Review of capital and operating expenditure plans of SA Water

Report

3604-84

Prepared for
Essential Services Commission of South Australia

22 January 2016

ATKINS

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Shaping the Future

Document Information

Prepared for	Essential Services Commission of South Australia
Project Name	Report
Job Reference	3604-84
Date	22 January 2016

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Document Control

Version	Date	Author	Author Initials	Reviewer	Reviewer Initials
1	20/11/15	Christopher Koh, Peter Fordham, Jonathan Archer, Stephen Walker	CK, PF, JA, SW	Patrick Lavery	PAL
2	10/12/15	Christopher Koh, Peter Fordham, Jonathan Archer, Stephen Walker	CK, PF, JA, SW	Patrick Lavery	PAL
2.1	16/12/15	Christopher Koh, Peter Fordham, Jonathan Archer, Stephen Walker	CK, PF, JA, SW	Patrick Lavery	PAL
3.0	11/01/16	Christopher Koh, Peter Fordham, Jonathan Archer, Stephen Walker	CK, PF, JA, SW	Patrick Lavery	PAL
3.1	22/01/16	Christopher Koh, Peter Fordham, Jonathan Archer, Stephen Walker	CK, PF, JA, SW	Patrick Lavery	PAL

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Executive Summary

Introduction

This is the second time that SA Water has been subject to regulation of its maximum allowable revenue. The Essential Services Commission of South Australia (ESCoSA) set its first revenue control for SA Water in early 2013, covering the three year period from 1 July 2013 to 30 June 2016. ESCoSA will be making a second determination of SA Water's drinking water and sewerage revenues in early 2016, covering the four year period from 1 July 2016 to 30 June 2020. To assist in its price setting function, ESCoSA commissioned Cardno in association with Atkins to provide an independent financial and engineering assessment of the capital and operating expenditure plans of SA Water. Cardno/Atkins provided independent financial and engineering advice to ESCoSA for the first regulatory review and as such we have been able to observe the progress achieved by SA Water from the first to the second regulatory period.

This report provides our independent assessment of SA Water's capital and operating expenditure plans as set out in its Regulatory Business Proposal 2016-2020 (RBP2016) and supporting documents.

The specific scope of works required is as following:

Capital expenditure

ESCoSA requires advice on SA Water's capital expenditure plans, specifically:

- An ex-post review of SA Water's capex over the first regulatory period, to ensure that only prudent and efficient capex is included in the regulated asset base
- A review of SA Water's planning and asset management capability
- A view of planned capital expenditure on a 'whole of system' basis, taking account of a long-term planning horizon
- An engineering judgement as to the requirement for the proposed projects/programs (based on an appropriate level of sampling)
- A view on the timing and deliverability of the proposed projects/programs
- A view on the options considered in developing the projects/programs, including identification of any further options that should be considered
- A comparison of costs/unit costs of the planned projects/programs versus similar projects in other jurisdictions
- Where a project deferral is recommended, a re-phasing of expenditure should be provided
- An appropriately supported view on the reasonableness of SA Water's assumptions on cost escalation/efficiency on capital costs across the price determination period (e.g. wages growth, productivity assumptions, and materials costs).
- Any further relevant considerations.

Operating expenditure

ESCoSA requires advice on SA Water's operating expenditure plans, including the following:

- Provision of advice on any pass-through applications received from SA Water for the first regulatory period (to be recovered in the second regulatory period)
- A review of the efficiency of SA Water's proposed operating expenditure, including both directly attributed costs and allocated costs for regulated services and excluded services
- Identification and analysis of SA Water's potential for cost reductions/efficiency gains

- Identification and analysis of any areas of operations where planned expenditure is considered inadequate
- A view on the reasonableness of SA Water's attribution of costs between regulated, excluded and unregulated services, identifying any adjustments as necessary
- A review of the operating, maintenance, and administrative costs related to Adelaide Desalination Plant
- An appropriately supported view on the reasonableness of SA Water's assumptions on cost escalation/efficiency on operating costs across the price determination period (e.g. wages growth, productivity assumptions, materials costs)
- A review of SA Water's water supply mix assumptions, to ensure optimisation of water supply
- Any further relevant considerations.

SA Water

SA Water is wholly owned by the Government of South Australia, established by the *South Australian Water Corporation Act 1994*. SA Water provides water and wastewater services to approximately 1.66 million customers via over 760,000 water connections and 590,000 sewerage connections across both metropolitan Adelaide and country South Australia. SA Water [1] owns assets with a replacement cost of more than $21 billion, including:

- More than 27,00km of water mains.
- Approximately 8,800km of sewer mains.
- 42 water treatment plants.
- 24 wastewater treatment plants.

SA Water's operations are primarily governed by the *South Australian Water Corporation Act 1994* and the *Public Corporations Act 1993.* The *Water Industry Act 2012* came into force on1 July 2012, replacing a number of other pieces of legislation that previously provided SA Water with its powers to operate and maintain its infrastructure and charge for these services.

Methodology

For this review, our methodology for determining the efficient level of capital and operating expenditure required by SA Water for the upcoming regulatory period is broadly similar to that applied by us for the RBP2013 review. That is the concept of an efficient 'frontier' organisation competing in an open market to deliver services to customers. Under this framework, efficiency gains made by the frontier company are referred to as continuing efficiency, with catch-up applied to companies that are behind the frontier company, on the assumption that that they have greater scope to make improvements.

Consistent with our method of reviewing RBP2013, we have compared the business processes and systems and outcomes of SA Water against this standard of the frontier business, and assessed the level of efficiency gains that may be achieved by the organisation. However, for the RBP2016 we have sought to extend our review by making greater use of partial indicator benchmarking where the data is available and suitable for analysis.

Before applying efficiency gains, we have adjusted SA Water's expenditure proposals in the following areas:

- Adjustments to reflect better information provided by SA water

[1] National Performance Report 2014/15

- Adjustment to reflect our assessment of the prudence, timing and efficient level of expenditure of specific projects or programs.
- Adjustment of any top down factors applied to expenditure categories where we believe that the factors applied by SA Water are unreasonable (for example cost contingencies and real escalation factors).

Following these adjustments, continuing and catch-up efficiency factors are applied as appropriate to arrive at our determined level of prudent and efficient operating and capital expenditure. Note that the continuing and catch-up efficiency factors are applied across the whole expenditure program or parts of the program. This differs from project and program specific adjustments mentioned previously which are applied to a specific area of expenditure where there is sufficient evidence to justify an adjustment.

Continuing efficiency is the scope for top performing or frontier companies to continue to improve their efficiency. It reflects the continuing efficiencies being gained across all major sectors through innovation and new technologies. The continuing improvement element of efficiency relates to the increased productivity derived from process innovation and new technology that all well performing businesses should achieve, including frontier companies. This applies to a range of industry sectors and applies internationally to the extent that new innovations in one region are able to be adopted in other regions.

Catch-up efficiency is the productivity gains that may be realised when an agency moves from its current position to that of the frontier utility. Our assessment of catch-up efficiency is based on a qualitative, process based assessment of SA Water against leading practice for utilities in Australia and internationally, supplemented by partial indicator benchmarking. It is based on the professional judgement of our team formed from their broad and in-depth understanding of these processes across many utilities in Australia and internationally. Our assessment was based on identified improvements to processes and business opportunities. These improvements would generate efficiencies in future years to enable the agency to move towards the frontier utility.

Performance in RBP2013 regulatory period and Business Transformation project

In the RBP2013 period, SA Water has outperformed the capital and operating expenditure forecasts that were allowed for in its revenue Determination. SA Water's operating expenditure was more than 10% below the level allowed for in the Determination for 2013/14. An increase in operating expenditure for the water service in 2014/15 reduced the level of outperformance to around 4% in that year. This includes an increase in the outturn total operating expenditure of $7.7M for 2014/15 above the forecast included in the RBP2016 submission as detailed in Section 8.1. For 2015/16, SA Water is predicting a further increase in water operating expenditure but that total operating expenditure will still be marginally below the level allowed in the Determination.

SA Water's actual capital expenditure (and forecast outturn for 2015/16) for the RBP2013 period is 20% ($207M) lower than the $1,048M in capital expenditure allowed for in SA Water's revenue Determination. SA Water's own analysis concludes that it has achieved efficiency savings of $42.2M (3% saving on the revenue Determination) through improved capital delivery and through benefiting from favourable market conditions. Capital expenditure deferrals net of projects reprioritised into the current regulatory period total $134M and represent a 13% reduction on the capital expenditure forecast allowed in the Determination. It is not possible to conclude what proportion of this amount is expenditure delayed compared with expenditure that is no longer required due to better information on asset performance. In any case, the reduction in capital expenditure has not resulted in a reduction in service delivery; SA Water met 65 out of the 66 service standards specified for it to meet.

In all, the significant savings observed for capital expenditure compared with the 2013 Determination and the savings (although diminishing) for operating expenditure represent a notable achievement for the organisation and in turn, customers.

SA Water states in its RBP2016 submission (with respect to the water service but the comments are also applicable to the sewerage service):

> *Achieving these efficiencies, and achieving them early, has not been easy. These results were possible through transformational change involving restructuring our business, improving information technology (IT) systems, actively optimising our water supply mix, innovative energy sourcing methods and increased flexibility and resilience of the water supply network.*

SA Water commenced a "Business Transformation" program during the RBP2013 period. This program is led by a program manager and there is a dedicated Business Transformation team. The potential remit of the Business Transformation program is across all areas of the business and therefore all processes relating to operating and capital expenditure. The initiatives commenced under this program span areas including procurement, field mobility and cost estimating. For the RBP2016, SA Water has in particular identified investment in information technology as an enabler to realising further business efficiencies.

As detailed in Section 1.6.2, SA Water has committed to realising further efficiencies across its operating and capital expenditure in the coming regulatory period – 1% per annum year on year for operating expenditure and a flat 5% reduction in capital expenditure. A central consideration for this review is the extent to which these internal efficiency targets reflect the likely efficiency gains that will result from ongoing Business Transformation activities and continual improvement of business processes.

Supply mix optimisation and operation of the Adelaide Desalination Plant

At the RBP2013 Determination, the extent to which SA Water had optimised its supply mix was a consideration for ESCoSA. During the current regulatory period the Adelaide Desalination Plant (ADP) has also been in operation for warranty proving purposes.

We consider that SA Water has improved on its approach to optimising its supply mix. It has implemented a new model, the Distribution Optimisation Tool to forecast the demand on each of its supply sources for the RBP2016 period. The model has been subject to review, albeit by those who assisted in its development. Based on our limited assessments we consider that SA Water has taken an appropriate approach to modelling its supply mix for the RBP2016 period within the constraint set for operation of the Adelaide Desalination Plant (ADP) which we discuss below.

SA Water proposes to operate the ADP in 'minimum production mode' during the RBP2016 period. In this mode, the plant will produce 30ML/day of potable water for 9 months of the year which equates to around 8GL/year of potable water production. This proposal is not based on SA Water requiring the water to meet demand, but instead is due to SA Water's consideration of 'asset stewardship and mitigation of operational and strategic supply risks'. In SA Water's submission it estimated the annual incremental cost of operating the ADP in minimum production mode to be $5.7M compared with supplying demand from available lower cost sources. However, this figure was revised down by SA Water to $4.1M per annum after further analysis.

Based on our analysis of the likely level of deferrals able to be achieved by SA Water as a result of operating the ADP in minimum production mode we do not believe that this proposal is cost neutral on a net present cost basis. We therefore conclude that it is not prudent or efficient for SA Water to operate the ADP in a minimum production mode.

However, we acknowledge that there are difficult to quantify benefits that are not included in the net present cost assessment; particularly the network resilience and operational flexibility resulting from the additional supply source. SA Water, as the network operator and having responsibility for delivering service to its customers, is much better placed than us to consider whether these difficult to quantify benefits outweigh the increased operating costs arising from operation of the plant. Ultimately, SA Water needs to decide on the appropriate balance between cost and risks in service delivery.

We recommend that, if it adopts minimum production mode for the coming regulatory period, as soon as possible, SA Water identifies the critical assets which are impacted by the ADP's operation (both being necessary if it is unavailable and less necessary if it is available). For this list of ADP-critical assets, the risk profile of forthcoming major maintenance and renewal work can be ascertained and a prioritised works program developed. SA Water can then undertake a program of works for which it has a clear understanding of the impact of the works on its overall network resilience. We would expect that, in coming years, SA Water would be able to articulate how any major maintenance or renewal works have altered (reduced) its risk profile.

Strategic asset management

The conclusions from customer surveys carried out as part of the RBP2016 development appear to be fairly narrow – customers do not particularly wish to pay more (or less) for improved (or reduced) level of service provision. This broadly reflects the findings of customer research we have seen carried out in other jurisdictions. The key elements absent from the conclusions of the customer research is granularity and preference for different areas of focus, albeit within the same overall levels of expenditure.

Aligning with the expectations of ISO55000, SA Water drew attention to the work it had carried out since RBP2013 on establishing line of sight throughout the asset management process from Board level policy and strategy to activities carried out and their impact on the service received by customers. This is an important step in the right direction.

Of note and particular relevance to operational costs, but of significance to asset management and capital program considerations is SA Water's acknowledgement that it has not had a "typical" year for 10 years or more. The expenditure on the Adelaide Desalination Plant (ADP) drew upon available funds and led to deferment of non-critical expenditure.

