analyses must be done by NATA accredited professionals. In South Australia, this includes the Australian Water Quality Centre, the Institute of Medical and Veterinary Science, and the Australian Government Analytical Laboratories.

Sample sizes shall be taken as required by the accredited testing authority for each sample type to ensure adequate sample is collected for analysis. All samples will be collected, sealed and labelled as required by the testing authority.

2.1 Factors Influencing Water Sampling

At certain times, environmental factors affect Council's ability to take water samples, particularly from the peripheral groundwater monitoring bores, these include:

-) Inundation – preventing access to groundwater bores and effectively compromising groundwater samples as surface water from inundation permeates more readily and enters the bores from the bore tubes. In these cases, samples cannot be reasonably collected and will not be provided for analysis as a result of site inundation and will be recorded accordingly with the sample analytics.
-) Dry Periods – where a lesser quantity of water is available from the bores that is normally required by the testing authority. In these cases, the maximum amount of water possible will be extracted from the bore and distributed in the required samples for analysis, notwithstanding their reduced volumes.
-) Dry Bores – many of the bores surrounding the CWMS lagoons at Parndana, American River and Penneshaw do not (or do not regularly) intercept the ground water plane. In these cases, the testing authority will be appropriately advised that there is no sample available as a result of the dry bore and will be recorded accordingly with the sample analytics.

2.2 Transportation of Samples for Analysis

Due to the physical isolation of Kangaroo Island from the Mainland of South Australia, the capacity for Council to immediately convey water samples for analysis to an accredited NATA facility, is not readily available. Kangaroo Island's Health Service and water supply utility services also require frequent water testing to be undertaken. Therefore Council will utilise the most economical and reliable services possible to convey the waste water samples for analysis.

Currently Council provides its water samples to SA Water Kangaroo Island, in accordance with the testing facilities temperature control and handling requirements, for transport to the SA Water Quality Centre, Adelaide.

2.3 Raw Effluent

Raw effluent samples will be analysed to determine the Biochemical Oxygen Demand (BOD) and Suspended Solids (SS). This sampling is undertaken at the collection system prior to entering the inlet of the treatment system (Refer to Appendix A to D for sampling locations). Sampling should be done on a quarterly basis. These samples should be taken at approximately the same time of the day. This helps to create consistency within the sampling. Also the person undertaking the sampling should be recorded.

The procedures outlined in Table 1 should be observed whilst sampling effluent for Biochemical Oxygen Demand (BOD):

Table 1 - Sampling Procedures for BOD

Sample volume	1L (or as required by the testing authority)
Type of sampling container	Plastic or glass bottle Only pre-cleaned bottles should be used (preferably obtained from analysing laboratory)
Collection technique	Do not pre rinse bottle with sample Direct collection of sample into bottle Fill bottle completely to the top to exclude air Sample must be free of air bubbles
Sample holding time and storage	Refrigerate at 1 - 4°C and store in the dark Do not freeze Sample can be held for up to 24hrs if refrigerated

The procedures outlined in Table 2 should be observed whilst sampling effluent for Suspended Solids (SS):

Table 2 - Sampling Procedures for SS

Sample volume	1L (or as required by the testing authority)
Type of sampling container	Plastic bottle Only pre-cleaned bottles should be used (preferably obtained from analysing laboratory)
Collection technique	Pre rinse bottle with sample water 3 times before collection Direct collection of sample into bottle Fill bottle up to the shoulder Avoid excessive turbulence whilst filling to minimise presence of air Sample must be free of air bubbles
Sample holding time and storage	Refrigerate at 1 - 4°C and store in the dark Do not freeze Sample can be held for up to 24hrs if refrigerated

2.4 Treated Effluent

Sampling and analysis of treated effluent will enable to determine if the established treatment system is working effectively to produce the required water quality as stipulated by the relevant DH and EPA guidelines. Samples are to be collected and analysed quarterly from the outlet of the treatment system prior to entering any storage systems (Refer to Appendix A to D for sampling locations).

As an absolute, treated effluent will need to be sampled and analysed for BOD, SS and *Escherichia coli*. Once again the individual responsible for the sampling should be recorded.

The sampling procedures stipulated in Table 1 and 2 will need to be observed whilst sampling treated effluent for BOD and SS respectively.

The procedures outlined in Table 3 should be observed whilst sampling treated effluent for *E. coli*:

Table 3 - Sampling Procedures for *E. coli*

Sample volume	100ml (or as required by the testing authority)
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Type of sampling container	Sterilised plastic or glass bottle Only pre-sterilised (preferably by means of autoclaving) bottles should be used (preferably obtained from analysing laboratory)
Collection technique	Keep pre-sterilised bottles closed until ready to collect samples Carefully remove cap and do not touch or contaminate inner surface of cap or bottle Do not pre rinse bottle with sample Direct collection of sample into bottle Fill to below shoulder of bottle to facilitate mixing by shaking Replace cap immediately
Sample holding time and storage	Refrigerate at 1 - 4°C and store in the dark Do not freeze Sample can be held for up to 24hrs if refrigerated

2.5 Other Desirable Analysis for Treated Effluent

It is desirable for the following parameters to also be measured quarterly at the outlet of the treatment system in order to determine the functionality of the treatment system:

-) Conductivity
-) pH TDS
-) Total Phosphorous as P
-) Total Kjeldhal Nitrogen (TKN) as N
-) Nitrate and Nitrite as N

Conductivity, pH and TDS are parameters that can be easily tested in the field using portable meters. However in the absence of field monitoring equipment, the sampling procedures in Table 4 to Table 6 will need to be observed.

The procedures outlined in Table 4 should be observed whilst sampling treated effluent for pH:

Table 4 - Sampling Procedures for pH

Sample volume	125ml (or as required by the testing authority)
Type of sampling container	Plastic bottle Bottle cap must have a Teflon liner Use new pre-cleaned bottles
Collection technique	Direct collection into sample bottle Ensure sample Bottle is pre-rinsed three times with sample water before final collection. Excessive turbulence should be avoided to minimise presence of air bubbles Fill container completely to the top The sample must be free of air bubbles.
Sample holding time and storage	Refrigerate at 1 - 4°C and store in the dark Do not freeze Sample can be held for up to 6hrs if refrigerated

The procedures outlined in Table 5 should be observed whilst sampling treated effluent for Total Dissolved Solids (TDS):

Table 5 - Sampling Procedures for TDS

Sample volume	100ml (or as required by the testing authority)
Type of sampling container	Plastic bottle Bottle cap must have a Teflon liner Use new pre-cleaned bottles
Collection technique	Direct collection into sample bottle Ensure sample Bottle is pre-rinsed three times with sample water before final collection. Excessive turbulence should be avoided to minimise presence of air bubbles Fill container completely to the top The sample must be free of air bubbles.
Sample holding time and storage	Refrigerate at 1 - 4°C and store in the dark Do not freeze Sample can be held for up to 24hrs if refrigerated

The procedures outlined in Table 6 should be observed whilst sampling treated effluent for Conductivity:

Table 6 - Sampling Procedures for Conductivity

Sample volume	125ml (or as required by the testing authority)
Type of sampling container	Plastic bottle Bottle cap must have a Teflon liner Use new pre-cleaned bottles
Collection technique	Direct collection into sample bottle Ensure sample bottle is pre-rinsed three times with sample water before final collection Direct collection into sample bottle Excessive turbulence should be avoided to minimise presence of air bubbles Fill container completely to the top to exclude air. The sample must be free of air bubbles
Sample holding time and storage	Refrigerate at 1 - 4°C and store in the dark Do not freeze Sample can be held for up to 24hrs if refrigerated

The procedures outlined in Table 7 should be observed whilst sampling treated effluent for Total Phosphorous:

Table 7 - Sampling Procedures for Total Phosphorous

Sample volume	200ml (or as required by the testing authority)
Type of sampling container	Plastic bottle Use new pre-cleaned bottles
Collection technique	Direct collection into sample bottle Ensure sample bottle is pre-rinsed three times with sample water before final collection Fill just below the shoulder of the bottle
Sample holding time and storage	Refrigerate at 1 - 4°C and store in the dark Do not freeze Sample can be held for up to 24hrs if refrigerated

The procedures outlined in Table 8 should be observed whilst sampling treated effluent for TKN:

Table 8 - Sampling Procedures for TKN

Sample volume	200ml (or as required by the testing authority)
Type of sampling container	Plastic bottle Use new pre-cleaned bottles
Collection technique	Direct collection into sample bottle Ensure sample bottle is pre-rinsed three times with sample water before final collection Fill just below the shoulder of the bottle
Sample holding time and storage	Refrigerate at 1 - 4°C and store in the dark Do not freeze Sample can be held for up to 24hrs if refrigerated

The procedures outlined in Table 9 should be observed whilst sampling treated effluent for Nitrate and Nitrite as N:

Table 9 - Sampling Procedures for Nitrate and Nitrite as N

Sample volume	125ml (or as required by the testing authority)
Type of sampling container	Plastic bottle Use new pre-cleaned bottles
Collection technique	Direct collection into sample bottle Ensure sample bottle is pre-rinsed three times with sample water before final collection Fill just below the shoulder of the bottle
Sample holding time and storage	Refrigerate at 1 - 4°C and store in the dark Do not freeze Sample can be held for up to 24hrs if refrigerated

The following table indicates how the above data can be presented.

