KANGAROO ISLAND COUNCIL

Infrastructure and Asset Management Plan

2023-2033

Chapter 4

Community Wastewater Management Schemes

Document Control

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1	15 Nov 2023	Annual review and update to next year	CAS	MO[1]	MO
2	7 Dec 2023	Consultation version – track changes removed	CAS	Full Council	Full Council
3	2 Feb 2024	Post consultation version presented to Council for adoption	CAS	Full Council	Full Council
4	13 Feb 2024	Adopted version - Track changes removed	CAS	Full Council	Full Council

[1] Manager Operations

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1. EXECUTIVE SUMMARY

This IAMP, Chapter 4, is to be read with IAMP Chapter 1 – General Statements.

1.1 The Purpose of the Plan

Refer Chapter 1 – General Statements.

This chapter covers the infrastructure assets that provide a Community Wastewater Management System (CWMS) network to enable a sustainable method of safe collection, treatment and disposal of wastewater in the townships of Kingscote, Parndana, American River and Penneshaw. Council also provides reuse of the treated wastewater at Kingscote, Parndana and American River.

1.2 Asset Description

Assets included in this IAMP - Chapter 4, Community Wastewater Management System are:

- Nodes
  - Maintenance holes
  - Flushing points
  - Domestic pumps
  - Connection points
  - Dump Ezys
- Pipes
  - Gravity pipes
  - Rising mains
  - ReUse mains
  - Connections
- Pumping Stations
  - Pumps
  - Pump chambers
- Treatment, Storage and Reuse
  - Lagoons
  - Treatment facilities
  - Site facilities (access roads, fencing, sheds)
  - Reuse mechanics/electrics

The CWMS network has a total replacement value of $30,414,756.

1.3 What Does it Cost?

The key indicators of cost in providing levels of service used in this IAMP are lifecycle costs and maintenance and renewal expenditure.

1.3.1 Lifecycle Costs (Long Terms costs)

Lifecycle costs are the average costs that are required to sustain the service levels for the longest asset life. Lifecycle costs include maintenance and asset consumption (depreciation expense). Lifecycle expenditure is maintenance plus capital renewal expenditure.

Table 1: Lifecycle Costs

Asset Category	CWMS
Average Annual Lifecycle Cost	$1,723,900
Average Lifecycle Expenditure	$1,161,605
Life Cycle Gap	$562,295
Sustainability Index	67%

1.3.2 Planned Maintenance and Renewal Expenditure (Medium term costs)

The projected maintenance and capital renewal expenditure to deliver existing service levels for the period 2023 to 2033 versus Council's planned maintenance and capital renewal expenditure is shown in Table 2.

For further information on financial indicators, refer to Section 6 of this Infrastructure and Asset Management Plan.

Table 2: Planned Maintenance and Renewal Expenditure

Asset Category	CWMS
Total 10 Year Maintenance & Capital Expenditure	$11,616,051
Average 10 Year Maintenance & Capital Renewal	$1,161,605
Planned Maintenance & Capital Renewal Expenditure (2023-24)	$1,064,000
Average 10 Year Planned Maintenance & Capital Renewal Expenditure	$900,677
Sustainability Index	92%

1.4 Plans for the Future

Refer Chapter 1 – General Statements.

In addition, Council plans to operate and maintain the CWMS network to achieve the following strategic outcome and objective from the Kangaroo Island Council Strategic Plan 2020-2024 (Kangaroo Island Council, 2020):

- Infrastructure: A built environment focused on essential and community service
  - 1.1 Road and Assets: Develop and maintain our roads and physical assets to acceptable standards
    - 1.1.5 Review the 2005 Kingscote Community Wastewater Management System Extension Plan to prioritise the extension works.

For further information on strategic actions, refer to section 3.2 of this Chapter of the Infrastructure Asset Management Plan.

1.5 Measuring our Performance

Refer Chapter 1 – General Statements.

1.6 The Next Steps

Refer Chapter 1 – General Statements

2. INTRODUCTION

2.1 Background

This IAMP, Chapter 3, is to be read with IAMP Chapter 1 – General Statements and covers the assets involved with Community Wastewater Management Schemes on Kangaroo Island and represents the asset base as at 30 June 2023.

2.1.1 Strategic Linkages

In addition to the documents listed in Chapter 1, this infrastructure and asset management plan has considered and is aligned with the following strategic and planning documents:-

- Council's Community Wastewater Management Schemes Policy (Kangaroo Island Council, 2022)
- Local Government Association Guidelines
- Management Plans for the relevant schemes (Kangaroo Island Council, 2019)
- SA Health Guidelines – Community Wastewater Management Systems code (SA Health)
- ESCOSA Requirements
- Scheme audits & capacity engineering assessments

Any specific actions from these plans are discussed with Appendix C.

2.1.2 Infrastructure and Assets included in the plan

This infrastructure and asset management plan covers the infrastructure assets listed in Table 3:

Table 3: Assets Covered by the IAMP - CWMS

Asset Category	Dimension	
Nodes	2,950 points	$3,249,195
Pipes	80,462 metres	$14,340,479
Pumping Stations	18 sites	$2,089,597
	31 domestic pipes	$207,700
Treatment, Storage & Reuse[2]	4 sites	$10,529,785
TOTAL		$30,416,756

[2] Includes reuse pipes. Excludes generators as these are mobile and thus included with Chapter 5 Plant and Equipment.

2.2 Goals and Objectives of Asset Management

Refer Chapter 1 – General Statements.

2.3 Plan Framework

The key elements of this IAMP are:-

- Levels of service: specifies the services and levels of service to be provided by Council.
- Future demand: how this will impact on future service delivery and how this is to be met.
- Life cycle management: how Council will manage its existing and future assets to provide the required services.
- Financial Summary: what funds are required to provide the services.
- Asset Management Practices: what systems, standards and guidelines are utilised to maintain and further develop asset management practices.
- Plan Improvement and Monitoring: how the plan will be assessed to ensure it is meeting Council's objectives.

3. LEVELS OF SERVICE

3.1 Customer Research and Expectations

Refer Chapter 1 – General Statements.

3.2 Strategic and Corporate Goals

Refer Chapter 1 – General Statements.

Council's Strategic objectives (Kangaroo Island Council, 2020) and how these are addressed in this IAMP are summarised in Table 4.

In addition, Council's Vision and Mission are addressed in this infrastructure and asset management plan by:

- CWMS upgrades to be done in line with Levels of Service and risk management practices.
- Undertake regular asset valuations, updates and annual review of depreciation rates.
- Annually review service levels of assets and condition ratings for each asset category.

3.3 Legislative Requirements

Refer Chapter 1 – General Statements.

3.4 Current Levels of Service

Refer Chapter 1 – General Statements.

3.4.1 Customer Values

Customer Values for CWMS are shown in Table 5.

3.4.2 Community Levels of Service

Council's Community Levels of Service for Buildings and Complexes are set out in Table 6.

3.4.3 Technical Levels of Service

Council's Technical Levels of Service for Buildings and Complexes are set out in Table 7.

Table 4: Strategic Goals and how they are addressed in this IAMP

Goal	Objective	How Goal and Objectives are addressed in this IAMP
A built environment focussed on essential and Community services	Develop and maintain our roads and physical assets to acceptable standards	*1.1.5 Review the 2005 Kingscote Community Wastewater Management system Extension Plan to prioritise the extension works.*– included in the Improvement Plan.

Table 5: Customer Values

Customer Values	Customer Satisfaction Measure	Current Feedback	Expected Trend Based on Planned Budget
CWMS scheme is available and operating	Customer Complaints	Minimal comments received on scale of scheme	Scheme will gradually expand
CWMS scheme is maintained and operating	Customer Complaints	Generally satisfied with the scheme	Not anticipated to significantly change

Table 6: Community Levels of Service

Type of Measure	Level of Service	Performance Measure	Current Performance	Expected Trend Based on Planned Budget
Condition	Ensure safety around high risk system components including pump stations, manholes, and treatment plant and storage lagoons	Number of internal incident reports	<2 per year	Internal processes following incidents aim at reducing risk in the future
	Confidence levels		*Low*	*Medium*
Function	Collection system operation without blockages that impact on the system	Number of blockages that impact on the system	1 per year	Not anticipated to change
	Confidence levels		*High*	*Medium*
Capacity	System has capacity to accept current and projected flow rates	Percentage of residential properties connected within defined service network[3]	84%	Expected to gradually increase each year
	Confidence levels		*High*	*Medium*

Table 7: Technical Levels of Service

Lifecycle Activity	Purpose of Activity	Activity Measure	Current Performance[4]	Recommended Performance
Acquisition	Provide new and upgraded assets to address capacity requirements	Percentage of residential properties connected within defined service network[5]	84%	Aim to have 100% of service network covered
		Budget	*$3,860,121 Total (10 years)*	*$3,859,000 Total (10 years)*
Operation and maintenance	Meet EPA Requirements	Number of Mandatory incident reports to EPA	<1 per year	<3 per year
	Meet Department of Health Requirements	Monthly Effluent Monitoring Report results	3 consecutive high readings	<3 consecutive high readings
	Meet ESCOSA Requirements	Yearly ESCOSA Reports	Meets requirements	Meets requirements
	Meet Office of Technical Regulator Requirements	Maintain Safety, Reliability, Maintenance and Technical Management Plan	Plan updated annually	Plan updated annually
	Septic Tank pump outs	Pump out frequency	Tanks are pumped out once every 4 years	Tanks are pumped out once every 4 years

[3] Refer Appendix F

[4] Current activities related to Planned Budget.