With the construction of mains that link the supply areas on the north and south side of Adelaide city (the North South interconnection system), it is now possible to seek optimal resource use. A further important consideration is the service headroom that the improved connectivity and availability of water from the ADP provides. This headroom means that sustained outages can now take place at some treatment works, storage facilities and pumping stations that were previously critical to maintaining the supply to substantial parts of the metropolitan area. Avoiding the need to "work live" will facilitate more efficient operational and capital maintenance activities as well as asset inspection. The situation remains unchanged for rural areas where there is little available resource flexibility.

The capital maintenance activities proposed for the RBP2016 are substantially dealing with backlogs and removing or reducing the number of assets with what it has been decided is an unacceptable risk of failure. Activities have been prioritised and the duration and phasing of the programs influenced by SA Water's appetite for risk and the desire to maintain customer charges at the current level. We saw some examples of how the budget is reduced to reflect situations where the need has been reassessed through challenge or changed circumstances. Generally, the documented approach appears to compare the "do nothing" option to the "do the project" option or proactive versus reactive maintenance costs.

The existing SA Water approach to asset management is well set up to respond to the customer and other stakeholders' preference for stable bills and levels of service maintained at their current levels in term of both requirements and outturn. We believe SA Water should continue on its asset management journey and develop its response to customer preference within its business as usual.

SA Water accepts that as things stand, it is almost impossible to determine whether it has optimised the lifecycle cost for a particular level of service and at an acceptable risk. However, it can justifiably say that, for the capital planning process:

- Transparency and understanding of the decision making process has significantly improved over the past three years.

- Decisions are better informed and being made at the right level in the organisation.
- Decisions are subject to wider and deeper scrutiny than in the past.

SA Water has stated that it will make improvements both corporately and specific to asset management to arrive at a 3-year improvement plan. We believe this demonstrates a realistic understanding of its position upon its journey and an ethos of striving for continuing improvement.

Recommended prudent and efficient operating expenditure

Our overall conclusions with respect to operating expenditure are:

- That the base year position 2014/15 as defined by SA Water is a reasonable basis on which to forecast costs for the second regulatory period.
- We believe that SA Water, consistent with the first regulatory period determinations, should manage labour cost escalator issues within the overall CPI framework along with the other key cost drivers of power, materials and contracted services
- We have noted a number of adjustments that we think should be applied to the additional costs to the base that SA Water has identified in its RBP. These include some cost allocation issues in relation to the way in which costs have been allocated between the regulated business and non-regulated and excluded services and between water and sewerage services.
- We recognise that a general efficiency target applied across the totality of the operating expenditure base will impact differing elements of the cost base at differing levels of efficiency. This will reflect factors such as the degree of management control over those cost drivers, the potential headroom in service delivery, the degree to which the benefits from the proposed IT investment program are realised and from the ongoing business transformation program and the flexibility afforded by contract negotiation. SA Water commented that there is uncertainty related to how the proposed 1% per annum efficiency is to be realised. However, given that there is business owner sign-up to delivery of the IT facilitated business benefits, that SA Water is already pursuing potential savings through its contract management, and that there are likely to be further medium to longer term business benefits arising from the business transformation program initiated in the first regulatory period, we believe that a more challenging efficiency target is appropriate towards the latter end of the second regulatory period. We have calculated this additional efficiency target as being 50% of the general efficiency savings proposed by SA Water.

Our recommended level of efficient operating expenditure has been derived as follows consistent with our review methodology:

- **Adjustments for better information provided by SA Water**

  SA Water advised adjustments to the base year as discussed in Section 8.1

- **Adjustment to reflect our assessment of the prudence, timing and efficient level of expenditure of specific projects**

  We propose the following specific adjustments to operating expenditure items:

  - Removal of duplicated operating costs for Murray Bridge as detailed in Section 8.4.9
  - Reduction in operating expenditure for the Mandated Growth SFL as detailed in Appendix A and Section 8.4.9 to reflect a proposed reduction in capital expenditure in this area
  - Transfer of allocated costs of $100k per annum from sewerage to water to reflect our assessment of the appropriate allocation of costs

- **Adjustment of any top down factors applied to expenditure categories where we believe that the factors applied by SA Water are unreasonable.**

  Removal of the allowance for real labour escalation as detailed in Section 8.3.

- **Efficiency**

  Acceptance of SA Water's proposed efficiency target of 1% per annum (compounding) for the first two years of the RBP2016 regulatory period but applying an additional efficiency target equal to 50% of the general efficiencies identified by SA Water for the last two years of the regulatory period to reflect the level of ongoing efficiencies we consider that SA Water will be able to achieve.

Recommended efficient operating expenditure ($Dec 4)

Operating expenditure - $M	Water				Sewer			
	16/17	17/18	18/19	19/20	16/17	17/18	18/19	19/20
Proposed operating expenditure	327.6	328.6	326.6	324.4	131.1	131.3	131.1	129.8
SA Water Adjustments	(1.0)	(2.1)	(0.3)	(0.5)	(5.6)	(5.5)	(5.3)	(5.6)
Expenditure Adjustment								
- Labour Escalation	(0.8)	(1.1)	(1.5)	(1.9)	(0.3)	(0.5)	(0.7)	(0.8)
- Murray Bridge					(0.4)	(0.4)	(0.4)	(0.4)
- Cost Allocation	0.1	0.1	0.1	0.1	(0.1)	(0.1)	(0.1)	(0.1)
- Mandated growth SFL					(0.3)	(0.4)	(0.5)	(0.6)
Additional efficiency adjustment off base	-	-	(1.4)	(2.2)	-	-	(0.9)	(1.4)
Recommended efficient operating expenditure	326.0	325.5	323.5	319.9	124.3	124.4	123.2	120.8
Variance (recommended - proposed)	(1.7)	(3.1)	(3.1)	(4.5)	(6.8)	(6.9)	(7.9)	(8.9)
Variance (%)	-0.5%	-0.9%	-1.0%	-1.4%	-5.2%	-5.2%	-6.0%	-6.9%

Recommended prudent and efficient capital expenditure

Our recommended level of prudent and efficient capital expenditure for SA Water for the regulatory period has been developed in line with our methodology as follows:

- **Adjustments for better information provided by SA Water**

  SA Water advised that it had identified double counting in its estimated costs for the Mandated Growth WW Network SFL (9121). Our review of this project is set out in Appendix A. The impact of the double counting was to increase the expected costs by around $7.5M per annum. Removing this double counting reduces the overall RBP2016 capital expenditure program by $30.25M.

- **Adjustment to reflect our assessment of the prudence, timing and efficient level of expenditure of specific projects**

  We propose the following specific adjustments to capital expenditure items:

  - Removal of $12M of expenditure for the Structures Water Network Renewal program as this was a duplicated contingency.
  - Reduction of the amount allowed under the Mandated Growth Wastewater Network program to encourage infill development ($0.9M per annum). This revised level of expenditure is consistent with historic levels.
  - Reduction in the estimate of efficient costs for the Murray Bridge WWTP relocation to reflect benchmark costs for a conventional activated sludge treatment plant ($7.0M in the RBP2016 period).
  - Exclusion of costs for the Orroroo water quality improvement project ($12.8M) as it does not pass the prudence test on the information available.

- Reduction of expenditure for the Improve Environmental Performance program to align with the detailed cost breakdown provided by SA Water, and to remove $4.0M of expenditure for energy efficiency initiatives. We consider that energy efficiency should only be undertaken if the investment has a positive financial payback.
- Reduction of $1.11M in the proposed expenditure for the Tailem Bend to Keith Pipeline Storage costs to reflect efficient costs as per the findings of the capital cost benchmarking detailed in Section 7.2.

- **Adjustment of any top down factors applied to expenditure categories where we believe that the factors applied by SA Water are unreasonable.**

  None identified

- **Efficiency**

  We propose the following adjustments for capital expenditure efficiency:

  - We propose that capital efficiency targets be extended to information technology expenditure as detailed in Section 9.4.2.
  - As set out in Section 9.6, we propose that SA Water's proposed capital expenditure be subject to a continuing efficiency target of 0.25% per annum.
  - We recommend that SA Water's proposed flat capital efficiency of 5% be replaced by a compounding efficiency factor of 2% per annum.

The following table details our recommended prudent and efficient capital expenditure following the application of the adjustments and efficiency factors outlined above. The starting point is the proposed capital expenditure following the adjustments advised by SA Water on 3 November 2015 as detailed in Section 9.1.

Recommended prudent and efficient capital expenditure ($MDec14)

	16/17	17/18	18/19	19/20	Total
Proposed capital expenditure	294.5	353.6	327.6	284.8	1,260.5
Adjustments for better information provided by SA Water					
Mandated Growth WW Network SFL	-7.8	-7.9	-7.7	-7.8	-31.2
Expenditure adjustment					
Structures WN renewal SFL	-1.5	-3.7	-3.7	-3.0	-12.0
Removal of amount to encourage infill development for Mandated Growth WW Network SFL	-0.8	-0.8	-0.8	-0.8	-3.3
Murray Bridge WWTP relocation			-3.5	-3.5	-7.0
Removal of Orroroo water quality improvement	-1.3	-8.2	-3.1	0.0	-12.6
Reduction to Improve Environmental Performance program	-1.4	-3.4	-4.8	-4.5	-14.2
Reduction to Tailem Bend to Keith Pipeline proposed expenditure		-1.1			-1.1
Add back SA Water 5% flat efficiency factor	14.09	17.58	15.19	13.13	60.0
Total - Adjusted proposed capital expenditure	*295.8*	*346.0*	*319.0*	*278.3*	*1,239.1*
Efficiency adjustment					
Continuing efficiency	0.25%	0.25%	0.25%	0.25%	
Catch-up efficiency	2.00%	2.00%	2.00%	2.00%	

	16/17	17/18	18/19	19/20	Total
Total cumulative efficiency (compounded)	2.25%	4.45%	6.60%	8.70%	
Efficiency adjustment	-6.7	-15.4	-21.1	-24.2	-67.3
Recommended efficient capital expenditure	**289.2**	**330.6**	**298.0**	**254.1**	***1,171.8***
Variance (recommended - proposed)	*-5.4*	*-23.0*	*-29.6*	*-30.7*	-88.7
Variance (%)	*-1.83%*	*-6.50%*	*-9.04%*	*-10.79%*	*-7.04%*

Glossary

Term	Definition
ABS	Australian Bureau of Statistics
AC	Asbestos cement
ADP	Adelaide Desalination Plant
ADWG	Australian Drinking Water Guidelines
BOD	Biochemical Oxygen Demand
CEO	Chief Executive Officer
CI	Cast iron
CPI	Consumer Price Index
CPMM	Corporate Project Management Methodology
DICL	Ductile iron concrete lined
ESCoSA	Essential Services Commission of South Australia
FFA	Full Financial Approval
FMECA	Failure modes, effects and criticality
FTE	Full Time Equivalent
GIS	Geographical Information System
GRV	Gross replacement value
IS	Information Services
KPI	Key Performance Indicator
MSCL	Mild steel concrete lined
NPR	National Performance Report
NSIS	North-South Interconnection System
NWC	National Water Commission
NWI	National Water Initiative
O&M	Operations & Maintenance
OH&S	Occupational Health & Safety
PAS 55	Publically Available Standard on Asset Management
PE	Polyethylene
PMF	Probable Maximum Flood
PMP	Project Management and Procurement

Term	Definition
PVC	Poly vinyl chloride
PWC	Public Works Committee
PWQ	Pending Work Queue
RBP	Regulatory Business Proposal
RPI	Retail Price Index
SA	South Australia
SA Water	South Australian Water Corporation
SS	Suspended solids
SCADA	System Control and Data Acquisition
STP	Sewage Treatment Plant
TN	Total Nitrogen
WSAA	Water Services Association of Australia
WDV	Written down value
WTP	Water Treatment Plant
WWTP	Wastewater treatment plant

1 Introduction

1.1 Overview

Following South Australia's transition towards independent economic regulation of the water industry, the Water Industry Act 2012 appointed the Essential Services Commission of South Australia (ESCoSA) as the independent economic regulator of the state-wide water industry. ESCoSA was established under the Essential Services Commission Act 2002 (the ESC Act), and is an independent economic regulator of essential services in South Australia. In undertaking its regulatory functions, ESCoSA has the primary objective of protecting the long term interests of South Australian consumers with respect to the price, quality and reliability of essential services.

ESCoSA set its first revenue control for SA Water in early 2013, covering the three year period from 1 July 2013 to 30 June 2016 (Referred to herein as the RBP2013 regulatory period). ESCoSA will be making a second determination of SA Water's drinking water and sewerage revenues in early 2016, covering the four year period from 1 July 2016 to 30 June 2020 (Referred to herein as the RBP2016 period). To assist in its price setting function, ESCoSA commissioned Cardno in association with Atkins to provide an independent financial and engineering assessment of the capital and operating expenditure plans of SA Water.

This report provides our independent assessment of SA Water's capital and operating expenditure plans as set out in its Regulatory Business Proposal 2016-2020 and supporting documents.

1.2 Purpose and scope of this report

The purpose of this report is to provide expert advice to ESCoSA, from both a financial and engineering perspective, on the prudence and efficiency of SA Water's capital and operating expenditure plans for the forthcoming revenue determination period.

The specific scope of works required is set out in the following sections.