	Date:	Sampled by:	Sample Site No:
Parameter	Results		
BOD (mg/L)			
SS (mg/L)			
E.Coli (cfu/100ml)			
pH			
TDS (mg/L)			
Conductivity (µs/cm)			
Phosphorous Total as P (mg/L)			
Total Kjeldahl Nitrogen as N (mg/L)			
Nitrate and Nitrite as N (mg/L)			

2.6 Recycled Water

Recycled water should be sampled for BOD, SS and *E. coli* and total chlorine as a minimum to ensure their levels are within the guidelines required for the specific irrigation purpose. For example, if recycled water is used for restricted

irrigation (common practice by Council), then the levels of BOD, SS and *E. coli* total chlorine should be as follows as stipulated in the South Australian Reclaimed Water Guidelines:

-) BOD5 < 20 mg/L
-) SS < 30 mg/L
-) *E. coli*/100mL < 100
-) Total Chlorine ≥ 1mg/L

Recycled water samples should be collected post chlorination (Refer to Appendix A to D for sampling locations). Samples should be collected quarterly.

The sampling procedures stipulated in Tables 1, 2 and 3 will need to be observed whilst sampling recycled water for BOD, SS and *E. coli* and total chlorine.

The following table indicates how the above data can be presented.

	Date:	Sampled by:	Sample Site No:
Parameter	Results		
BOD (mg/L)			
SS (mg/L)			
E.Coli (cfu/100ml)			
Total Chlorine (mg/L)			

3 IRRIGATION SYSTEM MONITORING

Irrigation of recycled waste water to land is recorded by Kangaroo Island Council from each CWMS to each irrigation point. Due to the comparatively small CWMS schemes, the volumes of wastewater irrigated to land are substantially small as figures show:

Average rates of irrigation from CWMS (figures at 2015)

Locality	Site	Avg. Annual Volume Irrigated (ML) (@ 2015)	Area Irrigated (m ²)	Avg. Irrigation Rate (@ 2015)
Kingscote	Kct Golf Course	30	120,000 m ²	250 L/m ²
Kingscote	KI Horse Racing Course	11	24,000 m ²	458 L/m ²
Kingscote	Centre Pivot	35	77,000 m ²	454 L/m ²
Parndana	Sports Club Oval	0.006	19,000 m ²	0.3 L/m ²
American River	Sports Club Oval	<0.001 - Not Enough Recycled Wastewater Availability	16,000 m ²	<0.06 L/m ²
Penneshaw	Dedicated Scheme Disposal Area	n/a - Not Yet Commissioned	60,000 m ²	-

3.1 Groundwater Monitoring at Irrigation Sites

If a wastewater Irrigation Management Plan (IMP) has been established under license requirements of EPA, refer to the individual IMPs for the detailed requirements for groundwater monitoring at each site.

Subject to the low irrigation rates at its CWMS irrigation sites, only in the event that conditions at the irrigation sites gives rise to any environmental concerns, i.e. where waterlogging of the ground occurs, damaged or leaking pipework or irrigation system, or occurrence of isolated ponding or subsidence, giving rise to concern of exposure to health risks borne from the use of recycled water, Council will undertake monitoring of these sites.

Where recycled water is used by other parties whether under contract, or other arrangement, the owner or operator of the irrigation systems shall be responsible for ensuring that only sustainable levels of irrigation occur to avoid any risks to public or environmental health and that the infrastructure used in the process of irrigation functions appropriately to the requirements and is maintained in appropriate order.

Recycled wastewater management is advised to SA Department of Health within the Recycled Wastewater Management Plan (RWMP) and is a requisite to submit to DH on a yearly basis.

3.2 Soil Testing

If a wastewater Irrigation Management Plan (IMP) has been established under license requirements of EPA, refer to the individual IMPs for the detailed assessment of the soil conditions at each site.

Where there is no IMP, or the IMP does not stipulate any regular soil testing that needs to be done at each irrigation site, then only in the event that conditions at the irrigation sites gives rise to any environmental concerns, as mentioned above, Council will undertake monitoring of these sites.

3.3 Flow

Infrastructure monitoring including pump station operation, flow rates, pump hours as well as pump mechanics and maintenance are performed regularly by Council's CWMS Operator to ensure that all aspects of plant and equipment are operationally sound and the continuous operational demands upon the scheme are managed.

Continued and increased demands upon the scheme are considered in consultation with Council's engineers to ensure continuity of service, appropriate levels of redundancy in equipment and fixed infrastructure serviceability, and operational longevity are provided for in design and construction of the Scheme and its upgrades and extensions.

It is necessary to record the performance of CWMS infrastructure to ensure that Council is able to react to adapt the scheme's requirements where necessary and in advance of operational limits of the scheme being exceeded.

3.3.1 Pump Station Flows

Metered flows from each pump station and the total flow into the treatment system should be recorded on a monthly basis.

3.3.2 Treatment Plant Flows

Flow rates may be measured by a flow meter located at the treatment facilities. A template for recording of flows is given in Table 10.

Table 10 – Treatment Plant Flow Records

Month	Properties Connected	Estimated Population	Per Capita Flow	Total Flow	Total Flow Metres
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					

3.3.3 Irrigation Flows

Outflows from the storage ponds to the irrigation site are measured by the flow meter located at the irrigation pump stations. Data shall be recorded on an annual basis where required. A template for data presentation is given in Table 11.

Table 11 – Irrigation Flows

Month	Flow Meter Reading	Monthly Outflow	Monthly Inflow (Flow Meter at Treatment Plant)
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

4 LAGOON MONITORING

Sampling of leak detection bores or sumps around treatment and storage lagoons is required to ensure there is no leakage and potential contamination to the groundwater.

The parameters and method for sampling stipulated in Section 3.1 – Groundwater Monitoring should be incorporated here. Samples from leak detection bores or sumps should be collected and tested for on a half yearly basis.

4.1 Leak Detection

Kingscote:

Kingscote CWMS Lagoons are situated in an environment where the leak detection and groundwater monitoring bores are affected by tidal influence from nearby Nepean Bay. It is acknowledged per advice from the SA EPA that alternative water tests, i.e. *estrogen* or *caffeine* may provide an appropriate marker for wastewater leakage which would be detectable in addition to normal testing, where *E coli* may be present in ground water.

Parndana:

Parndana's leak detection pit, though seasonally dependant, intercepts ground water.

American River:

No leak detection system has been installed at American River CWMS Lagoons, which has been acknowledged by the South Australian Environment Protection Authority.

Penneshaw:

Leak detection has been established for the Penneshaw CWMS lagoons. During the May to December 2015 prior to commencement of construction of the lagoons a groundwater bore was installed and monitored at least weekly, without recording ground water.

Leak detection will be sampled for *E. coli*, pH and Conductivity, as well as any other specific test to identify lagoon leakage. The sampling procedures stipulated in Tables 1 to 9, will need to be observed whilst sampling recycled water for BOD, SS, *E. coli*, pH and Conductivity testing.

4.2 Groundwater Bore Monitoring

Prior to collecting groundwater samples, the bores will need to be purged as latent water that has been standing in the casing can be different, both physically and chemically, from the aquifer water. Purging introduces fresh groundwater into the bore that is representative of the aquifer (or geological unit). Bores at each location are marked accordingly to reflect the positions as shown on the site plans (refer Appendix A-C) for easy identification during sampling.

5 OTHER MONITORING & MAINTENANCE

5.1 Lagoon Lining Integrity

Detection of lagoon leakage can be undertaken using a number of methods including geoelectrical integrity testing i.e. current leakage detection processes and / or combination of geoelectrical testing, groundwater monitoring and water balances.

Kangaroo Island's CWMS lagoons are typically geomembrane lined with HDPE membranes installed (with the exception of the north-western most (storage) lagoon) at Kingscote, which remains an earthen rock armoured lagoon.

The Kingscote CWMS lagoons leak detection and groundwater monitoring bores encounter groundwater, both from rainwater soakage and migration and tidal influence from nearby Nepean Bay, which makes the leak detection and groundwater testing somewhat inconclusive due to the nature of groundwater movements and its characteristics.

At the time of writing, the use of geoelectrical testing is considered to be un-reasonably cost prohibitive due to accessibility this technology and cost of delivering the technicians and service to Kangaroo Island to perform testing of one scheme. Accordingly liner integrity testing is not proposed at this time.

NATA Accredited laboratories have been consulted with regard to appropriate means of groundwater leak detection for Kingscote CWMS with consideration of the specific influences affecting the site. Advice suggests that infrequent human only HST testing is capable of providing conclusive, semi-quantitative result with human faecal contamination range of High, Medium or Low.

5.2 Septage and Biosolids

In accordance with the Council's Kangaroo Island Waste Resource Recovery Centre (KIWRRC) Environmental Management Plan, Bio-Solids handling, processing and disposal, septage and management is to be undertaken by Council and private contractors at a frequency that is determined according to the Council's strategy and in accordance with EPA License and relevant guidelines.

It is required that a summary of the collection, processing and disposal of the bio-solids is collected and submitted annually to the EPA. The following table outlines the information that is required and how it could be presented.

6 REPORTING

Reporting shall be undertaken in accordance with the requirements of the South Australian Department of Health and South Australian Environment Protection Authority as required by their relevant licenses from each authority.

Reporting for both agencies is to occur on or before 30 September each year and will include the quarterly water sampling analysis results from the July – September (qtr. 1) October – December (qtr.2) through until January – March (qtr.3) and April – June (qtr. 4) in the following year.

Results will be considered against previous reporting with any anomalies identified and justified where possible, with a view to identifying reasonably obtainable improvements to the performance of the scheme(s).