[5] Refer Appendix F

Lifecycle Activity	Purpose of Activity	Activity Measure	Current Performance[4]	Recommended Performance
	Review and update operation and maintenance manuals	Manuals are relevant for current systems	Manuals are up to date	Manuals are reviewed and updated when changes occur to operating systems
	Availability of system	Number of outages	No outages exceeding 2 hours	No outages exceeding 2 hours[6]
	Existing Infrastructure is maintained in a suitable condition	Reactive service requests	Reactive service requests are assessed and completed within 2 hours	Reactive service requests are assessed and completed within 2 hours
		Pump stations are inspected and maintained	Inspected fortnightly and maintained as required	Inspected fortnightly and maintained as required
		Operating and Maintenance budget	Annual budget remains consistent	Annual budget should allow for increased maintenance as the network expands
		Budget	*$6,467,024 Total (10 years)*	*$9,324,542Total (10 years)*
Renewal	CWMS infrastructure is suitable for purpose	Age of network	8% of network > 80% of useful life	Less than 2% of network, by value, greater than 80% of useful life
	CWMS assets are renewed	Assets are renewed as due	Funding allocated in LTFP based of previous version of IAMP	Renewals should occur when due as per this IAMP
		Budget	*$2,511,000 Total (10 years)*	*$2,609,277 Total (10 years)*
Disposal	Disposal of assets no longer in use	Disposal of assets as per the IAMP	No disposals planned	No disposals planned
		Budget	*$0 total (10 years)*	*$0 total (10 years)*

[6] (Kangaroo Island Council, 2017)

4. FUTURE DEMAND

4.1 Demand Drivers and Forecast

Refer Chapter 1 – General Statements.

4.2 Climate Change

Refer Chapter 1 – General Statements.

There are a number of CWMS assets that have been identified as potentially impacted by sea level rises. A one meter rise in sea level could result in some of the pump stations in American River and Penneshaw being under water. In addition the land around the CWMS lagoons in Kingscote could be inundated resulting in the lagoons being surrounded by water potentially resulting in ingress of water from underneath (unlined lagoons) or the liners pushed up.

Through the term of this IAMP, these assets and sea levels will be monitored. In future versions of the IAMP, the need for mitigating options will be considered. (refer Section 8.2)

Increasing the reuse of treated wastewater has also been identified as a potential option to reduce the need on fresh water supply. Treated wastewater is currently being used in Kingscote, Parndana and American River. The quantity of treated wastewater available fluctuates and at this stage, there is not additional wastewater available at any scheme thus no expansions planned. However, as the Kingscote collection network expands, there is the potential to expand the reuse pipework to allow for irrigation at the Kingscote oval.

A review has been conducted to identify CWMS assets that are at risk of high tide and storm surges currently, by 2050 and by 2100. Many of these are underground pipes, connections and accesses to the network (ie valves, maintenance holes, flushing points) which although within the "at risk" zone should not be severely impacted by water inundation. The remaining assets identified are not impacted by high tide until 2100 however may be impacted by storm surges earlier. It is not necessary to relocate any of these assets at the moment however they will be monitored to determine if this changes.

4.3 Legislation change

There are no anticipated legislation changes that will impact on CWMS at the present time.

4.4 Changes in Technology

Technology changes are forecast to affect the delivery of services covered by this CWMS Infrastructure Asset Management Plan.

Table 8: Technology Changes

Technology Change	Effect on Service Delivery
New technology in pumping systems	Pump stations now monitored remotely using wireless technology allowing adjustments to be made to equipment via a tablet rather than always attending on site. More efficient pump system will reduce power consumption and enable solar power options to be investigated.
Alarm systems	Wireless technology also alerts operators of pump stations going into alarm instantaneously.
Changes in pipe technology	The ever changing material of pipes and particularly the advancement of pipe lining technology will have an effect in lengthening the life of pipes.
The treatment of wastewater	Significant effects on reuse and disposal options available
New schemes being sewer	Primary and secondary treatment occurring at the treatment facility
Individual onsite wastewater treatment and disposal systems negating the need for communal collection system(s)	Less reliance on increasing network infrastructure

4.5 Demand Management Plan

Demand for new services will be managed through a combination of managing existing assets, upgrading assets where required and providing new assets to meet demand. Demand management practices include non-asset solutions, insuring against risk and managing failures.

Opportunities identified to date for demand management are shown in Table 9.

4.6 New Assets from Growth

The new assets required to meet growth and community expectations will be acquired from land developments and constructed by Council.

Land divisions within the existing system and extensions to the existing systems will result in new connections over the next ten (10) years. Further expansions of the Kingscote and Penneshaw CWMS networks are discussed in section 5.5.

Table 9: Demand Management Plan

Demand Factor	Projection	Impact on Services	Demand Management Plan
Population	Population expected to increase and spread out	More pressure on existing CWMS systems. Expectation to extend the system to areas currently not serviced by CWMS.	Continue to gradually extend the Kingscote and Penneshaw systems.
		Services to small allotments and community titles requested	Assess as requested by Developers and connect where appropriate
		Requests for new systems, extensions and new connections	Upgrades will be not reactive and conducted in a controlled, staged manner that is in line with Council's Levels of Service, EPA requirements and the communities aspirations
		New subdivisions	Assess as required and installed by Developers giving consideration to available capacity.
Tourism	Tourism expected to eventually recover and increase	More pressure on existing CWMS systems. Expectation to extend the system to areas currently not serviced by CWMS.	Continue to gradually extend the Kingscote and Penneshaw systems.
		Potential for increase in grease entering the system from additional businesses	Grease arrestors to be installed at all commercial locations and cleaned regularly
Demographics and Household income	Aging population and average household income on Kangaroo Island is also $250 less per week than on the mainland	Less capacity to absorb increases in service charges, particularly as the CWMS infrastructure ages and requires renewal and upgrade. .	Any costs associated with maintaining, expanding or removing the network need to be within existing budgets where possible.

5. LIFECYCLE MANAGEMENT PLAN

The lifecycle management plan details how Council plans to manage and operate the assets at the agreed service levels while optimising lifecycle costs.

5.1 Background Data

5.1.1. Physical Parameters

The assets covered by this infrastructure asset management plan are shown in Table 12. These are incorporated into 5 schemes. The status of each is discussed in Table 10.

Table 10: Status of CWMS Schemes

Scheme	Status
Kingscote	This scheme covers the majority of Kingscote with some remaining gaps. A study by Wallbridge and Gilbert in 2022 (Wallbridge Gilbert Axtec, 2022) has highlighted and prioritised areas for expansion. (Refer section 5.5)
Parndana	This scheme covers the majority of Parndana and no new capital assets are anticipated within the projection of this CWMS Infrastructure and Asset Management Plan.
Parndana East	Parndana East is a small settlement of 11 properties off Timber Creek Road built in 1962 at the Research Centre. The CWMS was not installed by Council. Information on the system is limited. Further study will be done on how to manage this system in the future Section 8.2).
American River	Being a relatively new system (installed 2010) no new capital assets are anticipated within the projection of this CWMS Infrastructure and Asset Management Plan.
Penneshaw	The main portion of this scheme was installed in 2017/18 with expansions completed in 2020/21. A study by Wallbridge and Gilbert in 2022 (Wallbridge Gilbert Axtec, 2022) has highlighted and prioritised areas for expansion. (Refer section 5.5)

5.1.2. Asset Capacity and Performance

Council's services are generally provided to meet design standards where these are available. (LGA, 2017)

Asset components where deficiencies in service performance are known are detailed in Table 11 and have been identified from local knowledge and engineering reports, such as the Kingscote CWMS Capacity Assessment 2013 (Wallbridge & Gilbert, 2013).

Table 11: Service Deficiencies

Asset	Service Deficiency	Council Comment
Kingscote Network	Not all properties connected	Ongoing works to resolve this
Penneshaw Network	In emergency situation, truck that pumps our pumping station needs to travel to Kingscote to empty load thus creating a long turn around time.	Refer section 8.2 – Improvement Plan
Other settlements	No CWMS scheme installed	Penneshaw CWMS now operational. No other schemes proposed at this stage.
All schemes	Easements not recorded on all relevant properties	Easements are only required for new infrastructure and Council has the right to maintain existing infrastructure under the Water Industry Act. As such, this will not be progressed at this time.

5.1.3 Asset Condition

At this stage, condition assessments have not been conducted on the CWMS infrastructure assets.