1.2.1 Review of capital expenditure

ESCoSA requires advice on SA Water's capital expenditure plans, specifically:

- An ex-post review of SA Water's capex over the first regulatory period, to ensure that only prudent and efficient capex is included in the regulated asset base
- A review of SA Water's planning and asset management capability
- A view of planned capital expenditure on a 'whole of system' basis, taking account of a long-term planning horizon
- An engineering judgement as to the requirement for the proposed projects/programs (based on an appropriate level of sampling)
- A view on the timing and deliverability of the proposed projects/programs
- A view on the options considered in developing the projects/programs, including identification of any further options that should be considered
- A comparison of costs/unit costs of the planned projects/programs versus similar projects in other jurisdictions
- Where a project deferral is recommended, a re-phasing of expenditure should be provided
- An appropriately supported view on the reasonableness of SA Water's assumptions on cost escalation/efficiency on capital costs across the price determination period (e.g. wages growth, productivity assumptions, and materials costs).
- Any further relevant considerations.

1.2.2 Review of operating expenditure

ESCoSA requires advice on SA Water's operating expenditure plans, including the following:

- Provision of advice on any pass-through applications received from SA Water for the first regulatory period (to be recovered in the second regulatory period)
- A review of the efficiency of SA Water's proposed operating expenditure, including both directly attributed costs and allocated costs for regulated services and excluded services
- Identification and analysis of SA Water's potential for cost reductions/efficiency gains
- Identification and analysis of any areas of operations where planned expenditure is considered inadequate
- A view on the reasonableness of SA Water's attribution of costs between regulated, excluded and unregulated services, identifying any adjustments as necessary
- A review of the operating, maintenance, and administrative costs related to Adelaide Desalination Plant
- An appropriately supported view on the reasonableness of SA Water's assumptions on cost escalation/efficiency on operating costs across the price determination period (e.g. wages growth, productivity assumptions, materials costs)
- A review of SA Water's water supply mix assumptions, to ensure optimisation of water supply
- Any further relevant considerations.

1.2.3 Cost pass through

No cost pass through applications were received by ESCoSA from SA Water for the first regulatory period.

1.3 Overview of SA Water

The South Australian Water Corporation (SA Water) is a government enterprise, wholly owned by the Government of South Australia, established by the *South Australian Water Corporation Act 1994*. Prior to this time, water and sewerage services were provided by the State Engineering and Water Supply Department. SA Water was corporatised in 1995 and is wholly owned by the Government of South Australia.

SA Water is the dominant supplier of water and sewerage services in South Australia, serving approximately 1.66 million customers via over 760,000 water connections and 590,000 sewerage connections across both metropolitan Adelaide and country South Australia. SA Water[2] owns assets with a replacement cost of more than $21 billion, including:

- More than 27,000km of water mains.
- Approximately 8,800km of sewer mains.
- 42 water treatment plants.
- 24 wastewater treatment plants.

Table 1-1 lists key information relating to SA Water's assets and operations.

[2] National Performance Report 2014/15

Table 1-1 SA Water key statistics[3]

Assets	2013/14	2014/15
Length of water mains including recycled water mains (km)	26,984	27,078
Length of sewers (km)	8,807	8,853
Water treatment plants including ADP (no.)	42	42
Wastewater treatment plants (no.)	25	24
Accounts		
Total connected properties to sewerage and water supply services (000s)	1,339	1,353
Estimated population served - Water (000s)	1,605	1,664
Estimated population served - Wastewater (000s)	1,281	1,309
Demand		
Total urban potable water supplied (ML)	213,926	218,979
Average residential consumption per household (kL)	178	180
Water Sources		
Total sourced water (ML)	221,352	226,336
Volume of water sourced from surface water (% of total)	63.7%	81.4%
Volume of water sourced from groundwater (% of total)	5.4%	5.3%
Volume of water sourced from desalination of marine water (% of total)	27.6%	10.1%
Volume of water sourced from recycling (% of total)	3.4%	3.2%

1.4 Regulatory environment

SA Water's operations are primarily governed by the *South Australian Water Corporation Act 1994* and the *Public Corporations Act 1993*. The *Water Industry Act 2012* came into force from 1 July 2012, replacing a number of other pieces of legislation that previously provided SA Water with the powers to operate and maintain its infrastructure and charge for these services.

The key legislation guiding SA Water are summarised in Table 1-2.

Table 1-2 Legislative framework

Legislation	Description
South Australian Water Corporation Act 1994	This Act establishes the SA Water Corporation and makes it subject to the *Public Corporations Act 1993*. SA Water's primary functions, as set out in the Act, include: ▸ Supply of water by means of reticulated systems; ▸ Storage, treatment and supply of bulk water; and ▸ Removal and treatment of wastewater by means of sewerage systems.
Public Corporations Act 1993	This Act requires SA Water to operate as a commercial entity in accordance with a charter, performance statement or other direction issued by the Minister.
Water Industry Act 2012	The Water Industry Act regulates the South Australian water industry, including appointing the ESCoSA as economic regulator, licensing retail service providers, and ensuring appropriate technical standards for water and sewerage infrastructure and plumbing.
Metropolitan Drainage Act 1935	The Metropolitan Drainage Act provides for flood mitigation works on the River Torrens, Sturt River, and the Brownhill and Keswick Creeks.

[3] Sourced from SA Water National Performance Report data for 2013/14 and 2014/15

Legislation	Description
Rates and Land Tax Remission Act 1986	The Rates and Land Tax Remission Act provides for rates concessions for various rates to be granted to eligible pensioners. The remission scheme is funded by the Government but administered by SA Water.

SA Water's operations are also subject to regulation and oversight by a number of entities who are conferred powers under different items of legislation. The main entities involved in regulating the South Australian water sector are detailed in Table 1-3. A number of these other bodies set standards, with which SA Water must comply in delivering services to consumers.

Table 1-3 Entities involved in the regulation of the water industry[4]

Regulators	Overview of role within the water industry	Relevant legislation
Regulators		
Department of Environment, Water and Natural Resources	Regulates state water resources and other natural resource management matters	Natural Resources Management Act 2003
SA Health	Regulates health aspects relating to the provision of drinking water supplies.	Safe Drinking Water Act 2011
Office of the Technical Regulator	Regulates safety and technical matters.	Water Industry Act 2012
Environment Protection Authority	Regulates the environmental impact of water businesses.	Environment Protection Act 1993
Treasurer	Sets application fees and licence fees for water industry entities, issues Ministerial directions (billing and meters) and Pricing Orders.	Water Industry Act 2012
Minister for Water	Administers the Water Industry Act, and responsible for non-regulatory instrument (e.g. schemes) and appointing water industry entities.	Water Industry Act 2012
Energy and Water) Ombudsman SA	Handles complaints of customers of water licensees.	Water Industry Act 2012 Corporations Act 2001
Other Agencies		
Consumer and Business Services	Regulates the relationship between landlords and tenants in relation to the payment of rates and charges for water and sewerage services. CBS also regulates the professional conduct of plumbers.	Residential Tenancies Act 1995 Plumbers, Gasfitters and Electricians Act 1995
Department for Communities and Social Inclusion	Sets hardship and concession policy	Water Industry Act 2012

1.5 Review methodology

For this review, our methodology for determining the efficient level of capital and operating expenditure required by SA Water for the upcoming regulatory period is broadly similar to that applied by us for the RBP2013 review, that is the concept and of an efficient 'frontier' organisation competing in an open market to deliver services to customers. Under this framework, efficiency gains made by the frontier company are referred to as continuing efficiency, with catch-up applied to companies that are behind the frontier company, on the assumption that that they have greater scope to make improvements.

[4] Extracts from the Economic Regulation of SA Water's Revenues – Statement of Approach paper by ESCoSA, July 2012 (http://www.escosa.sa.gov.au/projects/162/economic-regulation-of-the-south-australian-water-industry.aspx#stage-720=&stage-list=7)

As at RBP2013, we have compared the business processes and systems and outcomes of SA Water against this standard of the frontier business, and assessed the level of efficiency gains that may be achieved by the organisation. However, for the RBP2016 we have sought to extend our review by making greater use of partial indicator benchmarking where the data is available and suitable for analysis.

Before applying efficiency gains, we have adjusted SA Water's expenditure proposals in the following areas:

- Adjustments to reflect better information provided by SA Water
- Adjustment to reflect our assessment of the prudence, timing and efficient level of expenditure of specific projects or programs
- Adjustment of any top down factors applied to expenditure categories where we believe that the factors applied by SA Water are unreasonable (for example cost contingencies and real escalation factors).

Following these adjustments, continuing and catch-up efficiency factors are applied as appropriate to arrive at our determined level of prudent and efficient operating and capital expenditure. Note that the continuing and catch-up efficiency factors are applied across the whole expenditure program or parts of the program. This differs from project and program specific adjustments mentioned previously which are applied to a specific area of expenditure where there is sufficient evidence to justify an adjustment.

Continuing efficiency is the scope for top performing or frontier companies to continue to improve their efficiency. It reflects the continuing efficiencies being gained across all major sectors through innovation and new technologies. The continuing improvement element of efficiency relates to the increased productivity derived from process innovation and new technology that all well performing businesses should achieve, including Frontier companies. This applies to a range of industry sectors and applies internationally to the extent that new innovations in one region are able to be adopted in other regions.

Catch-up efficiency is the productivity gains that may be realised when an agency moves from its current position to that of the frontier utility. Our assessment of catch-up efficiency is based on a qualitative, process based assessment of SA Water against leading practice for utilities in Australia and internationally, supplemented by partial indicator benchmarking. It is based on the professional judgement of our team formed from their broad and in-depth understanding of these processes across many utilities in Australia and internationally. Our assessment was based on identified improvements to processes and business opportunities. These improvements would generate efficiencies in future years to enable the agency to move towards the frontier utility.

1.6 Price base and cost data for review

1.6.1 Price base

ESCoSA required that SA Water submit for the purposes of this review its actual and estimated costs as follows[5]:

- Nominal (money of the day) prices for all actual expenditure up to and including 2014/15.
- Real (constant dollar) prices for all other expenditure without forecast inflation (i.e. $Dec14 real prices).

All costs presented in this report are at the December 2014 price base unless noted otherwise.

In its framework paper, ESCoSA notes that it *"intends to adopt a CPI-based approach to cost escalators in the SA Water PD 2016, unless it can be demonstrated that circumstances beyond the reasonable control of SA Water exist, which justify either an above-CPI or below-CPI cost change…. If SA Water believes that such*

[5] ESCoSA, Review of SA Water's Prices: 2016/17 – 2019/20 Guidance Paper, November 2014, p. 26-27.

circumstances will exist in any specific cost category, it will need to provide strong supporting evidence in RBP 2016."

1.6.2 Application of SA Water's internal efficiency targets

SA Water provided with its submission spreadsheets detailing its proposed expenditure by individual activity or project.

For capital expenditure, SA Water's cost data includes "Technical Submission" figures and its "RBP2016 Proposal" figures. The "RBP2016 Proposal" figures reflect a 5% flat efficiency target applied by the Board. This efficiency adjustment was made internally after the staff responsible for formulating the expenditure forecasts had finalised their forecasts. The efficiency adjustment was applied as a flat reduction on the expenditure proposed for each year for each initiative leading to an overall reduction of 5% of the total proposed expenditure. For this report, we have based our discussion and analysis on the "RBP2016 Proposal" figures, i.e. net of the 5% efficiency gain applied by the Board. We discuss this further in Section 9.3.

For operating expenditure, SA Water has also included an efficiency target that is around 1% in the first year and rising by 1% each year to be 4% in the final year of the Regulatory Period. However, this has been applied by SA Water using a different approach, as follows:

- Proposed operating expenditure was determined for each activity in each year and the expenditure for all activities was totalled
- Efficiency gains attributable to Information Systems expenditure were subtracted from the total operating expenditure forecast
- "General efficiency" savings were then subtracted to meet the efficiency target of 1% in 2016/17 rising to 4% in 2019/20. The general efficiency savings are not directly attributable to specific initiatives – they are a challenge the business has set for itself to outperform
- Labour cost escalation is added following application of efficiencies
- The proposed operating expenditure for RBP2016 is the total operating expenditure for all activities, less Information Systems related efficiencies, less general efficiencies, plus real escalation of labour costs.

This approach differs to that for capital expenditure as the efficiencies are applied at the aggregate level. In this report we discuss operating costs as proposed for activities by SA Water before the efficiency savings have been applied. We then discuss the proposed efficiency savings separately in Section 8.6.

The development of SA Water's operating expenditure is set out in Table 1-4. Note that 2014/15 is included as it is the base year for the determination and 2015/16 is included for reference.

Table 1-4 Application of efficiency savings and real labour escalation to proposed operating expenditure ($ basis)

	14/15	15/16	16/17	17/18	18/19	19/20
Total proposed operating expenditure (Gross)	**453.4**	**453.9**	**466.1**	**463.6**	**469.1**	**469.6**
IS enabled efficiency savings	0.0	0.0	(3.5)	(6.2)	(8.9)	(10.9)
General efficiency savings	0.0	0.0	(1.0)	(2.6)	(4.7)	(7.2)
Real escalation of labour	0.0	0.6	1.1	1.7	2.2	2.7
Net impact - efficiency and real labour escalation	*0.0*	*0.6*	*(3.4)*	*(7.1)*	*(11.4)*	*(15.4)*
Total proposed operating expenditure (Net)	**453.4**	**454.5**	**462.7**	**456.5**	**457.7**	**454.2**

Table 1-5 details the same data as Table 1-4 but as a proportion of the proposed operating expenditure gross of adjustments. This table shows that the proposed escalation of real labour partially offsets the proposed efficiency gains so that by 2019/20, the net reduction in operating expenditure applied by SA Water is 3.3%. We discuss operating expenditure and the scope for efficiency gains in detail in Section 8.