KINGSCOTE CWMS MONITORING

Table 1 - Raw Effluent:

Site No	Site Description	Site Location
KRE001	Decant from Induct to treatment plant (when water in settled, not agitated)	Refer to Appendix A Figure 1, W&G Kingscote Lagoon Upgrade Plan C060754- C02

Table 2 - Treated Effluent:

Site No	Site Description	Site Location
KTE001	WWTP outlet/ decant line to storage lagoons	Refer to Appendix A Figure 1, W&G Kingscote Lagoon Upgrade Plan C060754- C02

Table 3 - Recycled Water:

Site No	Site Description	Site Location
KRW001	CWMS Plant pump outlet (must be post chlorination)	Refer to Appendix A Figure 1, W&G Kingscote Lagoon Upgrade Plan C060754- C02

Table 4 - Irrigation System Groundwater Monitoring:

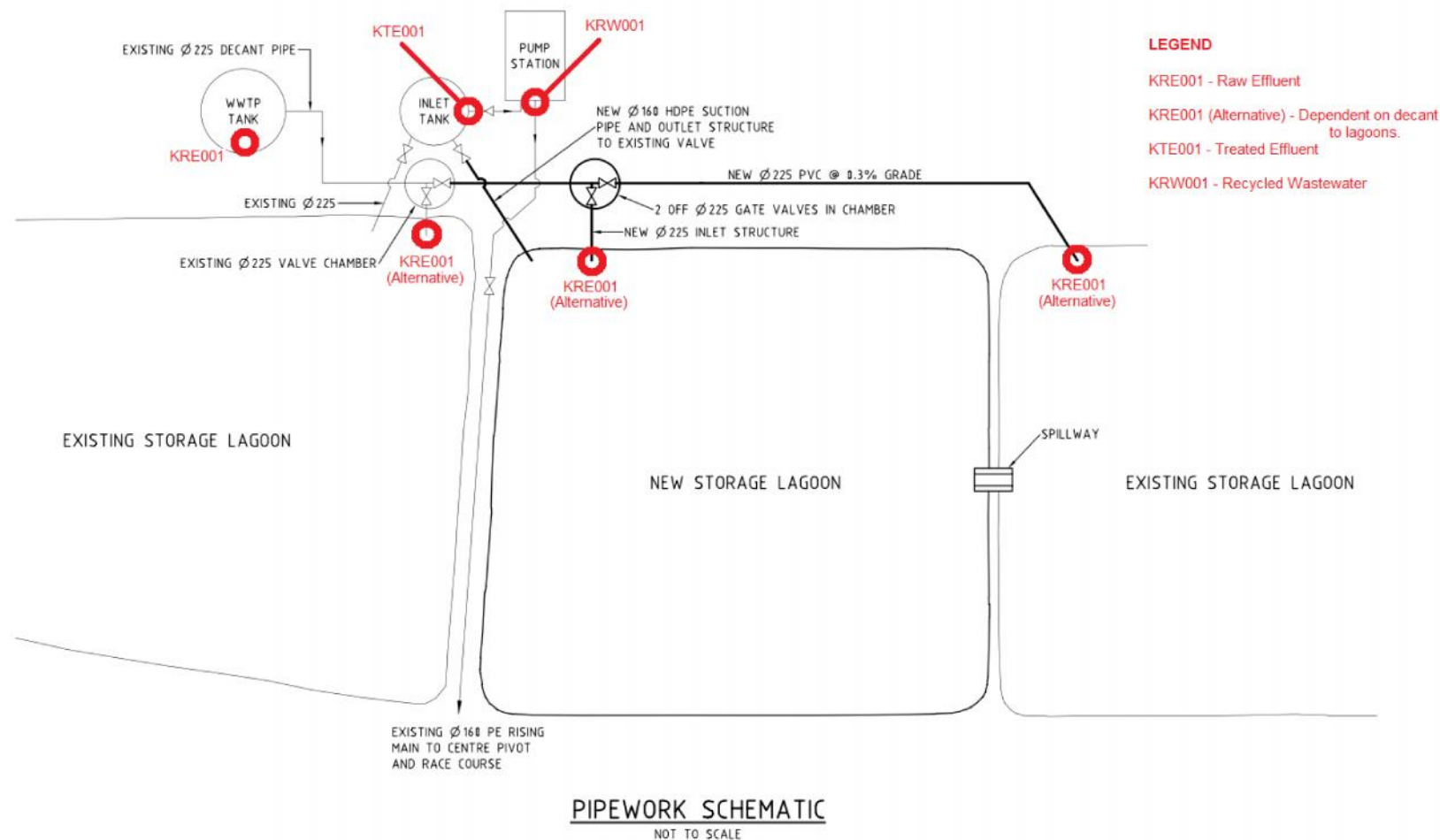
Site No	Site Description	Site Location
KGW001	Groundwater monitoring well K1	Refer to Appendix A Figure 2 Groundwater bore locations - Mercater CWMS Plans
KGW002	Groundwater monitoring well K2	
KGW003	Groundwater monitoring well K3	
KGW004	Groundwater monitoring well K4	
KGW005	Groundwater monitoring well K5	
KGW006	Groundwater monitoring well K6	

Table 5 - Groundwater Leak Detection Monitoring:

Site No	Site Description	Site Location
KLGW001	Leak detection bore/ sump at storage lagoon site	Refer to Appendix A Figure 3, Kingscote Lagoon Upgrade C060754-C01

Appendix A

Figure 1 – Kingscote CWMS Sampling Points for WWTP.
W&G Kingscote Lagoon Upgrade Plan C060754- C02












REV.	DATE	DESCRIPTION	DRAFT	ENG.	CHKD	<div><div>W&G</div><div>WALLBRIDGE & GILBERT</div><div>Consulting Engineers</div><div>60 Wyatt Street Adelaide South Australia 5000</div><div>Telephone (08) 8223 7433 Facsimile (08) 8232 0967</div><div>Email adelaide@wgeng.com</div><div>W&G Engineers Pty Ltd ACN 052 528 926</div><div>trading as Wallbridge & Gilbert</div></div>	<div><div>KINGSCOTE LAGOON UPGRADE</div><div>KANGAROO ISLAND COUNCIL, S.A.</div><div>DETAILS</div><div>A1</div><div>Design MJW Drawn LHB</div></div>	<div><div>DRAWING NUMBER</div><div>Job Number Sheet No. Rev.</div><div>C060754 C02</div></div>		
A	19.10.09	TENDER ISSUE	LHB	MJW	NJS					
Ø	13.01.2010	CONSTRUCTION ISSUE	JPF	MJW	NJS					

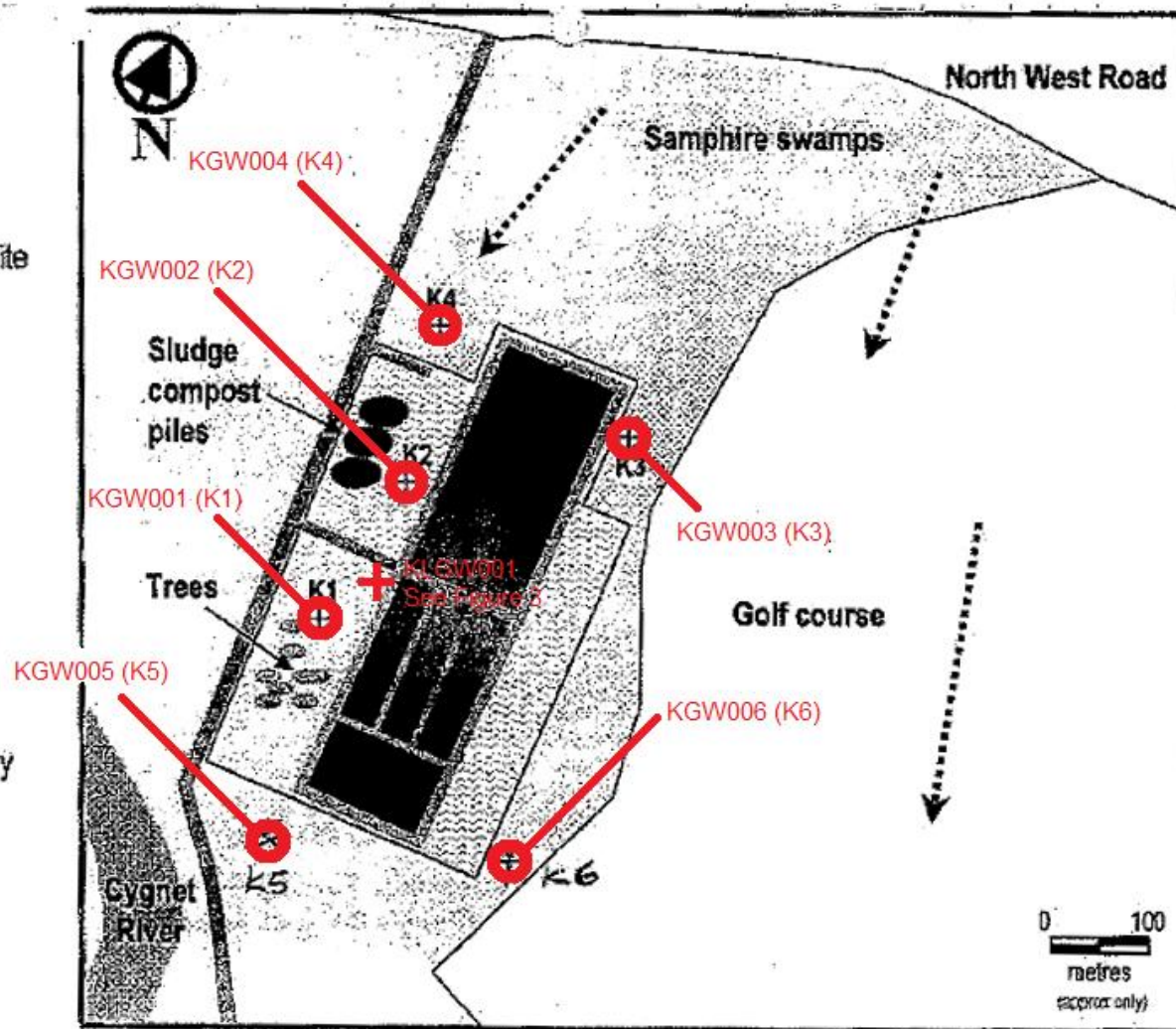
Appendix A

Figure 2 – Kingscote Groundwater Monitoring Bores.