In 2013/14 (Tonkin Consulting, 2014), work was undertaken to:

- Inspect pump stations to confirm pump sizes, model numbers etc
- Inspect wastewater treatment and reuse facilities to confirm pump types and sizes, controller types, flow metres, valves etc.
- Undertaken CCTV assessments of a cross section of the pipes and culverts to confirm size, age and condition of CWMS pipes and culverts (refer Appendix D)

Table 12: Physical Parameters, including age profile

Asset	Quantity and Unit	Useful Life (years)	Average Age (years)
Pipes	80462m	*75*	*26*
Gravity Mains	51355m	75	*29*
Vitreous Clay	1155m	75	69
Concrete	1986m	75	63
uPVC	47796m	75	26
HDPE	419m	75	6
Rising Mains	15977m	75	*9*
HDPE	5070m	75	6
uPVC	10907m	75	12
House Connections	13129m	75	*26*
Vitreous Clay	437m	75	64
HDPE	179m	75	3
uPVC	12513m	75	25
Nodes	*2,950*	60	*28*
Connection Points	1997	60	27
Dump Ezys	4	50	11
Flushing Points	686	60	36
Inspection Openings	24	70	5
Maintenance Holes	111	70	23
Maintenance Shafts	64	70	7
Septic Tanks	60	30	2
Valves	4	30	4
Pump Stations			
Stations	18	25[7]	11
Domestic Pumps	31	20	13
Treatment facilities	*4*	*38*	*10*
Earthworks	16	73[8]	-
Lagoons (storage)	11	46[8]	15
Treatment Assets	32	19[8]	9
Reuse Assets	113	29[8]	10
Reuse Pipes	16092m	75[8]	13
Site Facilities	40	32[8]	13
Solar Array System	1	25[8]	6

This work was used to develop the CWMS asset register. Valuations are currently based on the age and standard useful lives of the various components rather than condition. Ongoing assessments on the CWMS network, keeping the need for condition assessments, will continue.

The following graphs show the age of CWMS assets.

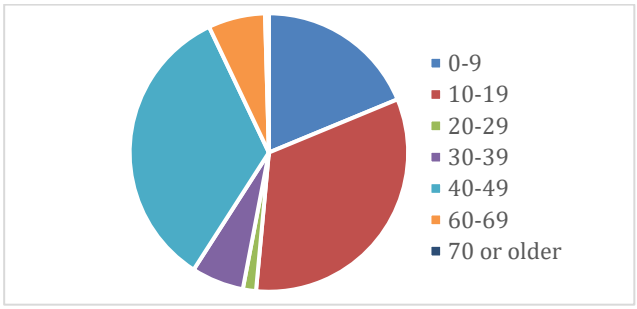

Figure 1: Age of CWMS Assets - Nodes

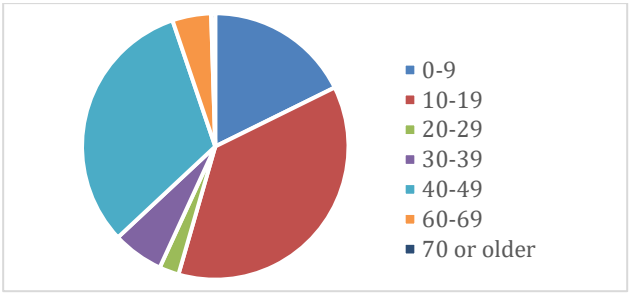

Figure 2: Age of CWMS Assets - Pipes

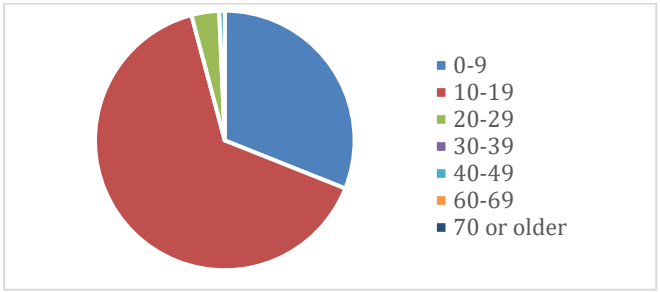

Figure 3: Age of CWMS Assets - Pump Station

[7] Useful life of pump (other components of the pump station have different useful lives)

[8] Average useful life of components used

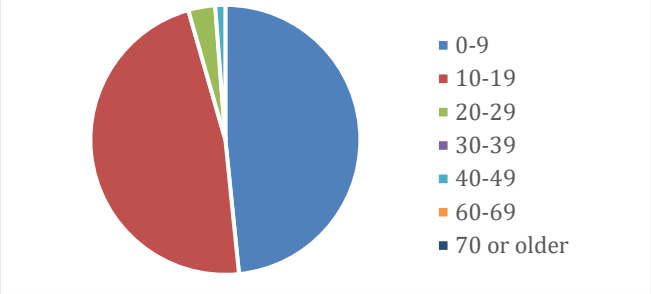

Figure 4: Age of CWMS Assets - WWTP

The graphs show that the a large portion of the pipes and nodes majority of the CWMS assets are 40-49 years old with a portion being more than 60 years old. The older assets are those that will be due for replacement sooner, based on condition and need. The large number of assets that are 40-49 indicates that a number of assets will be due for replacement at the same time. While this is beyond the current version of the IAMP, future iterations will need to include information on how to manage this.

5.1.4 Asset Valuation

The value of CWMS assets as at 30 June 2023 covered by this infrastructure and asset management plan is summarised below in Table 13. Assets are valued at Brownfield rates. This data is from the 2019 valuation (Jones Lang LaSalle (JLL), 2019) and work completed since then.

5.1.5 Measures of asset consumption, renewal and upgrade

Asset Sustainability Ratio

Capital Renewal Expenditure 2023/24 =	$ 267,000
Depreciation Expense 2023/24 =	$ 503,630
Therefore Asset Sustainability Ratio =	53%

Council's target is that this ratio should be greater than 90% and less than 110% over a rolling 3 year period. This figure is low due to the recent installation of the American River CWMS and Penneshaw CWMS which has significant depreciation but will not require any renewal for a number of years. However there are other schemes that are older and will need renewal.

Asset Consumption Ratio

Depreciated Replacement Cost 2023/24 =	$ 20,585,688
Current Replacement Cost 2023/24 =	$ 30,416,756
Therefore Asset Consumption Ratio =	68%

Council's target is that this ratio should be greater than 40% and less than 80%.

Asset Renewal Funding Ratio

IAMP projected 10 year expenditure =	$ 2,609,277
LTFP[9] projected 10 year expenditure =	$ 2,511,000
Therefore Asset Renewal Funding Ratio =	96%

As the ratio is less than 100%, this means that some assets may be delayed in their renewal.

5.2 Risk Management Plan

Refer Chapter 1 – General Statements.

Risk management assessments in previous plans identified a number of critical risks. Work has been undertaken to address some/all of these risks as summarised in Table 14. A full review of the risk assessment is included in section 8.2 Improvement Plan.

[9] The LTFP currently ends with year 2029/2030 and has been extrapolated in a straight line for the remaining 3 years of the IAMP.

Table 13: Valuation Summary as at 30 June 2023

Asset Class	Current Replacement Cost (CRC)	Depreciable Amount	Accumulated Depreciation	Carrying Amount (WDV)	Annual Depreciation
Pipes					
Gravity Mains	$9,557,940	$9,542,512	$3,376,364	$6,181,576	$127,233
Rising Mains	$2,200,409	$2,200,409	$745,046	$1,455,363	$29,339
House Connections	$2,582,130	$2,582,130	$314,692	$2,267,438	$34,428
Pipes Total	**$14,340,479**	**$14,325,051**	**$4,436,102**	**$9,904,377**	**$191,001**
Nodes					
Connection Points	$1,910,654	$1,910,654	$836,275	$1,074,379	$29,670
Dump Ezys	$18,000	$18,000	$3,975	$14,025	$360
Flushing Points	$525,938	$525,938	$312,116	$213,821	$7,962
Inspection Openings	$17,778	$17,778	$1,322	$16,455	$254
Maintenance Holes	$666,120	$666,120	$220,982	$445,138	$9,430
Maintenance Shafts	$5,760	$5,760	$598	$5,162	$81
Septic Tanks	$27,958	$27,958	$2,053	$25,905	$932
Valves	$76,988	$76,988	$8,604	$68,383	$2,566
Nodes Total	**$3,249,195**	**$3,249,195**	**$1,385,926**	**$1,863,269**	**$51,255**
Pump Stations					
Stations	$2,089,597	$2,089,597	$910,469	$1,179,128	$62,717
Domestic Pumps	$207,700	$207,700	$135,005	$72,695	$10,385
Pump Stations Total	**$2,297,297**	**$2,297,297**	**$1,045,474**	**$1,251,823**	**$73,102**
Treatment, Reuse and Storage					
Earthworks	$3,057,451	$0	$0	$3,057,451	$0
Lagoons	$1,502,313	$1,502,313	$821,931	$680,382	$42,823
Treatment Mech/Elec/Civil	$703,115	$703,115	$390,251	$312,864	$25,555
Reuse Mech/Elec/Civil	$716,460	$716,460	$351,016	$365,444	$26,758
Reuse Pipes	$3,004,252	$3,004,252	$788,112	$2,216,140	$40,057
Site Facilities	$1,253,193	$1,253,193	$541,937	$711,256	$41,359
Solar Array System	$293,000	$293,000	$70,320	$222,680	$11,720
Treatment, Reuse and Storage Total	**$10,529,785**	**$7,472,334**	**$2,963,567**	**$7,566,218**	**$188,271**
Asset Total	$30,416,756	$27,343,877	$9,831,068	$20,585,688	$503,630