Table 1-5 Application of efficiency savings and real labour escalation to proposed operating expenditure (% basis)

	14/15	15/16	16/17	17/18	18/19	19/20
Total proposed operating expenditure (Gross)	453.4	453.9	466.1	463.6	469.1	469.6
IS enabled efficiency savings	0.0	0.0	-0.8%	-1.3%	-1.9%	-2.3%
General efficiency savings	0.0	0.0	-0.2%	-0.6%	-1.0%	-1.5%
Total efficiency savings	*0.0%*	*0.0%*	*-1.0%*	*-1.9%*	*-2.9%*	*-3.9%*
Real escalation of labour	0.0	0.0	0.2%	0.4%	0.5%	0.6%
Total adjustments – Efficiency and real labour (%)	*0.0%*	*0.1%*	*-0.7%*	*-1.5%*	*-2.4%*	*-3.3%*

2 Profile of SA Water

2.1 Strategic Management

SA Water has published an Overview Strategic Plan for the period 2016 – 2020. This document sets out SA Water's purpose as:

Delivering safe, sustainable and affordable water services to customers and the community.

The Strategic Plan also sets out six strategic priorities supported by statements of intent. These are summarised in Table 2-1.

Table 2-1 SA Water's strategic priorities

Strategic priorities	Statement of intent
Affordability	▪ To drive efficiency and value-for-money in SA Water's services ▪ To meet customer expectations for service levels at the lowest possible price
Water for growth	▪ To contribute to the liveability and economic development of South Australia
Business agility and resilience	▪ To be agile and be able to respond appropriately to impacts and opportunities in a rapidly changing world. ▪ To be capable of recovering from significant events in order to continue providing products and services to future generations
Water quality and regulation	▪ To maintain and, where economic, enhance the quality of SA Water's products ▪ To meet all regulatory requirements (economic, environment, technical, health and water licensing)
Reliable infrastructure	▪ To ensure the reliability of assets and quality of supply ▪ To ensure network capability caters for growing demands
Climate resilient	▪ To ensure sufficient preparation for climate variability and understand how it affects resources, water security, assets and water quality

The aforementioned strategies were developed to focus on the seven key outcomes detailed in Table 2-2.

Table 2-2 SA Water's key outcomes and attributes

Key outcomes	Key attributes to successful outcomes
Great customer experience	▪ Satisfied customers ▪ Easy to do business with ▪ Caring for our communities ▪ Digitally and technology enabled
Safe, clean water	▪ Safe, clean drinking water
Reliable services	▪ Efficient capital delivery ▪ Reliable and dependable services ▪ Sound asset management practice in place
Healthy environment	▪ Protecting natural resources ▪ Importance of cultural heritage recognised and managed appropriately ▪ Climate variability planning
Smart investment	▪ Asset stewardship ▪ Agile and resilient business ▪ A secure and sustainable supply ▪ Alternate water sources ▪ Investing in our people ▪ Focused on innovation

Key outcomes	Key attributes to successful outcomes
Value for money	▪ Business efficiency and pricing ▪ Affordable ▪ Fair return on investment ▪ Good governance

2.2 Asset base

Table 2-3 provides a summary of SA Water's asset base. As with most water utilities, water mains (reticulation and trunk mains) are the most significant component of the asset base, comprising 38% of all assets by value. Wastewater mains are the next most significant category, comprising 15% of all assets by value.

Table 2-3 SA Water's infrastructure summary[6]

	Value		Quantity		
Asset Class	Gross Replacement Value	Written Down Value	Total	Country	Metro
Water					
Water Mains	4,516	2,506	24,165km	15,216km	8,949km
Major Pipelines	2,756	1,713	2,599km	2,357km	242km
Desalination Plant	1,813	1,677	6	1	5
Reservoirs	1,187	520	32	11	21
Water Filtration Plants	1,156	631	21	15	6
Water Services	1,010	658	681,459	213,085	468,374
Water Tanks	831	400	792	561	231
Water Pumps	631	319	848	529	319
Leased Water	208	90	11	11	-
Dosing Stations	119	57	166	139	27
Earth Storages	85	39	77	68	9
Water Meters	65	29	681,395	212,563	468,832
Bores & Wells	47	31	226	225	1
Wastewater					
Sewer Mains	3,080	1,979	9,051km	1,496km	7,555km
Sewer Connections	1,154	608	509,802	72,622	437,180
Wastewater Treatment Plant	1,844	1,083	27	20	7
Sewer Pumps	354	194	742	261	481
Corporate					
Land	313	313			
Software	145	38			
Telemetry	110	51			
Other	410	263			

[6] Provided by SA Water

Total	**21,835**	**13,199**

2.3 Performance in RBP2013 regulatory period and Business Transformation project

In the RBP2013 period, SA Water has outperformed the capital and operating expenditure forecasts that were allowed for in its revenue Determination. SA Water's operating expenditure was more than 10% below the level allowed for in the Determination for 2013/14. An increase in operating expenditure for the water service in 2014/15 reduced the level of outperformance to around 4% in that year. This includes an increase in the outturn total operating expenditure of $7.7M for 2014/15 above the forecast included in the RBP2016 submission as detailed in Section 8.1. For 2015/16, SA Water is predicting a further increase in water operating expenditure but that total operating expenditure will still be marginally below the level allowed in the Determination.

SA Water's actual capital expenditure (and forecast outturn for 2015/16) for the RBP2013 period is 20% ($207M) lower than the $1,048M in capital expenditure allowed for in SA Water's revenue Determination. SA Water's own analysis concludes that it has achieved efficiency savings of $42.2M (3% saving on the revenue Determination) through improved capital delivery and through benefiting from favourable market conditions. Capital expenditure deferrals net of projects reprioritised into the current regulatory period total $134M and represent a 13% reduction on the capital expenditure forecast allowed in the Determination. It is not possible to conclude what proportion of this amount is expenditure delayed compared with expenditure that is no longer required due to better information on asset performance. In any case, the reduction in capital expenditure has not resulted in a reduction in service delivery; SA Water met 65 out of the 66 service standards specified for it to meet.

In all, the significant savings observed for capital expenditure compared with the 2013 Determination and the savings (although diminishing) for operating expenditure represent a notable achievement for the organisation and in turn, customers.

SA Water states in its RBP2016 submission (with respect to the water service but the comments are also applicable to the sewerage service):

> *Achieving these efficiencies, and achieving them early, has not been easy. These results were possible through transformational change involving restructuring our business, improving information technology (IT) systems, actively optimising our water supply mix, innovative energy sourcing methods and increased flexibility and resilience of the water supply network.*

SA Water commenced a "Business Transformation" program during the RBP2013 period. This program is led by a program manager and there is a dedicated Business Transformation team. The potential remit of the Business Transformation program is across all areas of the business and therefore all processes relating to operating and capital expenditure. The initiatives commenced under this program span areas including procurement, field mobility and cost estimating. For the RBP2016, SA Water has in particular identified investment in information technology as an enabler to realising further business efficiencies.

As detailed in Section 1.6.2, SA Water has committed to realising further efficiencies across its operating and capital expenditure in the coming regulatory period – 1% per annum year on year for operating expenditure and a flat 5% reduction in capital expenditure. A central consideration for this review is the extent to which these internal efficiency targets reflect the likely efficiency gains that will result from ongoing Business Transformation activities and continual improvement of business processes.

2.4 Performance and cost benchmarking

Benchmarking can provide a useful insight into the relative performance of regulated businesses[7]. The most notable data set available is the National Performance Report. However, there are difficulties in benchmarking performance and cost data relating to Australia's water utilities. These include differing business structures and scope of services, inconsistent interpretation of the National Performance Report definitions and a lack of rigour in the data submitted for the National Performance Report. Despite these limitations, some useful insights can be gained from comparisons using this data set. We used this data set in our RBP2013 review of SA Water. For the RBP2016 review SA Water has engaged a consultant to benchmark its performance, largely relying on the National Performance Report data set.

We largely agree with the findings of SA Water's benchmarking analysis and note that the findings are broadly consistent with our conclusions at RBP2013. That is, that SA Water has amongst the lowest levels of operating costs amongst its peers in Australia. This is illustrated in Figure 2-1 which charts the combined water and sewerage operating costs for major water Australian utilities for the three years to 2013/14. Major water utilities are defined as those with more than 100,000 customers. SA Water has the third lowest reported operating costs per property in 2013/14, but in 2011/12 had the lowest amongst this group. We note that SA Water achieved further reductions in operating expenditure in 2014/15 and forecasts a further small decrease in 2015/16 before costs are proposed to increase again in 2016/17.

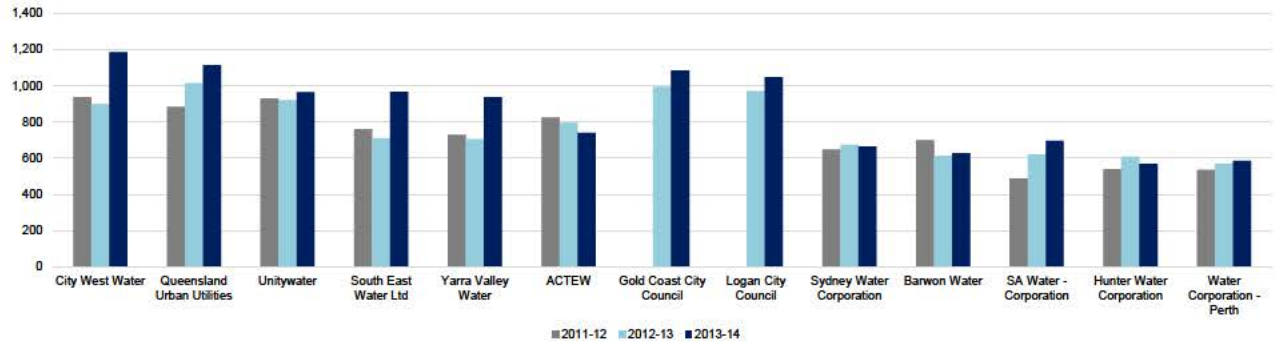


Figure 2-1 Combined water and sewerage operating cost per property for major water utilities 2011/12 - 2013/14 ($nominal/property)

Of this comparator group, Water Corporation, Hunter Water, Sydney Water and ACTEW are all vertically integrated utilities. The remaining utilities are distributor-retailer entities whose operating costs include charges for service provided by bulk suppliers. Figure 2-2 shows operating costs per property for the water service only and Figure 2-3 shows operating costs per property for the sewerage service only.

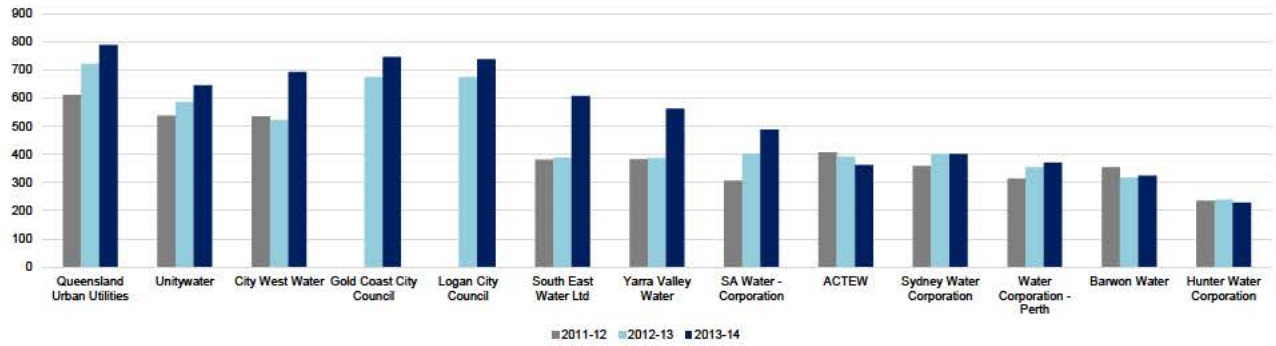


Figure 2-2 Water operating cost per property for major water utilities 2011/12 - 2013/14 ($nominal/property)

[7] Previously coordinated by the National Water Commission and now coordinated by the Bureau of Meteorology. More information and the latest reports can be obtained here: http://www.bom.gov.au/water/npr/

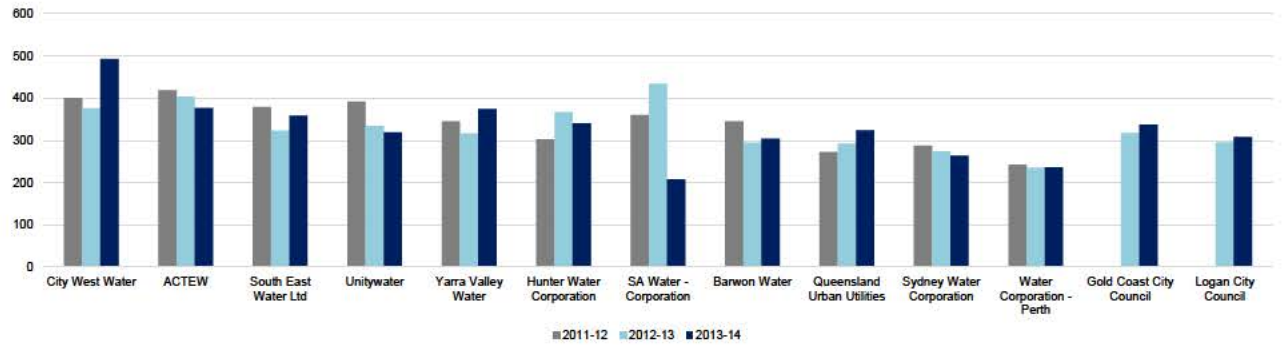


Figure 2-3 Sewerage operating cost per property for major water utilities 2011/12-2013/14 ($nominal/property)

The above two figures show that the increase in SA Water's combined water and sewerage operating costs is driven by the increase in water operating costs. This is partly explainable due to increased operating of the Adelaide desalination plant. However, the reason for the sudden decrease in SA Water's sewerage operating costs from 2012/13 to 2013/14 is less clear. We discuss movements in SA Water's operating costs in more detail in Section 8.