Mercater CWMS Plans

LEGEND

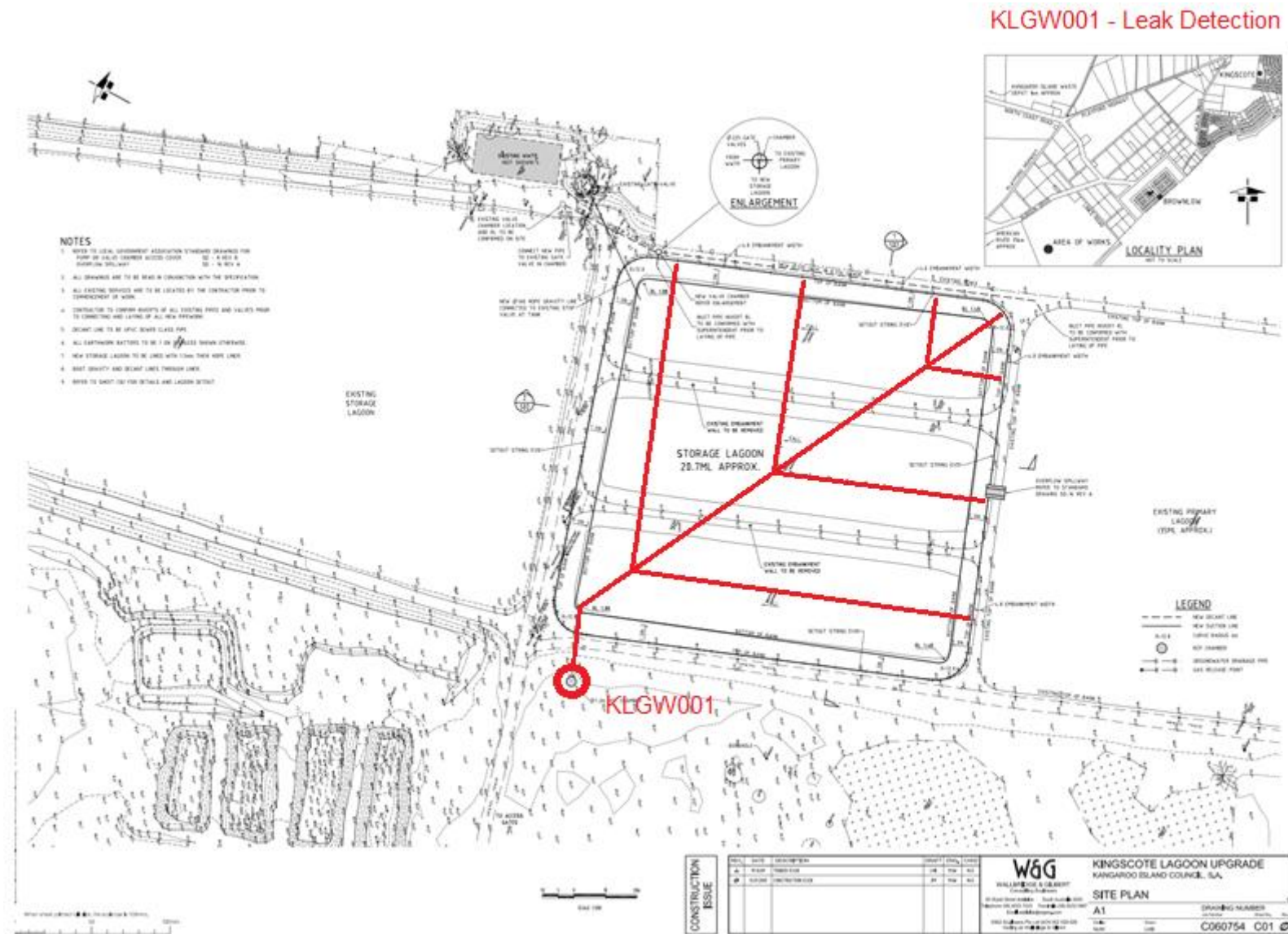
- K1  Location of groundwater monitoring well
-  Extent of fenced STEDS site
-  STEDS Lagoon
-  Access road
-  Lagoon walls
-  River
-  Samphire swamps/ estuary
-  Golf course
-  Direction of groundwater flow (inferred)



LEGEND

- KGW001 - Groundwater Bore 1
- KGW002 - Groundwater Bore 2
- KGW003 - Groundwater Bore 3
- KGW004 - Groundwater Bore 4
- KGW005 - Groundwater Bore 5
- KGW006 - Groundwater Bore 6

W&G CWMS Plan – C060754-C01



Appendix A

Figure 4 – Kingscote CWMS Sampling Points



APPENDIX B

PARNDANA CWMS MONITORING

Table 1 - Raw Effluent:

Site No	Site Description	Site Location
PRE001	Preferably from Manhole before lagoon site on Playford Highway, alternatively at inlet of lagoon.	Refer to W&G Parndana CWMS Upgrade C060235- C01-B

Table 2 - Treated Effluent:

Site No	Site Description	Site Location
PTE001	Storage lagoon (before chlorination).	Refer to W&G Parndana CWMS Upgrade C060235- C01-B

Table 3 - Recycled Water:

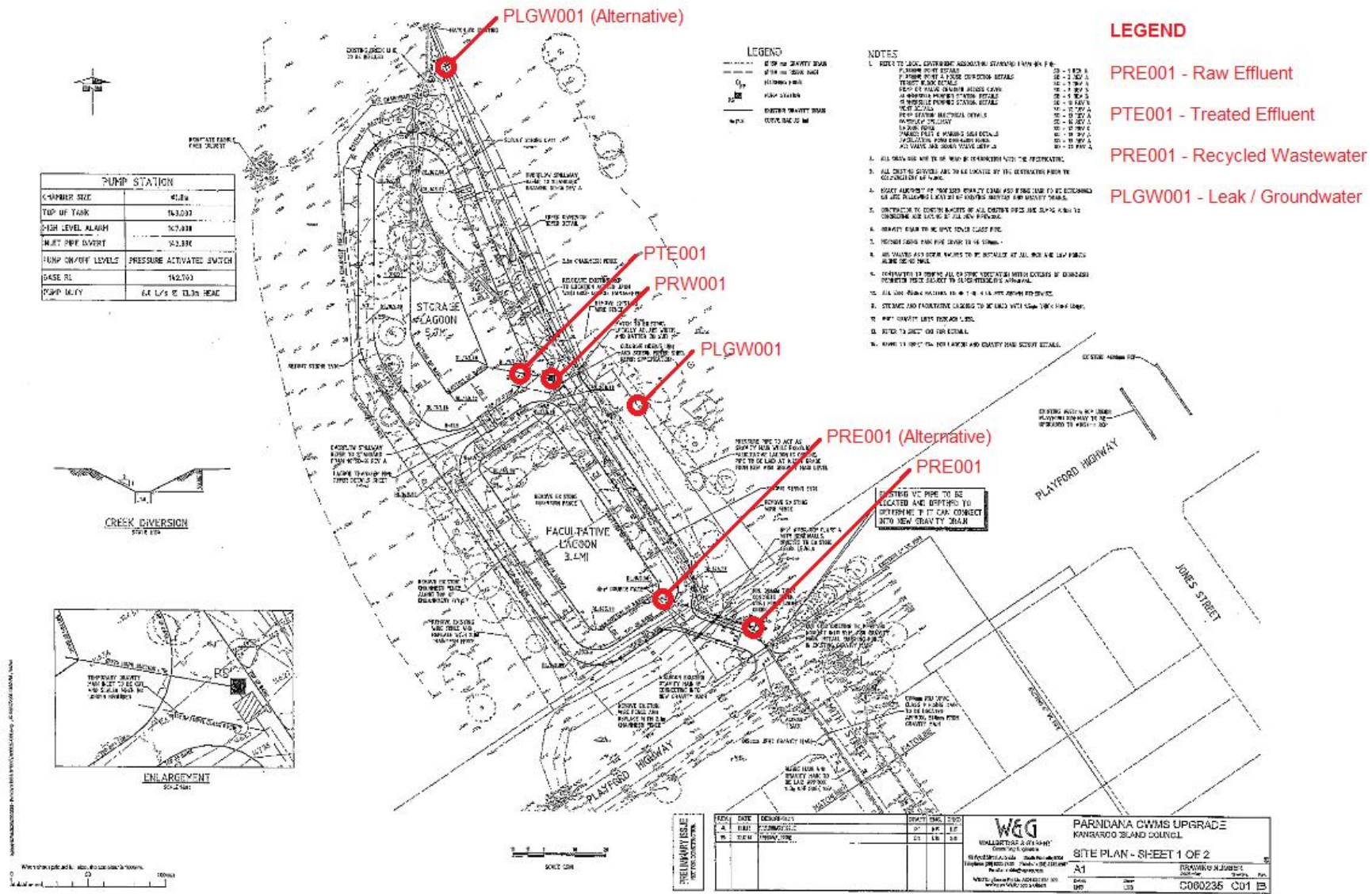
Site No	Site Description	Site Location
PRW001	Irrigation pump station outlet (post chlorination).	Refer to W&G Parndana CWMS Upgrade C060235- C01-B