Table 14: Risk Assessment Summary

Service or Asset at Risk	What can happen	Risk Rating	Risk Treatment Plan	Residual Risk	Cost of Risk Treatment Plan
Pump Stations	Pump failure due to power or mechanical failure	High	Dual pumps at each site. Diesel generators purchased to ensure pump stations can be running at any location within two (2) hours of power failure. Telemetry monitoring of systems. Staff on call.	Medium	Existing budget
Pipes / Nodes	Pipe blockage / sump damage due to tree roots or foreign objects	High	High pressure drain cleaner purchased to flush blockages. CCTV assessments undertaken to identify and monitor	Medium	Existing budget
Pipes / Nodes	Pipe breakage / sump damage due to contractor excavation	High	Revised as Revised as constructed drawing to be provided to Dial before you dig after major works or annually. Permit required for works on Council roads.	Medium	Existing budget
Pipes / Nodes	Grease and fat blockages	High	Require businesses to install and maintain Grease Arrestors.[10]	Medium	Existing budget

5.3 Maintenance Plan

5.3.1 Maintenance Types

Refer Chapter 1 – General Statements.

5.3.2 Maintenance Arrangements

The following is a summary of maintenance arrangements:

- Council staff undertake all maintenance of wastewater management including monitoring and operation of our wastewater treatment plants unless specialist skills or equipment are required and contractors are engaged (ie electrician, plumber).
- Contractors will be engaged for the de-sludging of septic tanks as per the Community Wastewater Management Schemes (CWMS) Customer Charter/Policy (Kangaroo Island Council, 2022)

5.3.3 Standards and Specifications

Maintenance work is undertaken in accordance with the following Standards and Specifications:

- Plumbing Code of Australia
- Water Services Association of Australia:
  - Sewerage Codes of Australia WSA 02-1999
  - Pressure Sewerage Codes of Australia WSA 07-2005
  - Sewerage Codes of Australia Vacuum WSA 06-2004
- AS / NZS 3500.2 Sanitary Plumbing and Drainage
- SA Water, Sewerage Systems Code and Construction Documentation
- EPA – Department of Natural Resources:
  - SA Biosolids Guidelines
  - SA Reclaimed Water Guidelines 1997
- Dept of Health and Local Government Assoc:
  - Septic Tank Effluent Drainage Scheme Design Criteria
  - Technical Specification for Construction of Septic Tank Drainage Schemes.

5.3.4 Maintenance Expenditure Patterns

Previous Maintenance expenditure is shown in Table 16. The figures exclude depreciation and finance costs (ie interest on loans) as wells as costs association with environmental management and water testing.

5.3.5 Future Maintenance Expenditure

Maintenance expenditure projections for the next ten years are detailed in Figure 5 which shows a gradual increase in expenditure allowing for additional maintenance associated with any expansions of the networks in section 5.5 and any items from the improvement plan in section 8.2.

[10] Specified as a requirement in the Council's CWMS Customer Charter/Policy (Kangaroo Island Council, 2022)

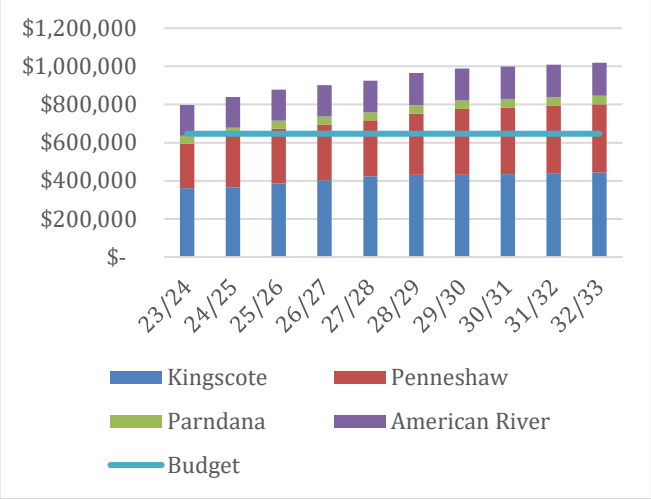

Figure 5: Maintenance Expenditure Projections

5.4 Renewal Plan

Refer Chapter 1 – General Statements.

5.4.1 Renewal Priority

Refer Chapter 1 – General Statements.

The priority ranking criteria for CWMS is detailed in Table 15.

Table 15: Renewal Priority Ranking Criteria

Criteria	Weighting
Environmental Performance/Risk	20%
Demand or capacity/population	40%
Age of Infrastructure	20%
Maintenance Requirements	20%
TOTAL	100%

5.4.2 Renewal Standards

Standards and specifications for new assets and for upgrade/expansion of existing assets are the same as those for renewal shown in Section 5.3.3. In addition, Council will give consideration to options available that have lower usage of natural resources such as LED lights and timed taps.

Table 16: Historic Maintenance Expenditure

	2018/19	2019/20	2020/21	2021/22	2022/23[11]	2023/24 Budget
Depot Operations	$336,593	$240,034	$328,762	$265,400	$344,025	$344,025
Property (Halls)	$254,272	$173,835	$171,087	$246,678	$221,786	$221,786
Property (Commercial)	$26,243	$32,572	$54,966	$45,970	$39,639	$39,639
Waste Management	$96,343	$117,556	$136,102	$126,113	$153,131	$153,131
TOTAL	$713,451	$563,997	$690,918	$684,160	$758,581	$758,581

[11] Includes an estimate of full cost allocation based on the average of previous years.

5.4.3 Summary of future renewal expenditure

Projected future renewal expenditure is summarised below in Figure 6. Note that all costs are shown in 2019[12] dollar values.

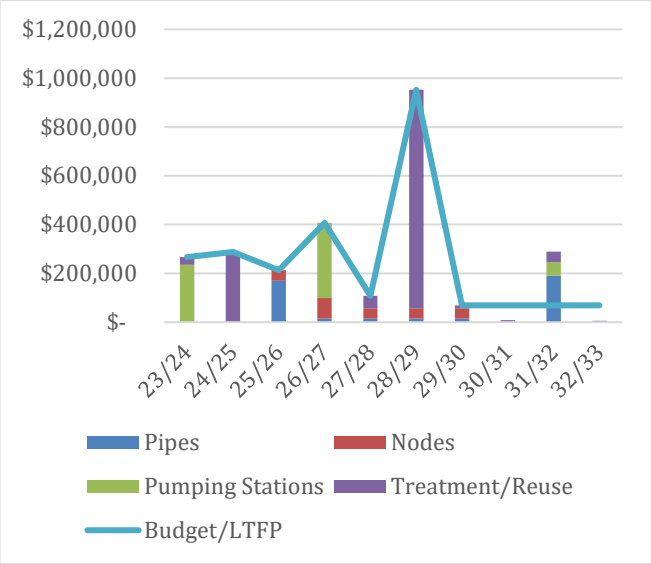

Figure 6: Projected Renewal Expenditure

5.4.4 Renewal Back log

The Renewal Backlog is shown in Table 17.

These have been incorporated into the projected renewal expenditure over the 10 years as the CCTV footage indicates they do not need replacing as yet.

5.4.5 Renewal Projection

A summary of upcoming renewals is shown in Projection is shown in Appendix G.

Pumps in American River have been excluded from this forecast as they are replaced as they fail under maintenance expenditure.

Table 17: Renewal Backlog Details

Asset Category	Back Log amount	Management commentary
Flushing Points and Connections (Parndana and Kingscote)	$ 185,120	These nodes are located on the VC pipes below and older concrete pipes in Kingscote, Parndana and Parndana East. The nodes will be monitored and replaced when the associated pipes unless required earlier.
Vitreous Clay (VC) Pipes (Parndana and Kingscote)[13]	$ 228,659	CCTV footage has been used to assess these pipes and as they are still in good condition, they will not be renewed as urgently. Repairs to these lines will either involve relaying a new pipe or lining existing pipes. Lining existing pipes can be a more suitable and cost effective option for back of property alignments as there is no need for major excavation.
TOTAL	$ 413,779	

5.5 New and Upgrade Plan

5.5.1 Selection Criteria

Refer Chapter 1 – General Statements.

The priority ranking criteria for CWMS is detailed in Table 18.

Table 18: New and Upgrade Priority Ranking Criteria

Criteria	Weighting
Within existing network	40%
Part of an allotment subdivision	40%
Required for environmental/risk reasons	20%
TOTAL	100%

[12] As the last valuation was conducted in 2019.

[13] Examples of the pipe condition in Parndana are available Appendix D.