SA Water has included in its RBP2016 Submission a 'multi-factor productivity' assessment. This assessment is based on a production function that uses a combination of number of customers, length of mains and volume of water delivered as a proxy for the output of Australian water utilities. This assessment uses 2013/14 data and finds that has SA Water has improved its efficiency compared with 2010/11 and is also one of the most efficient utilities in Australia based on this measure. We consider that this benchmarking is a useful reference and the findings of the multi-factor productivity assessment is discussed alongside consideration of environmental factors, partial indicators of productivity, and the limitations of the approach. We comment further on the operating cost benchmarking put forward by SA Water in Section 8.6.

3 Governance, budgeting and cost allocation

3.1 Governance arrangements

SA Water operates within a regulatory framework of over 150 pieces of legislation. This framework includes economic regulation of water and sewerage services. Under the Water Industry Act 2012 and the Essential Services Commission Act 2002, ESCoSA determines the maximum revenue the water utility can earn from the sale of supply of drinking water and sewerage services. Also under those Acts, ESCoSA is responsible for consumer protection and monitoring SA Water's performance and compliance against prescribed service standards, code requirements and allowable revenue.

It is important to note that there has been a change in SA Water's governance and reporting structure during the first regulatory review period. The previous and current governance and reporting structures are shown below for comparison purposes. One notable change is the consolidation of Business Groups from a total of nine to seven groups.

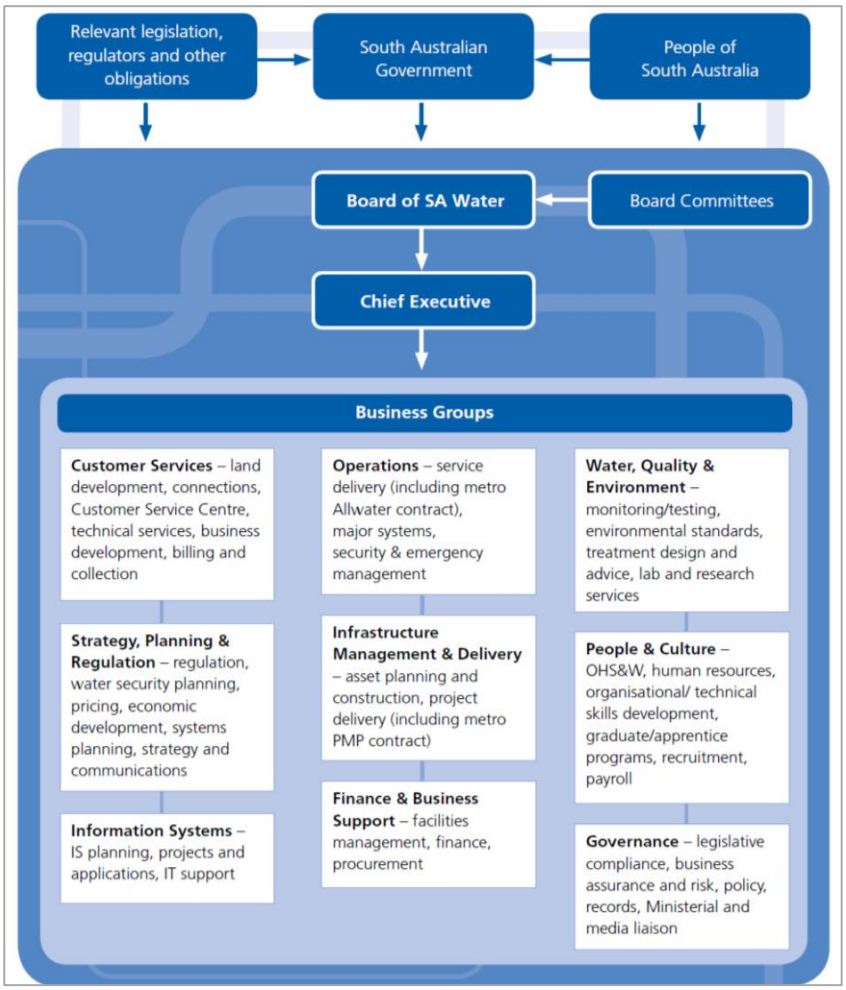


Figure 3-1 SA Water's previous governance and reporting structure

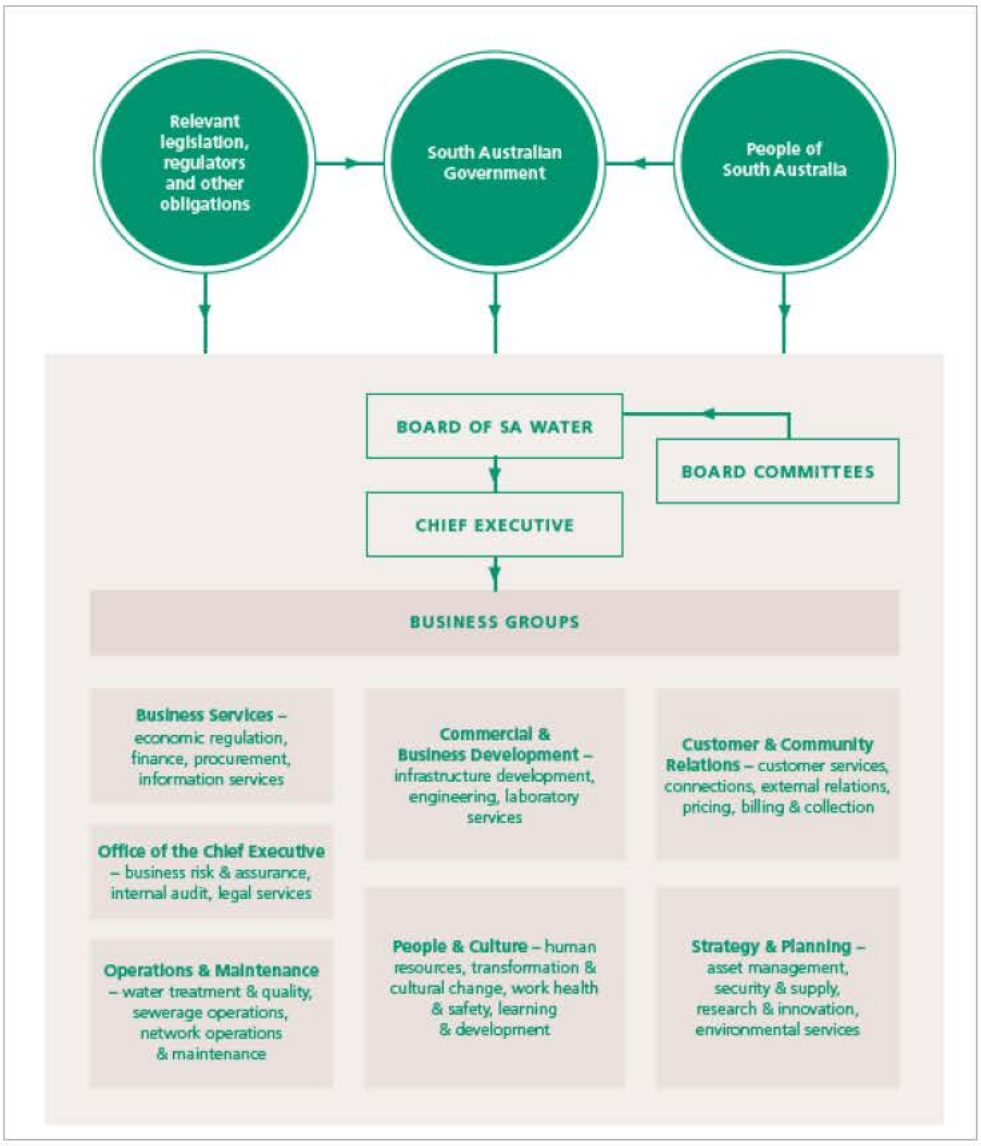


Figure 3-2 SA Water's current governance and reporting structure

Operational groups undertake direct control, excluded services and non-regulated services and are split along functional lines. Support groups provide support services to the organisational groups to meet the needs of key stakeholders. The organisational structure is described in further detail in the table below.

Table 3-1 SA Water's operational ('front-line') and business support groups as at 30 June 2015

Group Type	Group Name	Functions
Operational Group	Customers and Community Relations	▪ Customer liaison and service provided through Customer Service Centre ▪ External relations, customer participation and strategy ▪ Land development and connections ▪ Pricing ▪ Billing and collections
Operational Group	Operations and Maintenance	▪ Operation and maintenance of water and wastewater assets including preventative and corrective maintenance ▪ Operation of the Adelaide Desalination Plant
Operational Group	Commercial and Business Development	▪ Engineering (including design services) ▪ Infrastructure project delivery and stakeholder engagement ▪ Laboratory services ▪ New business and major development

Group Type	Group Name	Functions
		▪ Management of land and natural assets (including reservoirs)
Support Group	Strategy and Planning	▪ Water quality services ▪ Environmental management ▪ Treatment ▪ Asset management ▪ Systems planning ▪ Water licence management ▪ Drought response, water planning
Support Group	Business Services	▪ Finance ▪ Procurement ▪ Accommodation ▪ Energy services and strategy ▪ Info Services, IS Systems, ICT operations
Support Group	People and Culture	▪ Workplace health and safety ▪ Organisational development ▪ Human resource management, payroll ▪ Recruitment and training ▪ Internal communications
Support Group	Office of the Chief Executive	▪ Chief Executive and Corporation Secretary ▪ Insurance and risk ▪ Legal ▪ Compliance and policy ▪ Records management ▪ Director support

3.2 Budget development

Based on our understanding from the previous regulatory period review, SA Water's annual budgeting cycle reflects a well-established budget on budget approach with a formal quarterly review monitoring progress. There appears to be a mature set of thresholds for approvals for both capital and operating expenditure.

3.3 Operating expenditure development methodology

SA Water's methodology for developing its operating expenditure forecasts is summarised in Section 7.4 of its Proposal and follows these steps:

1. Selection of base year 2014/15
2. Allocation of operating expenditure between direct control, excluded and non-regulated
3. Further allocation of direct control operating expenditure between water and sewerage services
4. Adjustments to Base Year operating expenditure for each year to 2019/20
5. Application of real escalators
6. Application of efficiency savings.

3.4 Cost allocation

This regulatory review applies only to SA Water's direct control services. The classification of service areas into each of the three categories is summarised in Table 3-1.

Table 3-2 Regulatory classification of key services provided by SA Water (RBP 2016)

Direct control services	Excluded services	Non-regulated services
▸ Sale and supply of drinking water; and ▸ Sale and supply of sewerage services	▸ Standard and non-standard connection services; ▸ Miscellaneous minor services; ▸ Annual sewerage and recycled water audit services; ▸ Easement extinguishment services; ▸ Network analysis services	▸ Laboratory services provided on a commercial basis; ▸ Project management services and consultancy services provided on a commercial basis; ▸ Water transportation services provided to third parties; ▸ Operation and maintenance of the River Murray lock system and Salt Interception Schemes; ▸ Soil and sand testing services; ▸ Emergency functional services; and ▸ Metropolitan floodwaters drainage administration

We are required to comment on the reasonableness of SA Water's methodology for allocation of costs between direct control services, excluded services and non-regulated services. This methodology is outlined in SA Water's regulatory submission.

SA Water has a detailed cost allocation methodology (CAM) covering the basis and assumptions underpinning the allocation of costs between the regulated business, the excluded business and the non-regulated business encompassing those elements of costs that are directly attributed and those with a shared allocation of costs. KPMG has undertaken a full limited assurance of the Cost Allocation Method, Cost Allocation Model and Regulatory Expenditure Model Workbook as they relate to the 2016 RBP. KPMG assurance did not include any work related to future projections or reasonableness of incremental cost savings initiatives.

KPMG concluded in the double negative that:

"….we have not become aware of any matter that would lead us to believe that, in all material aspects:

- *The SA Water Cost Allocation….is not consistent with ESCoSA's classification of services*
- *The formulae on the worksheet of the Cost Allocation Model….are not mathematically accurate and internally consistent*
- *The formulae on the worksheets of the Regulatory Expenditure Model Workbook….are not mathematically accurate and internally consistent; and*
- *Baseline year financial data inputs for the period 1 July 2014 to 30 June 2015 and the comparative period 1 July 2013 to 30 June 2014….have not been accurately input from SA Water's financial system and allocated in accordance with the principles of the SA Water Cost Allocation Model."*

This provides comfort that the baseline year 2014/15 costs have been allocated consistent with ESCoSA's requirements. In that the baseline year provides the starting point for incremental movements in operating expenditure during the second regulatory period, it follows that the incremental movements should also follow the ESCoSA's requirements.