Table 4 - Lagoon Leak Detection Monitoring:

Site No	Site Description	Site Location
PLGW001	Leak detection bores adjacent to facultative and storage lagoon sites.	Refer to W&G Parndana CWMS Upgrade C060235- C01-B

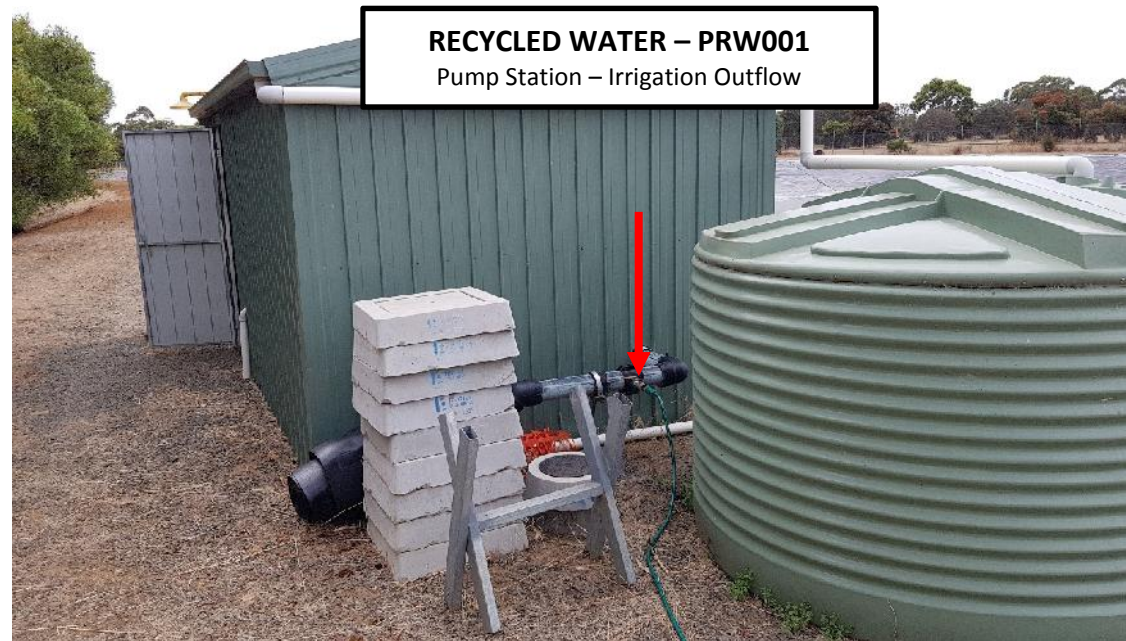
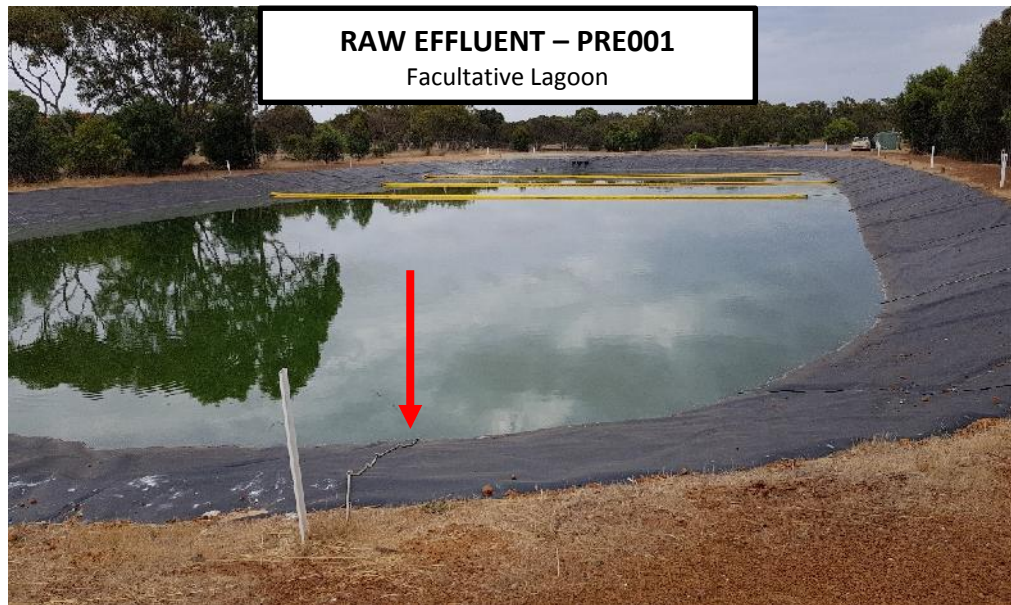
Appendix B

Figure 1 – Parndana CWMS Lagoon Site - Testing Points.
W&G CWMS Upgrade Plan C 060235 C01



Appendix B

Figure 2 – Parndana CWMS Sampling Points



APPENDIX C

AMERICAN RIVER CWMS MONITORING

Table 1 - Raw Effluent:

Site No	Site Description	Site Location
ARRE001	Inlet to CWMS treatment Plant or Storage lagoon.	Refer to drawing Figure 1, American River CWMS Plan

Table 2 - Treated Effluent:

Site No	Site Description	Site Location
ARTE001	WWTP settlement tank.	Refer to drawing Figure 1, American River CWMS Plan

Table 3 - Recycled Water:

Site No	Site Description	Site Location
ARRW001	Irrigation pump station outlet (post chlorination).	Refer to drawing Figure 1, American River CWMS Plan

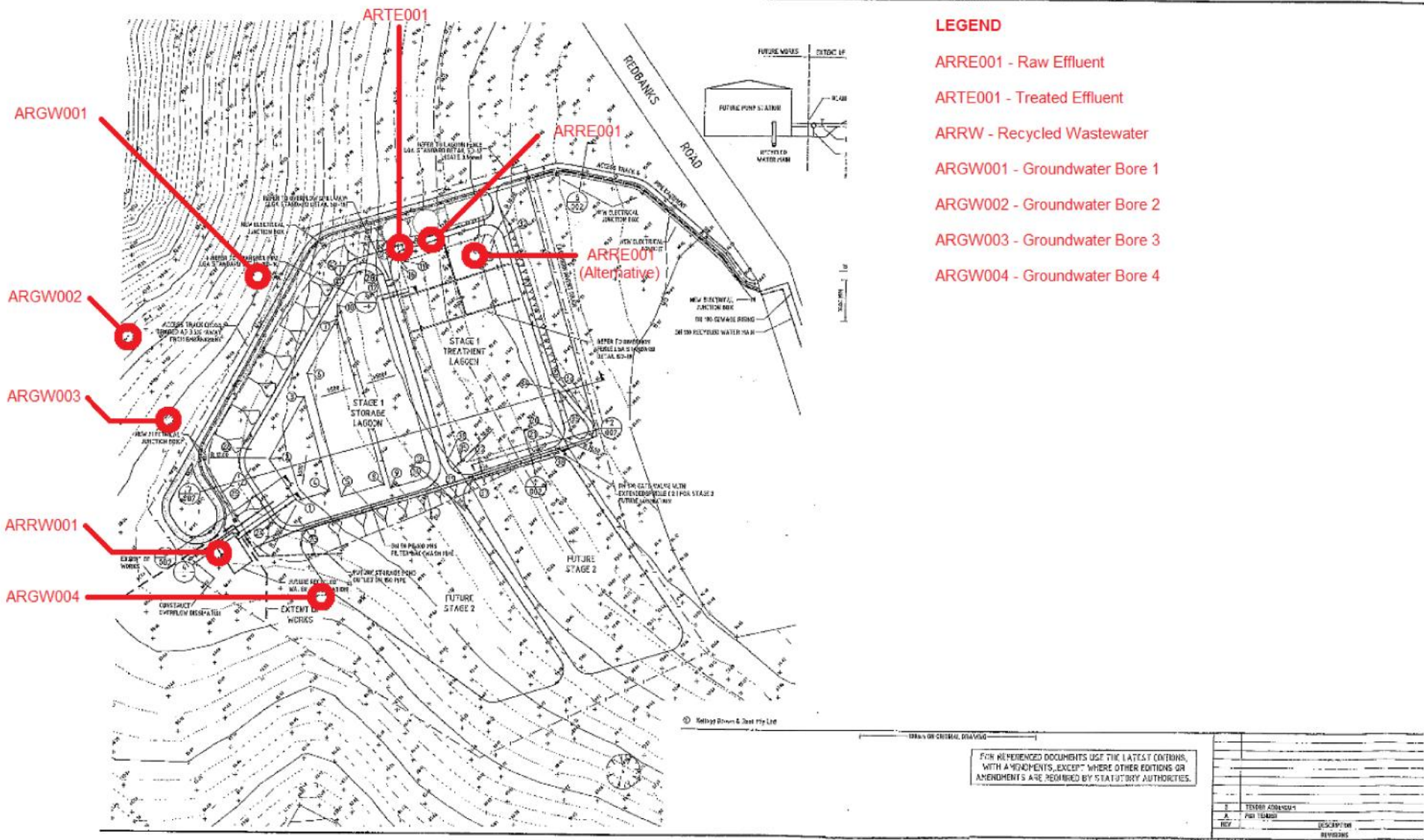
Table 4 - Irrigation System Ground Water Monitoring:

Site No	Site Description	Site Location
ARGW001	Groundwater monitoring well AR1.	Refer to drawing Figure 1, American River CWMS Plan
ARGW002	Groundwater monitoring well AR2.	
ARGW003	Groundwater monitoring well AR3.	
ARGW004	Groundwater monitoring well AR4.	