5.5.2 Standards and Specifications

Standards and specifications for new assets and for upgrade/expansion of existing assets are the same as those for renewal shown in Section 5.4.2.

5.5.3 Future upgrades/new assets expenditure

Projected new and upgrade expenditure is summarised in Figure 7.[14]

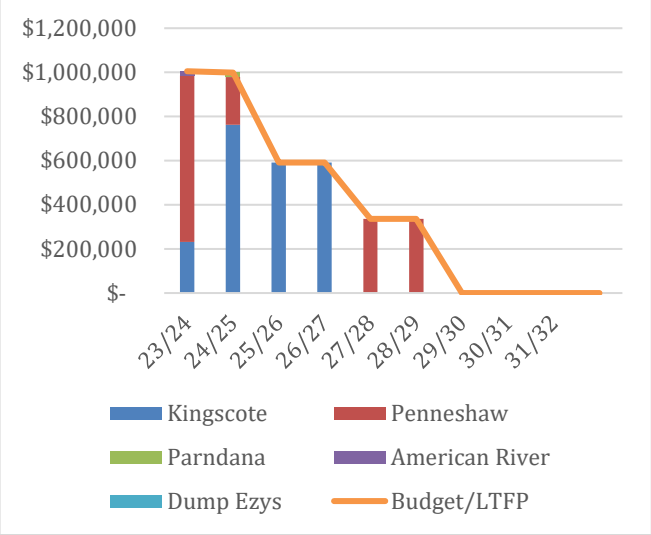

Figure 7: New and Upgrade forecast

Upgraded assets and services will be funded from Council's capital works program and grants where available.

A discussion of proposed upgrades for each CWMS system is provided in Appendix H.

A Kangaroo Island CWMS Review Future Scheme Extension Assessment in 2022 (Wallbridge Gilbert Axtec, 2022) resulted in a reprioritisation of expansions and adjustment of costs. If progressed, after 2029/30, the CWMS system will cover the majority four main population centres and at this stage there is no plans to create new systems in the smaller townships. Grant funding may be needed to proceed with this.

5.6 Disposal Plan

Disposal includes any activity associated with disposal of a decommissioned asset including sale, demolition or relocation.

While there are no plans to reduce the assets within the CWMS network there are opportunities to investigate Regional Authorities (Section 43 of *Local Government Act*) and Public Private Partnerships. It is not planned on progressing this at this time.

[14] The budget is taken from the current year's budget and information contained in the 2021-2030 Long Term Financial Plan.

6 FINANCIAL SUMMARY

This section contains the financial requirements resulting from all the information presented in the previous sections of this infrastructure and asset management plan.

6.1 Financial Statements and Projections

The financial projections shown in Figure 8 are for operating (reactive and planned maintenance), capital renewal expenditure and capital upgrade expenditure. Appendix A shows the actual figures used to obtain this graph.

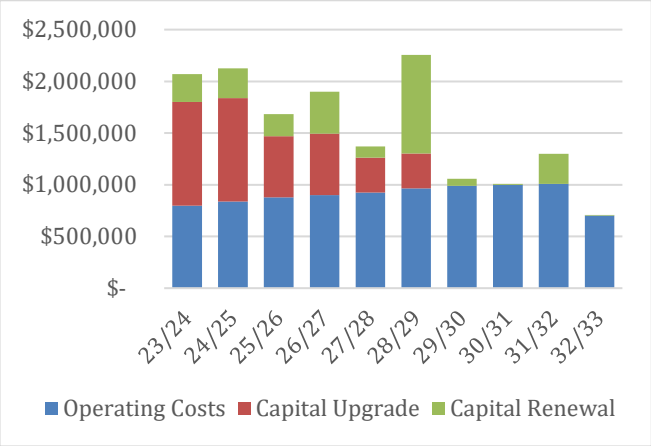

Figure 8: Financial Projections - Operating, Capital Upgrade and Capital Renewal

6.1.1 Sustainability of Service Delivery

Refer to Chapter 1 – General Statements for discussion on key indicators for financial sustainability.

There are two key indicators for financial sustainability that have been considered in the analysis of the services provided by this asset category, these being long term life cycle costs and medium term costs over the 10 year financial planning period.

Long Term – Life Cycle Cost

Table 19: Lifecycle Costs

Asset Category	CWMS
Average Annual Lifecycle Cost	$1,723,900
Average Lifecycle Expenditure	$1,161,605
Life Cycle Gap	$562,295
Sustainability Index	67%

Medium term – 10 year financial planning period

Figure 9 shows the projected asset renewals versus the planned renewal expenditure in the capital works program in the 10 year planning period.

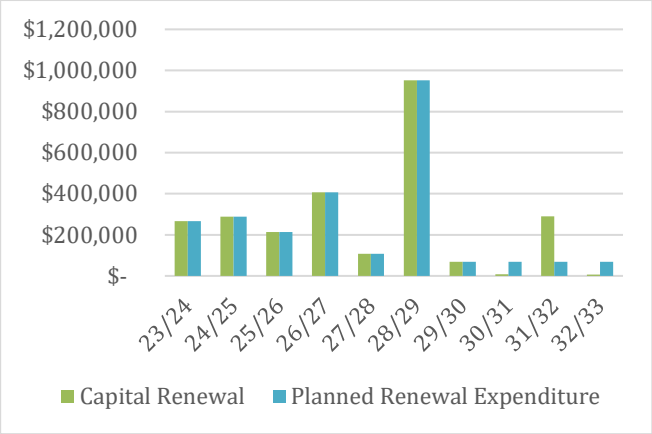

Figure 9: Projected vs Planned Asset Renewals

Table 20 shows the annual and cumulative funding gap between projected and planned renewals for CWMS assets.

Table 20: Accumulative Renewal Funding Gap

Year	Planned Renewals	Projected Renewals	Renewal Funding Gap	Cumulative Gap
23/24	$267,000	$267,000	$0	$0
24/25	$288,000	$288,422	-$422	-$422
25/26	$213,000	$213,118	-$118	-$540
26/27	$407,000	$407,203	-$203	-$743
27/28	$108,000	$108,261	-$261	-$1,004
28/29	$952,000	$952,387	-$387	-$1,391
29/30	$69,000	$68,957	$43	-$1,348
30/31	$69,000	$8,554	$60,446	$59,097
31/32	$69,000	$289,594	-$220,594	-$161,497
32/33	$69,000	$5,780	$63,220	-$98,277

Providing services in a sustainable manner will require matching of projected asset renewals to meet agreed

service levels with planned capital works programs and available revenue.

The small gap between projected asset renewals and planned asset renewals relates to rounding until the last three years which is reflective of LTFP currently ending with year 2029/2030 and being extrapolated in a straight line for the remaining 3 years of the IAMP. The investigation into making CWMS a self funding model (refer section 8.2 Improvement Plan) may also assist with mitigating any funding gap.

6.2 Funding Strategy

Projected expenditure identified in Section 6.1 is to be funded from Council's operating and capital budgets. The funding strategy is detailed in the Council's 10 year long term financial plan.

To achieve the financial strategy Council will require:-

- Further development of capacity assessment models based on actual connections.
- Ongoing CCTV assessments to monitor condition and capacity.
- Review of CWMS Fees to ensure user pays.

6.3 Valuation Forecasts

Asset values are forecast to gradually increase due to expansion of networks, ongoing new connections and revaluation every 5 years. The Current Replacement Cost Forecast is shown in Figure 10.

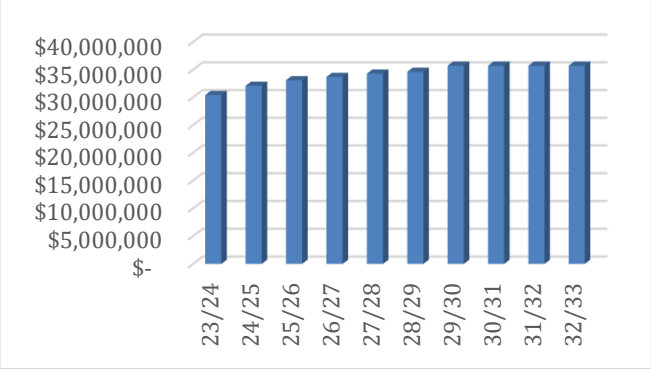

Figure 10: Current Replacement Cost Forecast

Depreciation expense values are forecast in line with asset values as shown in Figure 11.

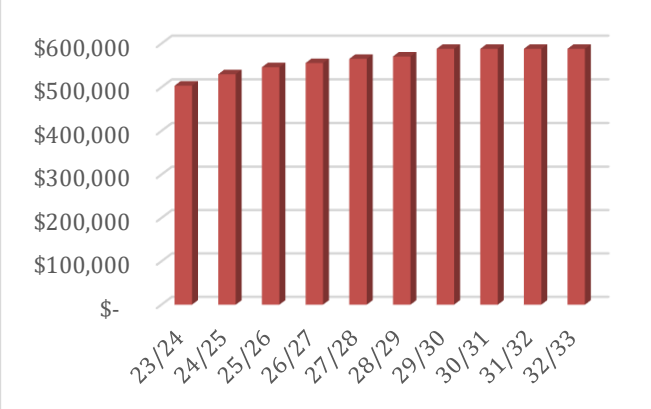

Figure 11: Depreciation Forecast

The depreciated replacement cost (current replacement cost less accumulated depreciation) will vary over the forecast period depending on the rates of addition of new assets, disposal of old assets and consumption and renewal of existing assets as shown in Figure 12.