The incremental movements to the base relate to the flat rate efficiency assumptions across the total operating expenditure of the base year and the operating expenditure increases from the base year related to:

- Unavoidable external requirements
- Improved customer support and experience
- Network growth
- Technology investment; and
- Labour escalation

Based upon the discussions we have had with SA Water and review of the supporting documentation, we believe that the changes to the base year operating expenditure as proposed in the RBP all relate to the regulated business.

SA Water's audited statutory financial accounts are the basis for all regulatory business proposals and regulatory reporting with costs allocated as described in SA Water's CAM. Table 3-3 summarises the allocation of costs between direct control, non-regulated and excluded services.

Table 3-3 Cost allocation summary

$M 13/14 Actual	Direct Charge	Allocated Costs	Total Opex	% Total Opex	Alloc. % Total Opex
Excluded Services	2	5	7	1.3%	0.9%
Non-Regulated	58	18	75	13.6%	3.2%
Direct Control			472	85.1%	
Total			**554**		

Source: Table 4 page 17 SA Water Cost Allocation Method

We noted that there are two material changes to the base year allocation of costs compared to RBP2013 arising from SA Water's review of its CAM resulting in an increase in direct control expenditure on average by $31m per annum over the regulatory period. SA Water told us that these have been subject to independent audit by Deloitte and the Auditor-General's office, in consultation with ESCoSA. These increases arise from:

- Capitalisation of the cost of connections fees which were incorrectly classified as operating expenditure for RBP2013 and allocated to excluded services. Under the updated allocation rules, these are capitalized in line with accounting standards but for the purposes of regulatory accounts expensed. This results in a greater redistribution of the operating expenditure pool from excluded services to direct control
- Reclassifying contingent rentals from finance leases in RBP2013 to operating expenses in RBP2016 consistent with Australian Accounting Standards AASB117.

In addition, there has been a reclassification of the water planning and management fee to 100% to the responsibility centre whereas in RBP2013 it was split between water and sewerage. The effect of this is to increase the water base cost by some $7m to $8m and reduce the sewerage base costs by some $8m to $9m per annum over the RPB 2016 period. (source: pages 18/19 of SA Water Cost Allocation Method).

We understand that there are in effect two sets of costs related to the base year. The first, reflecting the RBP2013 allocations, has been used in the comparisons of actuals to RBP2013 allowances. The second, reflecting the revised cost allocations, is used as the baseline for projecting costs forward for the RBP2016 proposals. We think this is reasonable.

Turning to the split between water and sewerage costs; consistent with the coding that underpins the general ledger and management accounts costs are attributed, where possible, directly to the appropriate responsibility centre. SA Water told us that approximately 60% of costs are directly attributed; where a cost is

not specific to water or sewerage direct control the component has been split 67% to 33% consistent with the RBP2013. This assumption excludes the Adelaide Desalination Plant (ADP) as it would skew the analysis.

4 Service demand

4.1 Overview

Under the Water Industry Act 2012, ESCoSA is responsible for setting service standards for SA Water's water and sewerage services. The first service standards for SA Water were published in October 2013 and applied for the first regulatory period. These service standards detail the quality of the service that SA Water must seek to achieve on a 'best endeavours' basis, given the level of operating and capital expenditure it is allowed to recover in its revenue.

For 2013/14, SA Water's met 65 out of the 66 specified service standards. In order to better understand the expectations of its customers regarding service delivery, SA Water undertook a customer engagement program (Your Say) during the RBP2013 period. The key findings of the engagement program in relation to the level of service provided were:

- the customers are generally satisfied with the level of service provided
- the customers are not willing to pay more for a better service
- the customers are not willing to pay less for a lower level of service.

For the RBP2016 regulatory period, SA Water proposes that the current 66 service standards be consolidated into 18 standards. Further, SA Water proposes to align its service standard targets for the second regulatory period with the performance levels determined at the time of customer consultation. SA Water states that a reduced list of service standards will enable it to explain its investments and performance to customers more readily.

We note that the Your Say results align with those undertaken by other utilities where customers have supported the status quo. We caution that this is not necessarily an endorsement of the current situation but quite possibly a reflection of either customer's unwillingness to move to different state, their inability to comprehend what the different state would mean for their welfare (in terms of service delivery and cost impact), or both. That SA Water proposes to align service standards to current performance will reinforce the present circumstances and we are concerned that this may hinder its ability to identify where a different trade-off (up or down) between costs and service may be preferred by customers.

4.2 Benchmarking of service standards

A number of SA Water's important service standards (current and proposed) have been benchmarked against the standards (or performance) of three Victorian water businesses. The businesses selected include a large metropolitan business and two smaller businesses, including a regional business. Victorian water businesses have been selected as these businesses specify service standard targets that are approved by the Essential Service Commission (of Victoria) The Victorian water businesses' approved service targets and Guaranteed Service Levels are published in the Essential Service Commission's Customer Service Code. Therefore, the applicable standards are publically available and transparent.

The comparison is shown in Table 4-1.

Table 4-1 Comparison of sample of key performance indicators targets

KPI	Service Provider	Currency	Approved service standards
Customer Contact Services – Answer Rate	SA Water	2013/14 to 2015/16	85% of calls answered within 30 secs in FY
		2016/17 to 2019/20 (proposed)	85% of calls answered within 30 secs in FY
	Yarra Valley Water	2014/15	77% of calls answered within 30 secs in FY
	Barwon Water	2013/14 to 2017/18	90% of calls answered within 30 secs in FY

KPI	Service Provider	Currency	Approved service standards
	North East	2013/14 to 2017/18	95% of calls answered within 30 secs in FY
Attendance at Burst or Leaking Water Pipes Response metrics for Priority 1 events	SA Water	2013/14 to 2015/16	95% responded to within 1 hour for metropolitan customers
		2016/17 to 2019/20 (proposed)	98% responded to within 1 hour for metropolitan customers
	Yarra Valley Water	2014/15	Average response of 32.8 minutes
	Barwon Water	2013/14 to 2017/18	Average response of 27 minutes
	North East	2013/14 to 2017/18	Average response of 17 minutes
Attendance at Burst or Leaking Water Pipes Response metrics for Priority 2 events	SA Water	2013/14 to 2015/16	99% responded to within 5 hours for metropolitan customers
		2016/17 to 2019/20 (proposed)	98% responded to within 1 hour for metropolitan customers
	Yarra Valley Water	2014/15	Average response of 44.7 minutes
	Barwon Water	2013/14 to 2017/18	Average response of 43.4 minutes
	North East	2013/14 to 2017/18	Average response of 23 minutes
Sewerage Overflows to Dwellings Response Time	SA Water	2013/14 to 2015/16	95% responded to within an hour for metropolitan customers
		2016/17 to 2019/20 (proposed)	98% responded to within an hour for metropolitan customers
	Yarra Valley Water	2014/15	Average response time for sewer spills of 52.8 minutes
	Barwon Water	2013/14 to 2017/18	Average response time for sewer spills of 52.5 minutes
	North East	2013/14 to 2017/18	Average response time for sewer spills of 24 minutes
Sewerage Service Restoration Time	SA Water	2013/14 to 2015/16	99% restored within 5 hours for metropolitan customers
		2016/17 to 2019/20 (proposed)	97% restored within 5 hours for metropolitan customers
	Yarra Valley Water	2014/15	Average restoration time of 196.3 minutes
	Barwon Water	2013/14 to 2017/18	Average restoration time of 175 minutes
	North East	2013/14 to 2017/18	Average restoration time of 140 minutes

The framing of SA Water's service standards as percentiles makes direct comparison difficult to the reported averages, as comparability relies on the distribution of underlying performance. Basing service standards on percentiles means that SA Water can focus on the great majority of customers, with some outliers being possible without overly impacting its ability to achieve the service standard. We consider this to be a positive. As noted, the Your Say customer engagement program suggests that customers support the current levels of service. We consider that SA Water needs to better test specific areas of service delivery in the coming regulatory period and we expand on this topic throughout this report. Our discussion with SA Water suggests that it also considers that this to be the next stage in the development of its engagement with customers.

4.3 Line of sight in service delivery

For the RBP2016 period, SA Water has sought to establish a clearer line of sight between its activities and its customers. The framework it has used has been to define 'Key Performance Outcomes' for the water and sewerage service. The Key Performance Outcomes adopted by SA Water are:

- Ensure safety in the workforce
- Achieve customer satisfaction
- Demonstrate regulatory compliance
- Improved returns to our owner.

The Key Performance Outcomes are then mapped to 'service level impact to beneficiaries', or SLIBs. The SLIBS are an important part of the line of sight and SA Water's planning approach as they are the building blocks of the capital expenditure program. Each SLIB relates to a beneficiary of the investment – customer, worker or owner. Beneath SLIBs, SA Water has established business and infrastructure KPIs. The mapping from Key Performance Outcomes to SLIBs and to KPIs is summarised in Table 4-2 for the water service and Table 4-3 for the wastewater service. We note in undertaking this exercise that the line of sight is more developed for the wastewater service than for the water service.

We consider that the mapping of line of sight and reflection in its Regulatory Submission demonstrates a step change in the maturity of SA Water's approach to expenditure planning since RBP2013. We consider that the next stage of improvement for SA Water in the coming regulatory period is to embed these in its business planning documents as we have seen in our review that implementation is sometimes inconsistent which is understandable given the timeframe in which the RBP2016 submission was prepared. As the line of sight becomes ingrained in SA Water's activities, potential improvements will be identified and these should be documented, tested and where appropriate, endorsed and incorporated. We comment further on the line of sight between customers and asset management practices in Section 6.

Table 4-2 Mapping of Key Performance Outcomes, SLIBs and KPIs – Water Service

LINE OF SIGHT	Key Performance Outcome	Ensure safety in the community	Ensure safety in the workforce	Achieve customer satisfaction	Demonstrate regulatory compliance	Improve returns to our owner
	Primary SLIB	**Safety for the community**	**Safety for SA Water worker**	**Water supply reliability for the customer**	**Water quality for the customer**	**Financial for the owner/customer**
	Business Measures	▪ Acceptable risk to the community	▪ Reduction in the number of 'Serious Incidents'	▪ Acceptable level of interruptions to properties	▪ Compliance with Australian Drinking Water Guidelines (ADWG)	▪ Optimised lifecycle costing ▪ Average bill increases no more than CPI

Key Performance Outcome	Ensure safety in the community	Ensure safety in the workforce	Achieve customer satisfaction	Demonstrate regulatory compliance	Improve returns to our owner
Business KPI	▪ Zero injuries to members of the community ▪ No third party injuries associated with unauthorised access to SA Water 'non-critical sites'	▪ Serious incidents (no target as the new measure) ▪ Serious Injury Frequency Rate (SIFR) <8.6 ▪ Reduce SIFR from 11.44 to 5 by 2020 ▪ 100% compliance with legislation	**Headworks:** ▪ <1900 3+ property interruptions **Networks & Strategic:** ▪ <1900 3+ property interruptions ▪ Compliance with Environmental Flow Plan ▪ Customer satisfaction survey >87.5% ▪ 95% of construction/ extensions completed within target timeframes	▪ Compliance with ADWG: - 100% Metro - 99.8% Regional ▪ <2 Priority Type 1 incidents per year ▪ <35 Type 1 incidents per year ▪ <60 Type 2 incidents per year	▪ 100% positive or least negative NPV replacement options ▪ Profit Before Tax hits target
Infrastructure KPI	▪ 100% compliance with MHF Legislation ▪ No breach of compliance with ANCOLD guidelines ▪ All inspection issues resolved by due date ▪ No more than 150 trespasses per year on 'non-critical sites'	▪ No more than 150 trespasses per year for non-critical sites ▪ Zero known non-compliances with building legislation ▪ Reduce number of Serious Incidents associated with infrastructure	**Headworks:** ▪ Full compliance with system transfer requirements through weirs, aqua, etc. ▪ No unplanned occurrences of storage below low low levels ▪ <4 major pipeline bursts per 100km ▪ Condition 4 assets replaced by nominated date ▪ Compliance with extraction River Murray licence conditions **Networks & Strategic:** ▪ E-flow Recipe[8] delivered ▪ No material impact on reliability of supply due to failure to react in a timely manner ▪ No impact to reliability of supply from 3rd party trespassing and interference with infrastructure ▪ Water networks	▪ 100% of assets below 'High' risk on corporate heat-map ▪ Number of detections of hazardous contaminants	▪ System planning models no more than 5 years old ▪ Major plant (heavy vehicles) average age not more than 10 years old ▪ No major and minor plants more than 10% over its optimal life (or EUL if not available) ▪ All steel pipes protected in optimal way ▪ Zero structural assets in condition grade 5 ▪ 100% of meter within 5% accuracy

[8] An e-flow recipe is defined as the volume and timing of flow releases to mimic the natural environment and maintain waterway ecosystems.