Appendix C

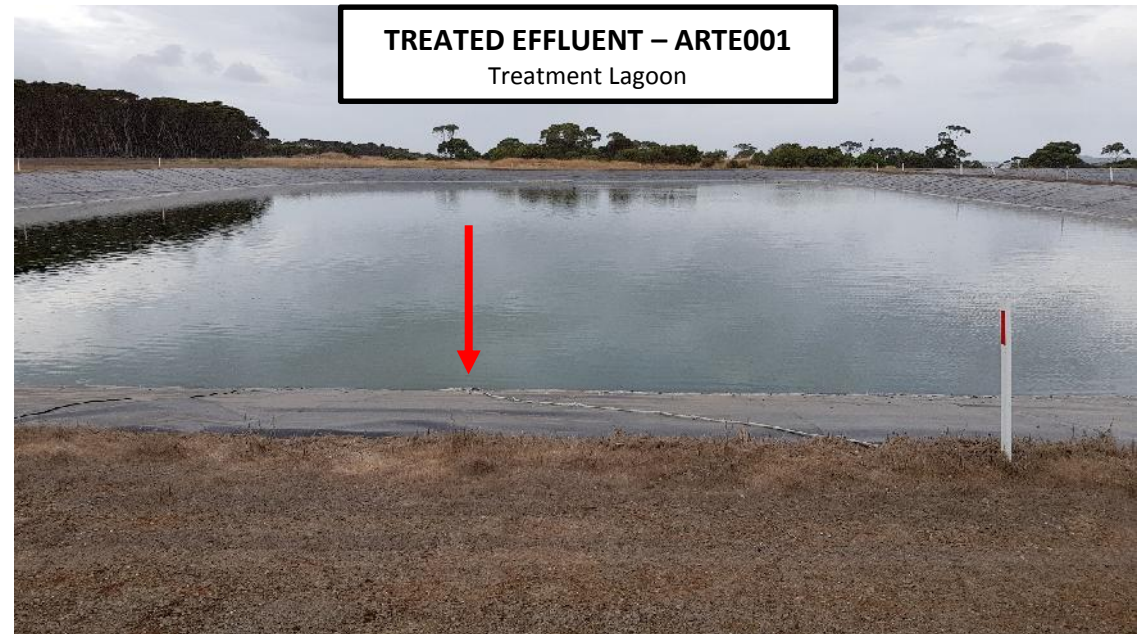
Figure 1 – American River CWMS Lagoon Site - Testing Points.

American River CWMS Plan



Appendix C

Figure 2 – American River CWMS Sampling Points



APPENDIX D

PENNESHAW CWMS MONITORING

Table 1 - Raw Effluent:

Site No	Site Description	Site Location
PENRE001	Inflow tank (first tank, next to aerator tank).	Refer to drawing Figure 1, Penneshaw CWMS Plan

Table 2 - Treated Effluent:

Site No	Site Description	Site Location
PENTE001	Far end of storage lagoon, sample point nearest to tanks.	Refer to drawing Figure 1, Penneshaw CWMS Plan

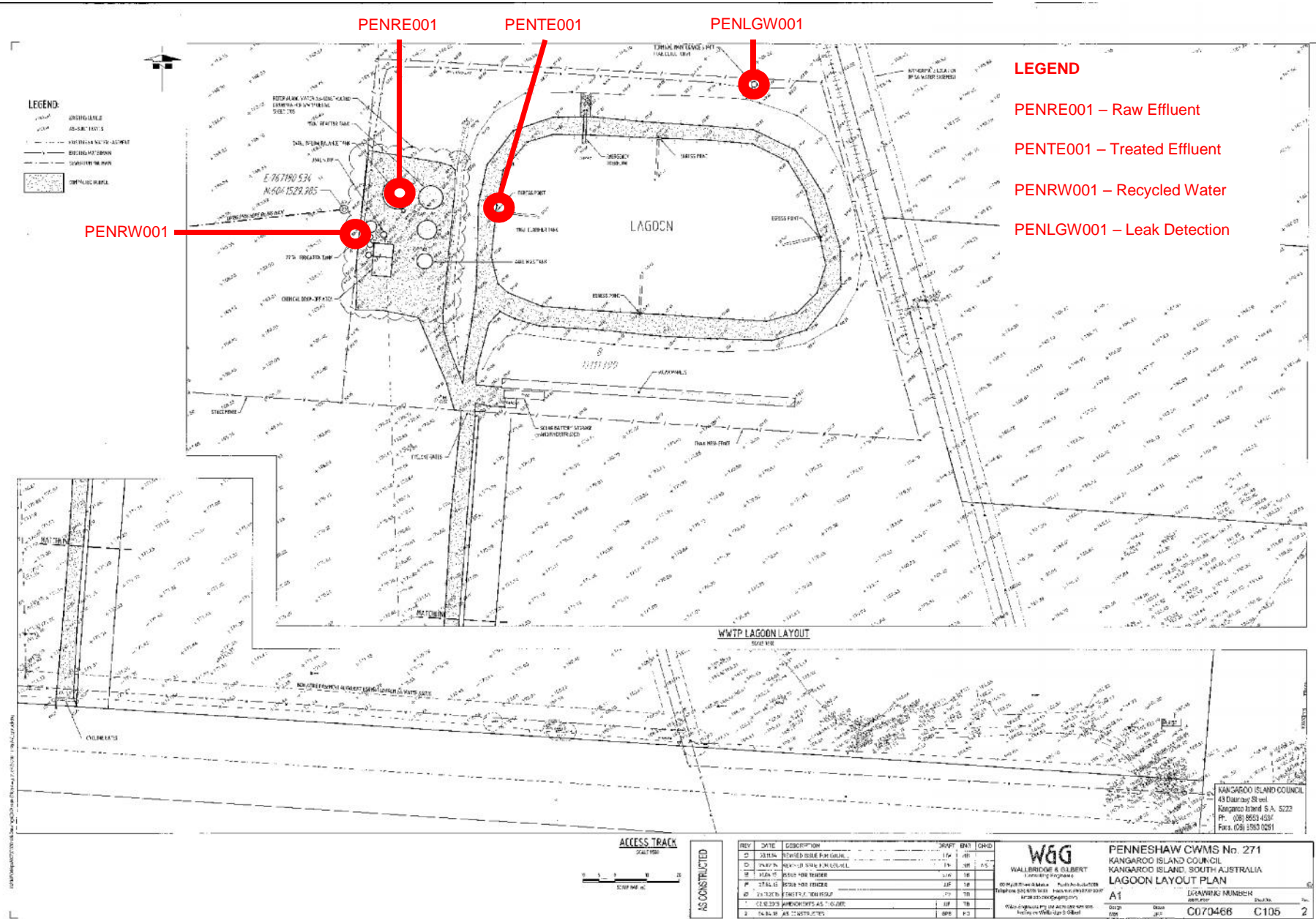
Table 3 - Recycled Water:

Site No	Site Description	Site Location
PENRW001	Tap between chlorine contact and irrigation storage tanks.	Refer to drawing Figure 1, Penneshaw CWMS Plan

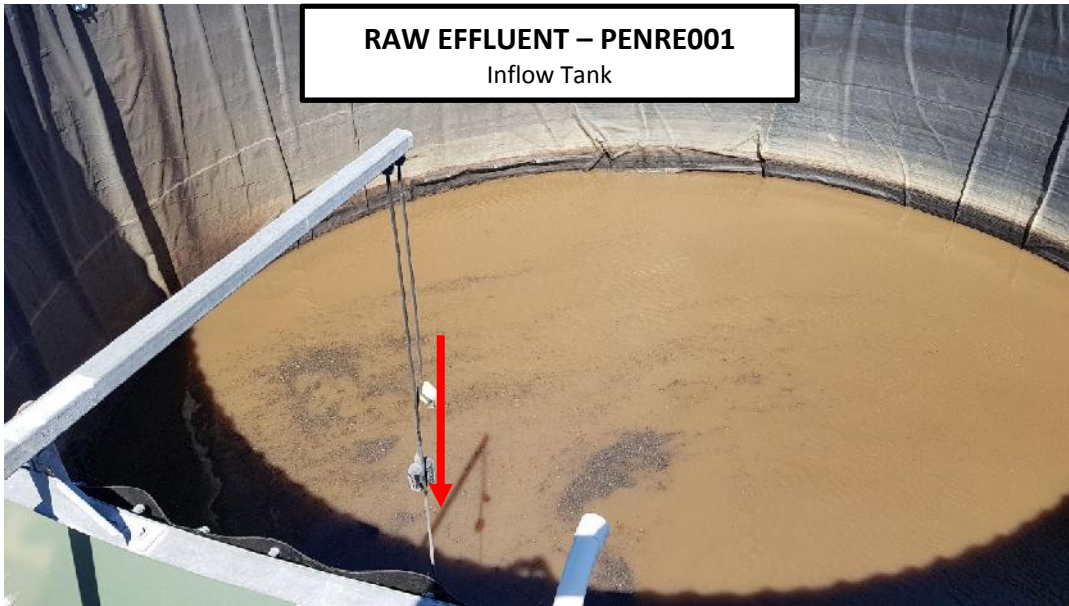
Table 4 - Lagoon Leak Detection Monitoring:

Site No	Site Description	Site Location
PENLGW001	Leak detection bore adjacent to storage lagoon.	Refer to drawing Figure 1, Penneshaw CWMS Plan

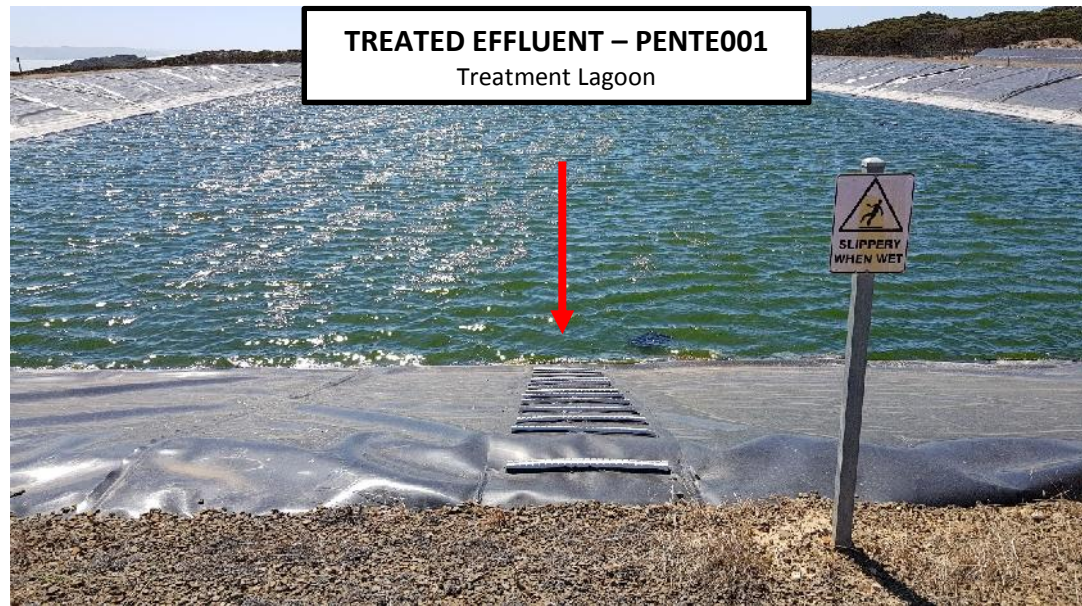
Appendix D
Figure 1 – Penneshaw CWMS Lagoon Site - Testing Points.
Penneshaw CWMS Plan



RAW EFFLUENT – PENRE001
Inflow Tank



TREATED EFFLUENT – PENTE001
Treatment Lagoon



RECYCLED WATER – PENRW001
Storage Tank



WASTEWATER SAMPLING INSTRUCTIONS

Ensure that all bottles are clearly labelled and a copy of the Expected samples Checklist is included with the samples.

Microbiological Analysis Samples

- ⌋ Where taking Potable water samples, wash your hands thoroughly before taking the sample – preferably using an antibacterial hand wash.
- ⌋ For potable water sampling the sample tap may need to be flame sterilised or sterilised with Sodium Hypochlorite solution before the sample is taken. There is a possibility that the sample may become contaminated with micro-organisms from the tap body. Keeping the sample tap clean and free from dirt minimises the possibility of this occurring.
- ⌋ Flush the tap for approximately 30 seconds prior to taking the sample (if the tap is connected to a bore, the bore must be flushed for at least 5 minutes if it is not in regular use). The flush time may require longer to properly purge the pipework of latent water.
- ⌋ The sample can be taken directly from the tap after flushing without transferring the sample in another vessel.
- ⌋ The sample must be taken in a sterilised bottle – If the sample bottles are supplied by the AWQC they are marked with a sticker indicating that the sample bottle has been sterilised and contains Sodium Thiosulphate. **DO NOT** rinse these bottles with the sample.
- ⌋ When taking the sample **do not** touch the inside of the bottle cap or the neck of the bottle with your hands or allow it to come into contact with the sample tap as the sample can be easily contaminated with micro-organisms from your skin or from the sample tap itself.
- ⌋ The sample bottle has to have an air gap left in the top of the bottle – approximately 2cm, and cap tightly.
- ⌋ Bottles must be refrigerated or iced and must be double bagged during transport and arrive at the AWQC within 24hrs of the first sample being taken. Do not freeze these samples.
- ⌋ Ensure that all bottles are clearly labelled and a copy of the Expected samples Checklist is included with the samples.

Chemical Analysis Samples

- ⌋ Wash your hands thoroughly before taking the sample – preferably using an antibacterial hand wash.
- ⌋ Flush the tap for approximately 30 seconds prior to taking the sample (if the tap is connected to a bore, the bore must be flushed for at least 5 minutes if it is not in regular use). The flush time may require longer if the sample tap location is not often used.
- ⌋ The sample can be taken directly from the tap. Keeping the sample tap clean and free from dirt minimises the possibility of contamination from the tap itself.
- ⌋ The sample must be taken in clean bottle – If the AWQC has not supplied a new bottle, a spring water bottle is the next best option. **Rinse these bottles with the sample before filling.**

-) When taking the sample **do not** touch the inside of the bottle cap or the neck of the bottle with your hands or allow it come into contact with the sample tap as the sample can be easily contaminated with residue from your skin or the sample tap itself.
-) Fill sample bottles completely and cap tightly.
-) Bottles should be refrigerated or iced during transport and arrive at the AWQC as soon as possible. Do not freeze these samples.

AWQC

	pH TDS (mg/L)			✓								✓
	Conductivity (µs/cm)			✓								✓
	Total Phosphorous as P			✓								✓
	Nitrate and Nitrite as N			✓								✓
	E-COLI (cfu/100ml)			✓								✓
	Total Kjeldhal Nitrogen (TKN) as N			✓								✓
KIGW006	GROUNDWATER BORE K6											
	Biological Oxygen Demand (mg/L)			✓								✓
	Suspended Solids (mg/L)			✓								✓
	pH TDS (mg/L)			✓								✓
	Conductivity (µs/cm)			✓								✓
	Total Phosphorous as P			✓								✓
	Nitrate and Nitrite as N			✓								✓
	E-COLI (cfu/100ml)			✓								✓
	Total Kjeldhal Nitrogen (TKN) as N			✓								✓
KLGW001	KINGSCOTE LEAK DETECTION											
	Biological Oxygen Demand (mg/L)			✓								
	Suspended Solids (mg/L)			✓								
	pH TDS (mg/L)			✓								
	Conductivity (µs/cm)			✓								
	Total Phosphorous as P			✓								
	Nitrate and Nitrite as N			✓								
	E-COLI (cfu/100ml)			✓								
	Total Kjeldhal Nitrogen (TKN) as N			✓								
	Host Source Tracking (HST)			✓								
PRE001	PARNDANA RAW EFFLUENT											
	Biological Oxygen Demand (mg/L)								✓			
	Suspended Solids (mg/L)								✓			
	E-COLI (cfu/100ml)								✓			
PTE001	PARNDANA TREATED EFFLUENT											
	Biological Oxygen Demand (mg/L)								✓			
	Suspended Solids (mg/L)								✓			
	E-COLI (cfu/100ml)								✓			
PRW001	PARNDANA RECYCLED WATER											
	Biological Oxygen Demand (mg/L)			✓			✓		✓			✓

PENRE001	PENNESHAW RAW EFFLUENT												
	Biological Oxygen Demand (mg/L)									✓			
	Suspended Solids (mg/L)									✓			
	E-COLI (cfu/100ml)									✓			
PENTE001	PENNESHAW TREATED EFFLUENT												
	Biological Oxygen Demand (mg/L)									✓			
	Suspended Solids (mg/L)									✓			
	E-COLI (cfu/100ml)									✓			
PENRW001	PENNESHAW RECYCLED WATER												
	Biological Oxygen Demand (mg/L)			✓			✓			✓			✓
	Suspended Solids (mg/L)			✓			✓			✓			✓
	E-COLI (cfu/100ml)			✓			✓			✓			✓
	Total Chlorine (mg/L)			✓			✓			✓			✓
PENLGW001	PENNESHAW LEAK DETECTION												
	Biological Oxygen Demand (mg/L)									✓			
	Suspended Solids (mg/L)									✓			
	E-COLI (cfu/100ml)									✓			

**KANGAROO ISLAND COUNCIL – KINGSCOTE CWMS
EFFLUENT MONITORING REPORT
TO 30 SEPTEMBER <YEAR>**

Introduction

Kangaroo Island Council is the principal sewerage and wastewater service provider for the township Communities of Kangaroo Island served by defined schemes complying with the Department for Health and Ageing the Environment Protection Authority (EPA) requirements. In all other areas responsibility for sewerage and wastewater service management rests with the landowner.

Kangaroo Island Council's CWMS (Community Wastewater Management Schemes) are comprised of two types of scheme:-

-) properties that utilise a septic tank for treatment of effluent waste before connecting to the CWMS (referred to as Septic Tank Effluent Drainage Scheme or STEDS type scheme) and:
-) properties that utilise a direct sewer type connections (no septic tank required) with all effluent treated by the scheme.

Council's CWMS operates in three townships currently, those being Kingscote, American River and Parndana, and is currently pending connections of its fourth scheme at Penneshaw.

Schemes at Kingscote and Parndana require the installation of a septic tank for each property that is connected to the CWMS.