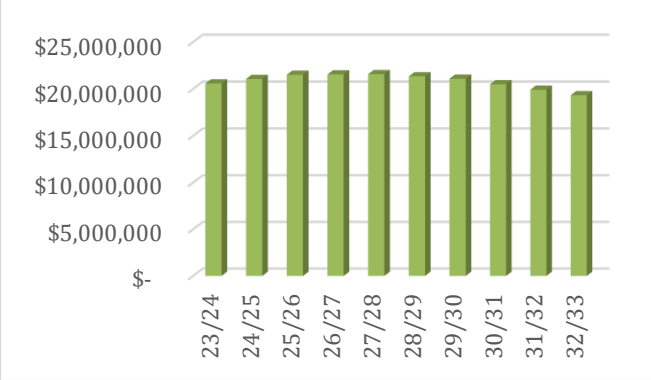

Figure 12: Depreciated Replacement Cost Forecast

6.4 Key Assumptions made in Financial Forecasts

Refer section 1.

Key assumptions made specific to this infrastructure and asset management plan are:

- Asset data for CWMS assets was revised by Kangaroo Island Council staff in 2018/19 and the information in this IAMP incorporates the latest data. The useful life and replacement costs of the assets were determined by JLL in June 2019 (Jones Lang LaSalle (JLL), 2019).
- Purchase cost rather than replacement cost is used for assets acquired after this date.

7 ASSET MANAGEMENT PRACTICES

7.1 Accounting/Financial Systems

Refer Chapter 1 – General Statements.

7.2 Asset Information System

Refer Chapter 1 – General Statements.

7.3 Information Flow Requirements and Processes

Refer Chapter 1 – General Statements.

Council's Community Wastewater Management Schemes (CWMS) Customer Charter/Policy provides a clear understanding of the standards of service and customer's rights and responsibilities. It contains a broad framework that guides the provision of consistent infrastructure and services and the allocations of costs for CWMS servicing.

7.4 Standards and Guidelines

Refer Chapter 1 – General Statements.

8 PLAN IMPROVEMENT AND MONITORING

8.1 Performance Measures

Refer Chapter 1 – General Statements.

8.2 Improvement Plan

Refer Chapter 1 – General Statements.

The asset management improvement plan generated from this infrastructure and asset management plan is shown in Table 21.

8.3 Monitoring and Review Procedures

Refer Chapter 1 – General Statements.

Table 21: Improvement Plan

Task No	Task	Update	Proposed Timeline	Estimated Cost	Area
1	An auto shut down system for Pump Stations A & B are to be installed to isolate them when the high level alarm is triggered at Pump Station C due to emergency storage capacity issues for Pump Station C.	Task has been delayed to allow for SCADA system (which needs to occur first) and review of need.	Jun 2025	Included with task 11	-
2	Parndana East system review including cost benefit analysis of upgrading existing and alternatives for managing waste water for the 11 properties.	Due to re-prioritisation of CWMS works this item has been delayed.	Dec 2025	$20,000	Maintenance
3	Investigate options for emergency pump outs at Penneshaw	Delayed due to prioritisation of other action	Jun 2025	Within current budget	
4	Installation of SCADA system at Kingscote and American River	Delayed, now scheduled to occur this financial year	Jun 2024	$40,000	Upgrade
5	Investigate agreements on residential pumps in American River and determine future direction	Investigation is still ongoing, task has been delayed	Dec 2025	Within current budget	
6	Implement emergency pump out option at Penneshaw	Delayed due to delay in task 4	Jun 2026	$15,000	Upgrade
7	CWMS Revaluation		Jun 2024	$10,000	Maintenance
8	Install Dump ezys from investigation	Priorities would be: 1) Browns Beach: $10k, popular campground, option for visitors arriving / departing ferry 2) Vivonne Bay:$10k, popular campground, provides option on South Coast 3) Stokes Bay: $18.5k, popular campground, provides option on North Coast, higher cost due to need for power and water, actual site requires consideration 4) Emu Bay: $18.5k, Emu bay is popular location, higher cost	Unscheduled Would require grant funding	$20,000	Upgrade

Task No	Task	Update	Proposed Timeline	Estimated Cost	Area
		due to need for power and water 5) Duck Lagoon: $10k, may not be needed as has Emu Bay and Brownlow as alternatives Ongoing costs include water, power and septic tank pump outs			
9	Implementation of Penneshaw WWTP power upgrades		Jun 2025	$180,000	Upgrade
10	CWMS Revaluation		Jun 2029	$10,000	Maintenance
11	Condition Assessments via CCTV assessment	Condition audit scheduled for the 2023/24 financial year	Ongoing – every 2 years	Within current budget	
12	Tender for Septic Tank desludging program		Dec 2030	Within current budget	Maintenance
13	Scope the effective mitigation or managed retreat of wastewater pumping stations at Brownlow and American River, exposed to both coastal hazards and flooding.	New from draft Preparing KI project. This projects is currently underway.	Mar 2024	Within current budget	Upgrade
14	Consider need for implementation of recommendations from the Auditor General's review of Berri Barmera and Yorke Peninsula CWMS networks including: - Formal approach to assessing the condition of the CWMS network - Use of condition assessment to inform maintenance and renewal the following year - Further componentisation of CWMS assets - Considering additional risks including business failure, natural events, infrastructure resilience, cyber security risk - Preventative maintenance reports - Community reporting	New	Dec 2024	Within current budget (Note: costs will be associated with the implementation of any actions progressed)	Maintenance

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APPENDIX A – CWMS Planned operating, capital renewal and capital upgrade expenditure

Asset Category	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31	31/32	32/33
Kingscote	$361,000	$364,697	$385,571	$403,556	$422,380	$431,704	$430,921	$435,230	$439,583	$443,978
Penneshaw	$233,000	$272,062	$287,813	$290,691	$293,598	$320,620	$345,527	$348,982	$352,472	$355,997
Parndana	$42,000	$41,820	$42,238	$42,661	$43,087	$44,118	$43,959	$44,399	$44,843	$45,291
American River	$161,000	$160,917	$162,527	$164,152	$165,793	$169,551	$169,147	$170,838	$172,547	$174,272
Operating	**$797,000**	**$839,496**	**$878,149**	**$901,059**	**$924,858**	**$965,993**	**$989,554**	**$999,450**	**$1,009,444**	**$1,019,539**
Pipes	$0	$0	$170,318	$14,598	$14,598	$14,598	$14,598	$0	$191,341	$0
Nodes	$0	$0	$42,800	$84,416	$42,800	$42,800	$42,800	$0	$0	$0
Pumping Stations	$235,788	$0	$0	$308,190	$0	$0	$0	$0	$54,325	$0
Treatment/Reuse	$31,212	$288,422	$0	$0	$50,864	$894,989	$11,560	$8,554	$43,928	$5,780
Capital Renewal	**$267,000**	**$288,422**	**$213,118**	**$407,203**	**$108,261**	**$952,387**	**$68,957**	**$8,554**	**$289,594**	**$5,780**
Kingscote	$232,000	$762,667	$591,667	$591,667	$0	$0	$0	$0	$0	$0
Penneshaw	$753,121	$215,879	$0	$0	$336,000	$336,000	$0	$0	$0	$0
Parndana	$0	$20,000	$0	$0	$0	$0	$0	$0	$0	$0
American River	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Upgrade	**$1,005,121**	**$998,546**	**$591,667**	**$591,667**	**$336,000**	**$336,000**	**$0**	**$0**	**$0**	**$0**
TOTAL COSTS	$2,030,702	$2,085,523	$1,640,129	$1,856,024	$1,324,071	$2,207,818	$1,010,333	$959,343	$1,249,891	$975,680

APPENDIX B – CWMS Rules for Finance and Asset Finda

Finance:

The following sub-department have been included in all finance calculations:

- 009 CWMS

The following expenses have been excluded from all finance calculations:

- Depreciation
- Bank charges
- General Interest Expenses
- Capital Cost Allocation

Asset Finda:

The following rules have been applied when entering data into Asset Finda:

- Communities
  Assets are allocated to the community based on their location and the Communities used are consistent with the Departments used in finance
  - Township:
    - American River
    - Baudin Beach
    - Emu Bay
    - Island Beach
    - Kingscote/Brownlow
    - Nepean Bay
    - Penneshaw
    - Parndana
    - Vivonne Bay
  - Rural:
    - Dudley
    - MacGillivray
    - Redbanks
    - Stokes
    - Vivonne
    - Wisanger
    - Western Districts
- Categories
  Assets are allocated to the category based on which CWMS system they are associated with. The Categories are:
  - American River CWMS
  - Kingscote CWMS
  - Parndana CWMS
  - Penneshaw CWMS
- Asset Classes
  Assets are divided into 4 asset classes (Pipes, Points, PumpStations and TreatReuse) with the following asset Types and numbers (refer to table on next page)
- Notes:
  - All diameters and heights are in mm
  - Contract IDs are the finance GL code
  - Condition rating criteria have not been developed