	Key Performance Outcome	Ensure safety in the community	Ensure safety in the workforce	Achieve customer satisfaction	Demonstrate regulatory compliance	Improve returns to our owner
				breaks/100km/year - Metro <21 - Regional <8 ▪ Water trunk failures/100km/year = 10 state-wide ▪ 100% of assets below 'High' risk on corporate heat-map ▪ Flow rate at customer meter: - Metro >27L/min - Country >5 L/min ▪ Maintain number of high/low pressure complaints: - Metro <1,500 - Regional <800		

Table 4-3 Mapping of Key Performance Outcomes, SLIBs and KPIs – Wastewater Service

LINE OF SIGHT	Key Performance Outcome	Ensure safety in the workforce	Achieve customer satisfaction	Demonstrate regulatory compliance	Demonstrate regulatory compliance	Improve returns to our owner
	Primary SLIB	**Safety for SA Water worker**	**Wastewater service reliability for the customer**	**Wastewater service reliability for the environment**	**Wastewater quality discharged to the environment**	**Financial for the owner/customer**
	Business Measures	▪ Acceptable number of serious incidents	▪ Acceptable number of internal overflows per annum ▪ Quality of recycled water supplied to customers	▪ Meeting total number of Type 1 and Type 2 reportable incidents caused from wastewater overflows	▪ Compliance with EPA Licences and Environmental Legislation ▪ Meeting total odour complaints targets for wastewater networks ▪ Compliance with SA Water's effluent quality targets	▪ Optimised life cycle costing (LCC) ▪ Affordable water bill

	Key Performance Outcome	Ensure safety in the workforce	Achieve customer satisfaction	Demonstrate regulatory compliance	Demonstrate regulatory compliance	Improve returns to our owner
	Business KPI	▪ Serious incidents (no target as the new measure) ▪ Serious Injury Frequency Rate (SIFR) <8.6	▪ <290 internal overflows per annum ▪ 100% compliance with DoH Licence and Legislative Requirements	▪ <86 total wastewater overflows Type 1 and 2 reportable incidents per annum (77 per annum by 2019-2020)	▪ <450 odour complaints associated with wastewater networks ▪ 100% compliance with SA Water targets for WWTP Water Quality Performance (not currently Business KPI) ▪ 100% compliance with EPA Licence and Environmental Legislation	▪ ROI (return on investment) % increase Sewage $ Bill for average valued residential property above CPI
	Lower Level Business KPI	Nil	**Connections:** ▪ <222 properties with an internal sewer overflow caused by a sewer connection choke **Reticulation Mains:** ▪ <68 properties with an internal sewer overflow caused by sewer main choke **WWTPs:** Nil	**Wastewater Mains:** ▪ ≤67 Type 1 and 2 wastewater network overflow notifications from wastewater mains ▪ <1500 Type 3 environmental incidents per annum relating to sewer main choke **Wastewater Pumping Stations:** ▪ ≤17 Type 1 & 2 wastewater network overflow notifications from wastewater pumping systems (pumping stations and pumping mains) **WWTPs:** ▪ ≤8 Type 1 environmental incidents at WWTPs per annum	Nil	▪ 100% positive or least negative NPV replacement options
	Infrastructure KPI	**All Asset Types**: ▪ Reduce the number of 'serious incidents' associated with infrastructure (reduction in	**Connections:** ▪ 10% reduction in internal overflows per annum caused by a sewer connection choke	**Wastewater Mains:** ▪ No wastewater overflows or Type 1 and 2 notifiable incidents as a result of network capacity shortage	**Mains, Ancillaries and Pumping Stations:** ▪ Removal of all multiple complaint hotspots greater than or equal to 3	**Wastewater Network Structures**: ▪ Maintain structural integrity where no structures assets in

	Key Performance Outcome	Ensure safety in the workforce	Achieve customer satisfaction	Demonstrate regulatory compliance	Demonstrate regulatory compliance	Improve returns to our owner
		percentage or absolute terms to be determined) ▪ Risk reduction of the highest priority risk rated hazards associated with particular assets, each year	**Reticulation Mains:** ▪ 10% reduction in internal overflows per annum caused by a sewer main choke ▪ Wastewater main breaks and chokes per 100km/year: - 52 Metro - 15 Regional **RWTPs:** ▪ 100% compliance with DOH Supply Approval ▪ 100% compliance with DOH Use Approval ▪ No Type 1 Incidents for E.coli in Recycled Water ▪ Average Daily Turbidity Compliance % - Virginia Pipeline RWS (≤0.5 NTU for 95% of days) ▪ TDS Compliance % - Virginia Pipeline RWS ▪ pH Compliance % (<8.5, >6.0 for every day, 99% of time in that day) ▪ TDS Compliance % - Mawson Lakes RWS (≤900 for every week, 86% of the time in that week)	▪ Number of wastewater reticulation main blockages (per annum): - 3,815 Metro - 220 Regional ▪ No intolerable risks greater than the corporate risk appetite (acceptable level of risk) for network M&E and Ancillary assets ▪ No intolerable risks greater than the corporate risk appetite (acceptable level of risk) for network trunk mains ▪ Wastewater main breaks and chokes per 100km/year: - 52 Metro - 15 Regional **Wastewater Pumping Stations:** ▪ No intolerable risks greater than the corporate risk appetite for network M&E assets (based on the Wastewater Quality risk profile) **WWTPs:** ▪ No Type 1 environmental incidents at WWTPs as a result of capacity storage	complaints within a 48 hour period ▪ 50% reduction in number of odour hotspots with greater than or equal to 10 complaints over three years (rolling) **WWTPs:** ▪ No failure of defined targets for malodours for each WWTP at boundary of nearest receptor ▪ Meet Performance Targets as defined for WWTPs for BOD, SS, Turbidity, NH3-N, TN, TP ▪ No failure of effluent quality performance targets defined for WWTPSs as a result of capacity shortage ▪ No intolerable risks greater than the corporate risk appetite for WWTP M&E assets (based on the Wastewater Quality risk profile) ▪ 100% compliance with specified timeframes to meet EIP outcomes ▪ No unacceptable levels of risk for environmental impacts identified under the EMS relating to compliance with the Environment Protection Act	condition grade 5 **WWTPs:** ▪ Maintain structural integrity where no structures assets in condition grade 5

5 Supply mix optimisation

5.1 Supply mix optimisation

We are required to review SA Water's water supply mix assumptions to ensure optimisation of water supply, as operating costs for water supply are a major component of SA Water's total operating costs. SA Water obtains water from the following sources:

- Groundwater - which is typically an important source for small towns outside of Adelaide.
- The Adelaide Desalination Plant (ADP) – which has recently completed its proving phase. While SA Water considers that it does not require the plant during the RBP2016 period to meet demand, it proposes to operate the plant for operational reasons.
- Surface water collected in reservoirs in the Mount Lofty Ranges (MLR) – this is SA Water's cheapest source of water. However the volume available is not large, with storage equating to around 12 months' supply, and is dependent on rainfall.
- River Murray – water from this source makes up the balance of the water requirements for the Adelaide region. In drought years, the volume supplied from this source has been up to 90% of the total. Because of the costs of treating this water and pumping it from the River Murray to Adelaide, this source of water is more expensive than surface water collected in the MLR. A population of around 150,000 in townships along the river and in rural areas relies on the River Murray as its sole source of water.

Supply mix optimisation is relevant to the Adelaide region where multiple sources are available. For most regional areas, there is limited flexibility in supply. Therefore, this discussion focuses on the Adelaide region.

During the RBP2013 period, SA Water has improved its approach to modelling and forecasting its optimal mix of supply sources for the Adelaide region. It previously relied on the 'HOMA' model for this purpose. This model was around 30 years old and had some rigidities in how it was able to model the network. The newly developed Distribution Optimisation Tool incorporates a mass balance of the Adelaide supply network including sources (surface water, River Murray and the ADP), treatment plants, transfer mains and rivers (raw and treated water), pump stations and network storage. Linear programming is used for optimisation. The optimisation problem is typically to minimise operating costs over a given time period for given system constraints.

SA Water commissioned a review of the Distribution Optimisation Tool by the consultant that assisted it to establish the model. This review found that SA Water had developed the model using appropriate inputs and appropriate constraints. It found that the changes made reflected operational realities and were therefore improvements to the model. The review found that the model outputs were logical and avoided incongruous results such as excess system spill and unwarranted system transfers.

We consider that the review of the Distribution Optimisation Tool provides sufficient assurance that the model provides robust forecasts of SA Water's optimal supply mix. We have compared the forecast supply mix for major water treatment plants with actual throughput for 2014/15 in Figure 5-1. This figure shows declining output from the Happy Valley WTP and the ADP which is to be expected as the proving period comes to an end. The other metropolitan treatment plants increase production from 2015/16 to make up the reduced ADP input. The forecast water treatment plant outputs appear logical and provide some further assurance that SA Water's proposed supply mix is appropriate.

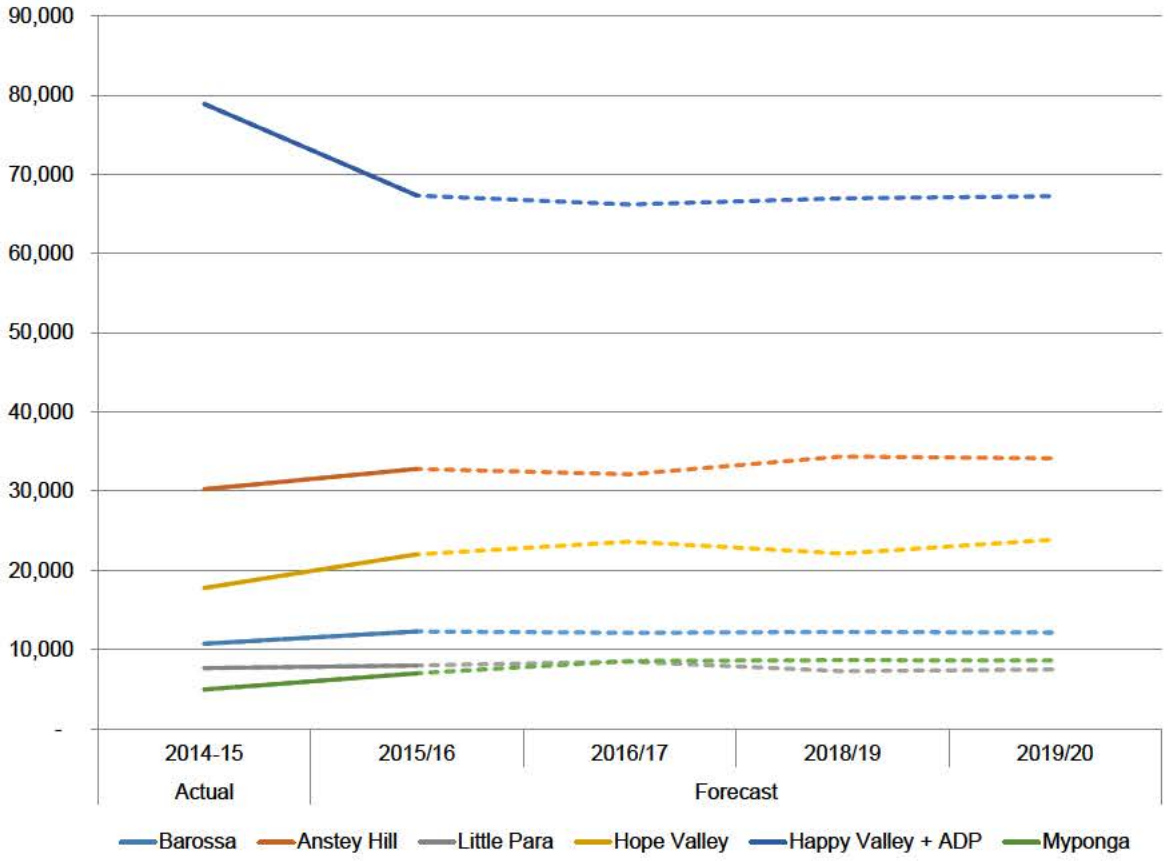


Figure 5-1 Adelaide water treatment plant actual and forecast throughput 2014/15 to 2019/20

We asked SA Water to identify the lessons learned from initial operation of the Distribution Optimisation Tool. The lessons learned include:

- New operational approaches
- Better incorporation of marginal cost at water treatment plants
- Some inability to account for operational constraints
- Better understanding of how best to work around interruptions driven by planned capital works and maintenance activities, as the Distribution Optimisation Tool allows operational configurations to be quickly evaluated.

We consider that the 'lessons learned' provide further assurance that SA Water is optimising its supply mix, as feedback from practical application is crucial to continual improvement. We are satisfied that the supply mix resulting from SA Water's modelling represents a sound basis for its RBP2016 submission. We note, however, that SA Water proposes to operate the ADP during the RBP2016 period, which was not an outcome of this optimisation modelling. We discuss the proposed operation of the ADP in the following section.