The American River and Penneshaw Scheme are full sewer schemes, for which direct connection is available without the installation of a septic tank. Some allotments may require property pumps to access the CWMS network where gravity drainage is not available.

PLEASE NOTE that some allotments in American River western extent of Sea Eagle Way, Plover Place and Kestrel Close) require STEDS type connection including septic tank.

Reclaimed water from CWMS Schemes' storage is currently pumped by the following locations:-

-) Kingscote Golf Club (Council Golf Course, contained upon the same land as the CWMS Plant and lagoons). This station is located adjacent to the treatment and storage lagoons on leased land owned by Kangaroo Island Council. The reclaimed water is used to spray irrigate the course of the Kingscote Golf Club. This is a permanently installed automatic irrigation system, which operates at night only.
-) Kangaroo Island Racing Club (Council land leased for the purposes of a horse racing club and track). This station is located also on lease land owned by Kangaroo Island Council. It provides treated effluent to the Race Course (own closed storage tank).
-) Kingscote Centre Pivot (Private agricultural; land). Recycled wastewater is supplied to this land for the cost of supply pumping) where it is irrigated with a centre pivot irrigation system.
-) Parndana Football Oval (Crown Land under Council care and control). Recycled wastewater is infrequently irrigated to Parndana Oval by sub-surface irrigation system. The water is chlorine dosed before irrigation.
-) American River Sports Oval (Council Land). American River CWMS has the ability to provide recycled wastewater from the scheme to the American River sports oval, however the scheme does not currently

receive adequate volumes of waste water to re-use via irrigation. The American River sports oval has a sub-surface irrigation system.

Irrigation volumes are recorded by Council for records purposes.

Requirement to Report

Kingscote CWMS is the only scheme on Kangaroo Island under license with the Environment Protection Authority. License requirements for EPA1516 require water monitoring reports to be returned annually on or before 30 September of that year and to contain Jul – Sept, Oct – Dec, Jan – Mar and Apr – Jun Quarters water monitoring results.

All other schemes are monitored in accordance with the KI Council CWMS Environmental Management Plan for due diligence and records purposes only in respect of EPA requirements, however also fulfil the requirements of each relevant South Australia Department of Health approval and conditions, and therefore seeks to be consistent with both agency's requirements for annual reporting.

To meet the South Australia Department of Health approval requirements, wastewater monitoring is scheduled quarterly, specifically for recycled wastewater quality, whether or not being actively re-used.

Kingscote CWMS (EPA1516)

Effluent Monitoring Results

Over the preceding twelve (12) month period the following results are reported as required by SAHC Licence (WCS 2546) and EPA License (EPA1516) conditions.

ID	SAMPLE TEST	Jan-Mar	Apr-Jun	Jul-Sept	Oct-Dec
----	-------------	---------	---------	----------	---------

KRE001	KINGSCOTE RAW EFFLUENT	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time
	Biological Oxygen Demand (mg/L)		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm
	Suspended Solids (mg/L)								
	pH TDS (mg/L)								
	Conductivity (µs/cm)								
	Total Phosphorous as P								
	Nitrate and Nitrite as N								
	E-COLI (cfu/100ml)								
	Total Kjeldhal Nitrogen (TKN) as N								

KTE001	KINGSCOTE TREATED EFFLUENT	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time
	Biological Oxygen Demand (mg/L)		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm
	Suspended Solids (mg/L)								
	pH TDS (mg/L)								
	Conductivity (µs/cm)								
	Total Phosphorous as P								
	Nitrate and Nitrite as N								
	E-COLI (cfu/100ml)								
	Total Kjeldhal Nitrogen (TKN) as N								

KRW001	KINGSCOTE RECYCLED WATER	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time
	Biological Oxygen Demand (mg/L)		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm
	Suspended Solids (mg/L)								
	pH TDS (mg/L)								
	Conductivity (µs/cm)								
	Total Phosphorous as P								
	Nitrate and Nitrite as N								
	E-COLI (cfu/100ml)								
	Total Kjeldhal Nitrogen (TKN) as N								
	Total Chlorine (mg/L)								

KGW001	GROUNDWATER BORE K1	Result	Sample Date & Time
	Biological Oxygen Demand (mg/L)		DD/MM/YY 00:00 am/pm
	Suspended Solids (mg/L)		
	pH TDS (mg/L)		
	Conductivity (µs/cm)		
	Total Phosphorous as P		
	Nitrate and Nitrite as N		
	E-COLI (cfu/100ml)		
Total Kjeldhal Nitrogen (TKN) as N			

[illegible]

KIGW002	GROUNDWATER BORE K2	Result	Sample Date & Time
	Biological Oxygen Demand (mg/L)		DD/MM/YY 00:00 am/pm
	Suspended Solids (mg/L)		
	pH TDS (mg/L)		
	Conductivity (µs/cm)		
	Total Phosphorous as P		
	Nitrate and Nitrite as N		
	E-COLI (cfu/100ml)		
	Total Kjeldhal Nitrogen (TKN) as N		

[illegible]

KIGW006	GROUNDWATER BORE K6	Result	Sample Date & Time
	Biological Oxygen Demand (mg/L)		DD/MM/YY 00:00 am/pm
	Suspended Solids (mg/L)		
	pH TDS (mg/L)		
	Conductivity (µs/cm)		
	Total Phosphorous as P		
	Nitrate and Nitrite as N		
	E-COLI (cfu/100ml)		
	Total Kjeldhal Nitrogen (TKN) as N		

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

KLGW001	KINGSCOTE LEAK DETECTION	Result	Sample Date & Time
	Biological Oxygen Demand (mg/L)		DD/MM/YY 00:00 am/pm
	Suspended Solids (mg/L)		
	pH TDS (mg/L)		
	Conductivity (µs/cm)		
	Total Phosphorous as P		
	Nitrate and Nitrite as N		
	E-COLI (cfu/100ml)		
	Total Kjeldhal Nitrogen (TKN) as N		
	Host Source Tracking (HST)		

Maintenance / Repairs

Kingscote CWMS and Wastewater Treatment Plant maintenance / repairs for the preceding twelve (12) month period:

EVENT DATE	Maintenance / Problem / Fault	Response / Outcome

Parndana CWMS

Effluent Monitoring Results

Over the twelve (12) month period the following results are reported as required by SAHC Licence (2009-00859/1) conditions.

ID	SAMPLE TEST	Jan-Mar	Apr-Jun	Jul-Sept	Oct-Dec
----	-------------	---------	---------	----------	---------

PRE001	PARNDANA RAW EFFLUENT
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

PTE001	PARNDANA TREATED EFFLUENT
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

PRW001	PARNDANA RECYCLED WATER	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time
	Biological Oxygen Demand (mg/L)		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm
	Suspended Solids (mg/L)								
	E-COLI (cfu/100ml)								

PLGW001	PARNDANA LEAK DETECTION
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

Maintenance / Repairs

Parndana CWMS and Wastewater Treatment Plant maintenance / repairs for the preceding twelve (12) month period:

EVENT DATE	Maintenance / Problem / Fault	Response / Outcome

American River CWMS

Effluent Monitoring Results

Over the twelve (12) month period the following results are reported as required by SAHC Licence (WCS 02452) conditions.

ID	SAMPLE TEST	Jan-Mar	Apr-Jun	Jul-Sept	Oct-Dec
----	-------------	---------	---------	----------	---------

ARRE001	AMERICAN RIVER RAW EFFLUENT
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

ARTE001	AMERICAN RIVER TREATED EFFLUENT
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

ARRW001	AMERICAN RIVER RECYCLED WATER	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time
	Biological Oxygen Demand (mg/L)		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm
	Suspended Solids (mg/L)								
	E-COLI (cfu/100ml)								

ARGW001	GROUNDWATER BORE AR1
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

ARGW002	GROUNDWATER BORE AR2
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

ARGW003	GROUNDWATER BORE AR3
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

ARGW004	GROUNDWATER BORE AR4
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

Maintenance / Repairs

American River CWMS and Wastewater Treatment Plant maintenance / repairs for the preceding twelve (12) month period:

EVENT DATE	Maintenance / Problem / Fault	Response / Outcome

Penneshaw CWMS

Effluent Monitoring Results

Over the twelve (12) month period the following results are reported as required by SAHC Licence (WWI-139/15) conditions.

ID	SAMPLE TEST	Jan-Mar	Apr-Jun	Jul-Sept	Oct-Dec
----	-------------	---------	---------	----------	---------

PENRE001	PENNESHAW RAW EFFLUENT
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

PENTE001	PENNESHAW TREATED EFFLUENT
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

PENRW001	PENNESHAW RECYCLED WATER	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time	Result	Sample Date & Time
	Biological Oxygen Demand (mg/L)		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm		DD/MM/YY 00:00 am/pm
	Suspended Solids (mg/L)								
	E-COLI (cfu/100ml)								
	Total Chlorine (mg/L)								

PENLGW001	PENNESHAW LEAK DETECTION
	Biological Oxygen Demand (mg/L)
	Suspended Solids (mg/L)
	E-COLI (cfu/100ml)

Result	Sample Date & Time
	DD/MM/YY 00:00 am/pm

Maintenance / Repairs

Penneshaw CWMS and Wastewater Treatment Plant maintenance / repairs for the preceding twelve (12) month period:

EVENT DATE	Maintenance / Problem / Fault	Response / Outcome

Summary / Conclusion

This Reporting Period

TBA

Trend Analysis

TBA

<NAME>

Environmental Health Officer

Kangaroo Island Council

DD/MM/YY