Asset Class	Asset Finda Template	Examples of Asset Types	Asset Numbers
Wastewater_Pipe	Utility line	House Connector Pipe, Gravity Pipe, Rising Main Pipe	PXXX
Wastewater_ Node	Utility Point	Connection Point	CPXXX
		Dump Ezy, Flushing Point, Holding Tank, Inspection Opening, Isolating Gate Valve, Maintenance Hole, Maintenance Shaft	NXXX
Wastewater_Pump Station	Parent Child	Council Owned Domestic Pump	DPXX
		Privately Owned Domestic Pump	PDPXX
		Pump Station (Dummy asset – no value, is purely for location of all assets), Civil Assets (ie hardstand area; Internal Pipework), Electrical Assets (ie Auto Dialer; PLC Controls), Mechanical Assets (ie Flow Meter ; Pump)	PSXXX
Wastewater_Treat _Reuse	Parent Child	All assets associated with the treatment and reuse of wastewater. Asset number depends on location ie American River and if part of treatment or reuse – ie ARR – American River Reuse	ARRXX; ARTXX; KRXX; KTXX; PaRXX; PaTXX

APPENDIX C – Strategic Document Recommendations

Strategic Document	Note/Recommendations	Council Comments
Business Continuity Plan (Kangaroo Island Council, 2017)	CWMS – Max Acceptable Outage = 4 hours	Included within Levels of Service
	Review Emergency Management Plans for each system.	Completed but ongoing
	Develop 3-4 contingency plans based on plausible worst case scenarios for CWMS.	Included with EMPs above
Kangaroo Island Plan (Government of South Australia, 2011)	Explore opportunities to work with local enterprises to fund the development of local community wastewater management schemes (CWMS).	With new developments, developers link in with existing schemes
	Explore the viability of building connections between waste management schemes in adjacent towns to maximise utilisation.	Not feasible considering the distance between townships on Kangaroo Island
	Upgrade CWMS in small communities.	Systems installed at American River and Penneshaw. There is no plan to create additional systems at this stage.
	Upgrade the sewerage infrastructure as development proceeds.	Ongoing as development occurs.
Regional Public Health Plan for the Southern & Hills LGA (LGA, 2015)	4.1 Continue to provide waste management services including: • Maintain existing Community Wastewater Management Schemes • Provide education and support in relation to onside wastewater management • Provide assessment, inspection and enforcement of onsite wastewater management systems Advocate for the expansion of Community Wastewater Management Systems where practicable.	Ongoing
	4.3 Work towards achieving essential services for the health of communities, towns and populations including through community wastewater systems to townships (eg. Penneshaw CWMS)	Penneshaw CWMS mostly complete, further expansions planned within this IAMP.

APPENDIX D – Capacity Assessment Recommendations – Kingscote and Parndana

Scheme	Walbridge & Gilbert Recommendations (Wallbridge & Gilbert, 2013) (Wallbridge & Gilbert, 2017) (Wallbridge & Gilbert, 2006)	Council Comments
Kingscote	(2013 Assessment) Divert flows from Pump Station E into Elizabeth Street Drain.	Completed as part of the 2015/16 and 2016/17 capital program. In Stage 1, bypass lines were installed on Elizabeth, Margaret and Todd Street. In Stage 2 bypass lines were installed down Giles and along Buller, connecting into existing 150mm gravity drain on Kingscote Esplanade. The bypass line on Elizabeth Street was connected to the rising main from Pump Station E reducing pressure on the existing lines providing sufficient capacity.
Kingscote	(2017 Assessment) Upgrade the Drain A1 from Buller St to Pump Station A (225mm PVC) to meet current capacity requirements.	No action required at this stage. The pipe is currently performing satisfactorily. The pipe is to be monitored and upgraded to 225mm when required or at the end of the current pipes useful life, whichever occurs first.
Kingscote	(2013 and 2017 Assessments) Upgrade the Drain C19 from Pump Station C to Cassini Street (225mm PVC) to meet current capacity requirements and ultimately up Karratta Terrace (150mm PVC) to meet future requirements and also creating a branch drain for connection of future developments.	No action required at this stage. Any current capacity issues were calculated using a minimum slope of 0.4% as the upstream inlet level was unknown. The slope/grade is more than that and at the time of writing this report there was no identified capacity issues with this pipe. As development in 'The Estate' continues, capacity of this pipe will be monitored and upgraded to 225mm when required or at the end of the current pipes useful life, whichever occurs first.
Kingscote	(2017 Assessment) upgrade the Drain C1 along Cygnet Road (150mm PVC), as well as the final 33m section of drain (225mm PVC) to meet current and future requirements.	No action required at this stage. The pipe is currently performing satisfactorily. The pipe is to be monitored and upgraded to 225mm when required or at the end of the current pipes useful life, whichever occurs first.
Kingscote	(2013 Assessment) Consider future catchment in the detailed design of Acacia Drive drain and the requirement to upgrade to 150mm PVC.	Stage 1 of Edgewater Estate has been constructed with 100mm pipe installed. The CWMS pipework within this Estate is owned by the developer. The 100mm pipe is sufficient for the current development however any future expansions of the Estate will need to consider if this pipe needs to be upgraded to 150mm pipe.
Kingscote	(2013 and 2017 Assessments) Locate any as constructed documentation for emergency storage at Pump Stations A & B and confirm existing emergency storage.	An audit conducted by Kellogg Brown & Root provides calculations and assessment of the emergency storage at Pump Stations A, B, C and D. Subsequent work was undertaken in 2006 to install additional 10m^3 tanks at Pump Stations A and B and an additional 20m3 tank at Pump Station C. Upon installation of the tanks at Pump Stations A and B, it was determined that there was already additional storage there (new tanks still installed). Thus total storage at these location is:

Scheme	Walbridge & Gilbert Recommendations (Wallbridge & Gilbert, 2013) (Wallbridge & Gilbert, 2017) (Wallbridge & Gilbert, 2006)	Council Comments

Pump Station	Sump Storage (m^3)	Gravity Main Storage (m^3)	Manhole Storage (m^3)	Additional Storage (m^3)	Total (m^3)
A	10.39	1.95	1.59	10 (tank installed 2006) ? (older tank)	23.9 + old tank
B	10.39	2.27	NA	17.8 Horizontal pipes) 10 (tank installed 2006) ? (older tank)	39.8 + old tank
C	10.39	1.88	1.36	20 (tank installed 2006)	33.6

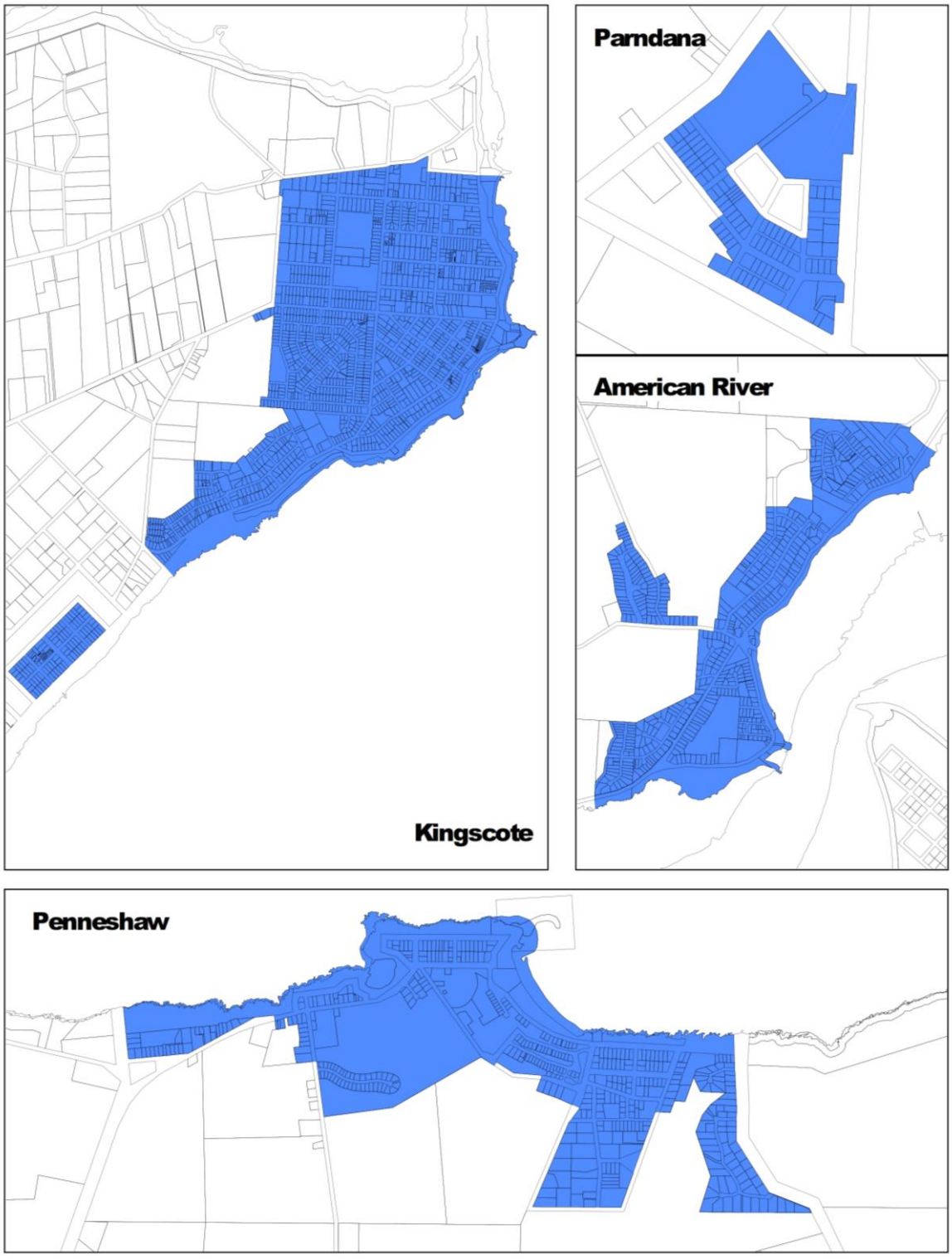
Kingscote	(2017 Assessment) Review and upgrade the emergency storage at Pump Station A & B.	No action required at this stage. To be actioned if any major developments occur upstream.
Kingscote	(2013 and 2017 Assessments) Upgrade the emergency storage at Pump Station C.	A SCADA (Supervisory control and data acquisition) system is to be installed which will monitor all pump stations and allow for isolation of any pump station when a high level alarm is triggered. Refer section 7.2 Improvement Plan.
Kingscote	(2013 Assessment) Investigate options for more frequent data logging at flow metres to assess stormwater ingress (2017 Assessment) Data would need to be daily in order to undertake an accurate assessment. It is suggested to install flow metres and pressure gauges at each pump station. This monitoring will also help to validate the results of the capacity assessment.	The SCADA system will allow for improved data logging. Refer section 7.2 Improvement Plan.
Kingscote	(2013 and 2017 Assessments) Install 150mm rising main from the swimming pool junction to Pump Station C (connecting to new rising main at Pump Station C)	Completed as part of a renewal program in 2018/19. Upgrading the 100mm pipe to 150mmm resolved pump duty issues at Pump Stations A & B.
Kingscote	(2013 Assessment) Install 250mm rising main from Pump Station C to the WWTP.	Completed as part of a renewal program in 2018/19. The previous rising main from Pump Station C to the WWTP had reached the end of its operational life and was of a diameter that is no longer manufactured, which made repairs difficult and expensive.
Kingscote	(2013 Assessment) Replace the pumps in Pump Station B with pumps equivalent to Pump Station A.	Complete
Kingscote	(2013 Assessment) Upgrade the duty of pumps at Pump Station D by 0.5-1.0L/s at next routine replacement.	No immediate action, included in renewal forecast for when Pump Station D is due for renewal. The progress of Edgewater Estate will be monitored as this progresses, it may bring the need for the pump upgrade forward.

Scheme	Walbridge & Gilbert Recommendations (Wallbridge & Gilbert, 2013) (Wallbridge & Gilbert, 2017) (Wallbridge & Gilbert, 2006)	Council Comments
Kingscote	(2017 Assessment) Establish a standard augmentation fee to cover system capacity use for all future developments.	Details on the charge for future developments is detailed in the Kangaroo Island Council's Community Wastewater Schemes (CWMS) Customer Charter/Policy.
Parndana	A capacity assessment of the drainage network was undertaken and revealed that all pipes have sufficient capacity to cater for current estimated loads.	Noted.
Parndana	The condition of the pipeline is unknown and it is recommended that a CCTV assessment be undertaken of the VC section of the network.	Completed 2013. Pipe cleaning and CCTV assessments undertaken. Repairs and pipe relining is occurring as a result of these inspections.
Parndana	An assessment of the lagoon was undertaken and revealed • Based on current estimated flow, the lagoon is at capacity • Lagoon is in a state of disrepair • Buffer distance from lagoon to the township does not meet requirement • Outlet from the lagoon discharges to the adjacent watercourse	Completed 2008. Storage lagoon upgraded to compliant treatment and storage lagoon and has been designed to cater for future development.
Parndana	Based on impacts of future development it is recommended the installation of a new 150mm gravity drain in Smith Street.	Completed 2008.

APPENDIX E – CCTV Assessment Examples

The images below are from the April 2013 CCTV assessment of the CWMS lines and are examples of the condition of the VC pipes in Parndana.

APPENDIX F – Defined Service Network



APPENDIX G – Renewal Priorities

Year		Amount	Asset Category	Details
2023/24	$	235,788	Pumping Stations	Pump chambers located within Kingscote Pump Stations A-F, replacement of older style control panels
	$	31,212	Treatment/Reuse	Kingscote WWTP aerator
2024/25	$	267,036	Treatment/Reuse	Kingscote WWTP aerators, pumps, PLC controls and chlorine dosing using
	$	21,386	Treatment/Reuse	Parndana WWTP Chlorine dosing unit
2025/26	$	155,720	Pipes	Gravity pipe at Parndana East
	$	57,397	Pipes and Nodes	Backlog
2026/27	$	41,616	Nodes	Maintenance holes in Kingscote and Parndana (note located within areas that have VC or Concrete pipes)
	$	308,190	Pumping Stations	Pumps located in American River Pump Stations 1-8 and Electrical assets in Kingscote Pump Stations A and B
	$	57,397	Pipes and Nodes	Backlog
2027/28	$	50,864	Treatment/Reuse	American River WWTP pump and chlorine dosing unit and Parndana WWTP pump
	$	57,397	Pipes and Nodes	Backlog
2028/29	$	894,989	Treatment/Reuse	Kingscote WWTP lagoon liner, shed, dead sludge tank and reuse irrigation tank and Penneshaw WWTP electrical works - router
	$	57,397	Pipes and Nodes	Backlog
2029/30	$	11,560	Treatment/Reuse	Reuse flow meters at Kingscote and Parndana
	$	57,397	Pipes and Nodes	Backlog
2030/31	$	8,554	Treatment/Reuse	Reuse flow meter and air conditioning unit at Kingscote WWTP
2031/32	$	191,341	Pipes and Nodes	VC pipes in Parndana
	$	54,325	Pumping Stations	Mechanical and civil assets in Kingscote Pumps Stations A and B
	$	43,928	Treatment/Reuse	Kingscote WWTP Reuse meter box
2032/33	$	5,780	Treatment/Reuse	American River WWTP reuse flow meter

APPENDIX H – Upgrade Priorities

Scheme	Potential New/Upgrades	Cost Estimate	Proposed Year
Kingscote	Installation of SCADA System	$20,000	2023/2024
	Expansion of network to cover part of Dutton St, Investigator Avenue and Stokes Court[15]	$333,000 (split over 2 years	2023/2024 2024/2025
	Expansion of network to cover Campbell St, Karatta Tce, Addison St area and part of Vivonne Ave [15]	$1,825,000[16] (split over 4 years)	2023/2024 2024/2025 2025/2026 2026/2027
	Expansion of network to cover part of Brownlow Road	$277,000	Not yet scheduled[17]
	Potential expansion to cover any new developments (ie Edgewater Estate, new hotels)	Unknown	Cost to be covered by developer
	Expansion of the reuse network to Kingscote oval	$500,000	Not yet scheduled
Parndana	No scheduled expansions, new connections to be managed through maintenance.	-	
Parndana East	Investigate options for Parndana East	$20,000	2024/2025
American River	Installation of SCADA System	$20,000	2023/2024
	No other scheduled expansions, new connections to be managed through maintenance.	-	
Penneshaw	Emergency Pump Out Options	$15,000	2024/2025
	Expansion of network to cover Freycinet Way [15]	$954,000 (split over 2 years)	2023/2024 2024/2025
	Expansion of network to cover East of Cheopis and/or Wright Road [15]	$672,000 (split over 2 years)	2027/2028 2028/2029
	Expansion of network to cover Binneys Track, Trethewey Tce, Vernan Court	$1,468,000	Not yet scheduled[17]
Dump Ezys	Installation of new Dump Ezys (Browns Beach and Vivonne Bay)	$20,000 each	Not yet scheduled, will only proceed with grant funding

[15] Considered high priority in Kangaroo Island CWMS Review Future Scheme Extension Assessment (Wallbridge Gilbert Axtec, 2022)

[16] The review (Wallbridge Gilbert Axtec, 2022) showed 3 possible scheme layouts, this is the cost associated with option B.

[17] Considered medium priority in Kangaroo Island CWMS Review Future Scheme Extension Assessment (Wallbridge Gilbert Axtec, 2022)