5.2 Operation of Adelaide Desalination Plant during RBP2016 period

SA Water proposes to operate the ADP in 'minimum production mode' during the RBP2016 period. In this mode, the plant will produce 30ML/day of potable water for 9 months of the year which equates to around 8GL/year of potable water production. This proposal is not based on SA Water requiring the water to meet demand, but instead is due to SA Water's consideration of 'asset stewardship and mitigation of operational and strategic supply risks'. In SA Water's submission it estimated the annual incremental cost of operating the ADP in minimum production mode to be $5.7M compared with supplying demand from available lower

cost sources. (Note that further review as detailed below estimated the annual incremental cost at a lower figure of $4.1M). SA Water identified the benefits of operating in minimum production mode as being that it:

- *"Maximises the life of the plant, so defers future capital expenditure to replace or renew elements of the plant*
- *Avoids, or defers $5-6 million per year in capital expenditure in other parts of the water treatment and supply network, because the plant provides an alternative to those water supply sources.*
- *Generally improves drinking water quality (salinity) in metropolitan Adelaide*
- *Improves the security of supply to customers who rely on the Happy Valley water treatment plant as their sole source of supply, in the event of a loss of distribution at the plant (such as a power failure)".*

ESCoSA commissioned a review[9] of the technical and financial reasoning underlying SA Water's proposal to operate the ADP in minimum production mode. This review concluded that:

- *We agree that operating ADP in minimum production mode provides operational resilience and water security for customers, would help to mitigate operational and strategic supply risks; provides more network operational flexibility and contributes some contingency for the Happy Valley Water Treatment Plant;*
- *We have reservations regarding the robustness of the justification for operating ADP in minimum production mode on the basis of Asset Stewardship. The Asset Stewardship Assessment is based on theoretical assessment and opinion rather than evidence and the outcomes of the assessment are very sensitive to changes in the assumptions, particularly with respect to the expected useful lives of the assets. Furthermore, the fees and contractual obligations of the O&M and AGL contracts have not been considered in the assessment;*
- *We confirm that there will be significant annual fixed operating costs for zero production mode and have assessed that the incremental annual average operating costs of minimum production rather than zero production for the second regulatory period is $4.7m....This compares to $5.7 million stated in the Regulatory Business Proposal. It should be noted that we have not be able to determine the reason for his difference as information on the basis of the $5.7m was not provided[10];*
- *We agree with the concept of lower wear & tear increasing the life of the plant, however, we consider the larger determinate of maximising the life of the plant is the level of maintenance undertaken by the O&M Team. In our opinion this is equally applicable in either hot or cold standby mode;*
- *We acknowledge the improvements that were experienced in drinking water quality when the ADP was under normal operation or at full capacity. However, with the ADP operating in "Hot Standby" minimum production mode, producing 30ML/d only, the drinking water quality improvements are likely to be minimal as 30 Mld represents only 10% of the volume of water that was produced by ADP during the proving period when the drinking water quality improvements were experienced;*
- *We do not consider that the evidence and examples provided in the Asset Stewardship Report support the conclusion that there will be re-commissioning / restart issues. It does not appear than any of the desalination plant examples referenced in the report have been restarted from a cold standby mode of operation. We would also expect that AAPL, as an experienced operator of desalination plants, will have undertaken comprehensive preservation maintenance during the shutdown period and will also have undertaken* [redacted] *during the shutdown period to mitigate the risk of re-commissioning difficulties;*

[9] Black & Veatch, Utilisation of Adelaide Desalination Plant – Technical Assessment, 2015

[10] For the avoidance of doubt, this text is quoted from the Black & Veatch report on the Utilisation of Adelaide Desalination Plant (7 December 2015). The incremental cost estimated in SA Water's submission was $5.7M per annum. SA Water later revised this figure downwards to $4.1M per annum. The $4.7M per annum figures is an estimated made by Black & Veatch based on its own analysis.

- *The provision, training and retention of experienced staff are the responsibility of the operator AAPL, not SA Water, and the risk associated with keeping a skilled workforce resides with them. We consider that there is a very low likelihood of not being able to recruit and retain experienced staff.*

Despite the concerns over SA Water's justification for operating the plant in minimum production mode, the review concludes that SA Water's proposal to operate the plant in minimum production mode is prudent and efficient. The reasoning for this conclusion is that the proposal has is cost neutral on a net present value basis and because operating the plant in minimum production will provide system resilience and operational flexibility.

We have reviewed SA Water's documentation relating to this proposal as well as the independent review commissioned by ESCoSA. We agree with the findings of the independent review and SA Water's position that the minimum production mode will provide operational flexibility, particularly allowing it to more easily undertake major maintenance work.

We also share the concerns of the independent review regarding the asset stewardship report. This report is conceptually flawed in that it fails to acknowledge in the analysis that the ADP operator is contractually obliged to meet certain requirements in relation to the condition of the ADP assets at handover. [redacted]

We are concerned that the NPV analysis is very sensitive to input data and in particular, that it requires the quantum of asset deferrals possible through operating the desalination plant in minimal production mode to be at least $5.25M per year for the NPV to be neutral between the options of the ADP operating and not operating. SA Water has provided example business cases for deferrals that it has quantified in the coming regulatory period. We note that the NPV modelling result requires at least $5.25M of deferrals to be realised every year for the next 18 years.

While we accept that there is little benefit in trying to predict deferrals accurately beyond the regulatory period, we are not convinced that it is appropriate to extrapolate the quantum of identified deferrals over the 18 year analysis period. To put the magnitude of the deferrals into perspective, SA Water has assumed in its NPV assessment that a total of $20M of deferrals will be realised in the RBP2016 period. On inspection of the model, around $20M of deferrals are required in the RBP2016 period for the NPV neutral result to be achieved. Of the five deferral case studies provided, four are for structures at water treatment plants. The deferrals estimated in these four case studies total $18.6M[11]. As a comparison, SA Water's total RBP2016 proposed expenditure for the Structures Management - Water Treatment Plant program totals $20.67M. That is, the amount that SA Water considers it will defer in the RBP2016 period is equal to the amount it plans to spend on these assets. The final business case is for a storage reservoir and the estimated amount deferred is $1.67M. SA Water forecasts spending much more on this asset class - $98.31M in the RBP2016 period. Without further evidence it is reasonable to suggest that if SA Water has extrapolated its estimated savings based on these case studies, then the future benefits should accrue in a similar proportion; that is, mostly for water treatment plant structures. We note further that the replacement cost of the water treatment plant structures owned by SA Water is around $732M[12]. The typical useful life for a concrete structure at a water treatment plant is around 80 years. Therefore, a simple aged based estimate of the renewals required to be undertaken by SA Water on these assets is $9.1M per year[13]. This means that SA Water implies that it will be able to defer more than 54% of its long term renewal requirements for this asset type. We consider that it

[11] The business cases have generally been presented in nominal terms in $2017. We have not rebased this amount to $Dec14.
[12] Advised by SA Water
[13] This is a coarse measure but adequate for the purpose of this analysis. A better approach would be to prepare a condition profile of the structures and estimate the remaining useful life of each. An annual renewal annuity could then be calculated.

is highly unlikely that the magnitude of deferrals able to be achieved will be sustained at this level across 18 years.

Based on this analysis and the information provided by SA Water, we consider that it is not prudent or efficient for SA Water to operate the ADP in a minimum production mode.

However, we acknowledge that there are difficult to quantify benefits that are not included in the net present cost assessment; particularly the network resilience and operational flexibility resulting from the additional supply source. SA Water, as the network operator and having responsibility for delivering service to its customers, is much better placed than us to consider whether these difficult to quantify benefits outweigh the increased operating costs arising from operation of the plant. Ultimately, SA Water needs to decide on the appropriate balance between cost and risks in service delivery.

We recommend that, if it adopts minimum production mode for the coming regulatory period, as soon as possible, SA Water identifies the critical assets which are impacted by the ADP's operation (both being necessary if it is unavailable and less necessary if it is available). For this list of ADP-critical assets, the risk profile of forthcoming major maintenance and renewal work can be ascertained and a prioritised works program developed. SA Water can then undertake a program of works for which it has a clear understanding of the impact of the works on its overall network resilience. We would expect that, in coming years, SA Water would be able to articulate how any major maintenance or renewal works have altered (reduced) its risk profile.

6 Strategic asset management

6.1 Introduction

There has been considerable change in the senior personnel involved in the implementation of the capital program; and the determination for RBP2013 led to a refresh of business processes. The asset management focus has been on sharpening SA Water's management practices and moving towards alignment with industry best practice. There appears to be an acceptance that rationalisation is a necessary driver of efficiency; the geography of the SA Water area and resulting disparate demand centres are a serious consideration. There has been a shift to functional rather than regional management, which has contributed towards the rationalisation of staff and processes.

We noted considerable progress on the "asset management journey" and the start that had been made on understanding customer preferences and willingness to pay and the customer impact of condition and performance. However, SA Water acknowledges that there may be a shortfall in the understanding of the impact of activities carried out in terms of the impact upon customers. There is an acceptance of the need to move towards an outcome driven business rather than focus on how programs are delivered.

Over the RBP2013 period, the efficiencies achieved exceeded those proposed in the previous plan; a justification of the challenges made at the first determination. However, there is an understandable question mark that the efficiencies and deferments achieved may have been at the expense of long term resilience and may have contributed to the build-up of a backlog of work.

Customer and stakeholder engagement has moved on considerably in recent years and the preparation of the RBP2016 was underpinned by customer consultation and particularly upon its conclusion that customers were content with the current levels of service and unwilling to pay more or less for improved or deteriorated levels of service.

There is now a clear line of sight between the customer and capital expenditure, which did not exist under the previous asset management structure, as used for the RBP2013. Considerable progress has been made by SA Water, which should form a good foundation for the application of a more granular approach to accommodating customer preferences within its capital program. A committee has been set up to underpin the governance of the capital program and to challenge the need and value at stages through projects' development. We believe this is a good approach.

6.2 Asset management framework

SA Water is working towards an Asset Management System (AMS) architecture that comprises:

- An Asset Management Policy
- A Strategic Asset Management Plan (SAMP)
- Lead Asset Management Plans (LAMPs) for water and wastewater – bridging the strategy level SAMP with the detail in the AMPs
- Asset Management Plans (AMPs) for asset systems, facilities and other asset initiatives

The future AMPs will be a combination of current AMPs and Asset Program Summaries (APSs) and look at water supply and wastewater removal services from a system perspective compared to the current AMPs that have more of a facility focus. The shift to considering system perspectives fits well with future aspirations to practice customer-centric asset management with a focus on customer outcomes. The future AMS architecture is illustrated in Figure 6-1.

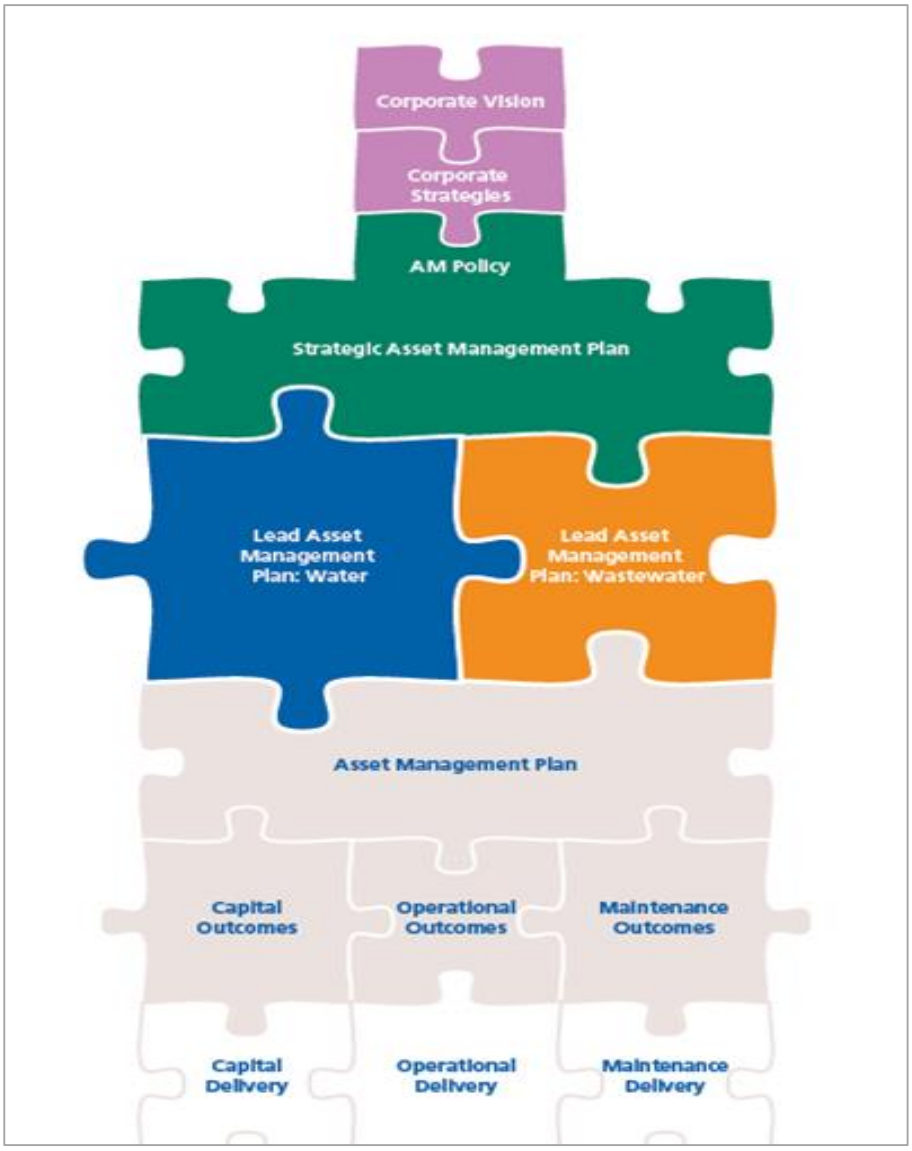


Figure 6-1 SA Water's future Asset Management System structure

While the proposed system develops and matures, SA Water has decided to:

- Combine the SAMP and LAMP documents to form a Strategic Lead Asset Management Plan (SLAMP). Each SLAMP includes SAMP and LAMP contents.
- Continue the current practice of using Asset Program Summaries, Asset Management Plans and Major Projects to identify and justify asset improvements.

This is a reasonable and practical approach to an evolving process. The interim/current AMS architecture is shown in Figure 6-2.

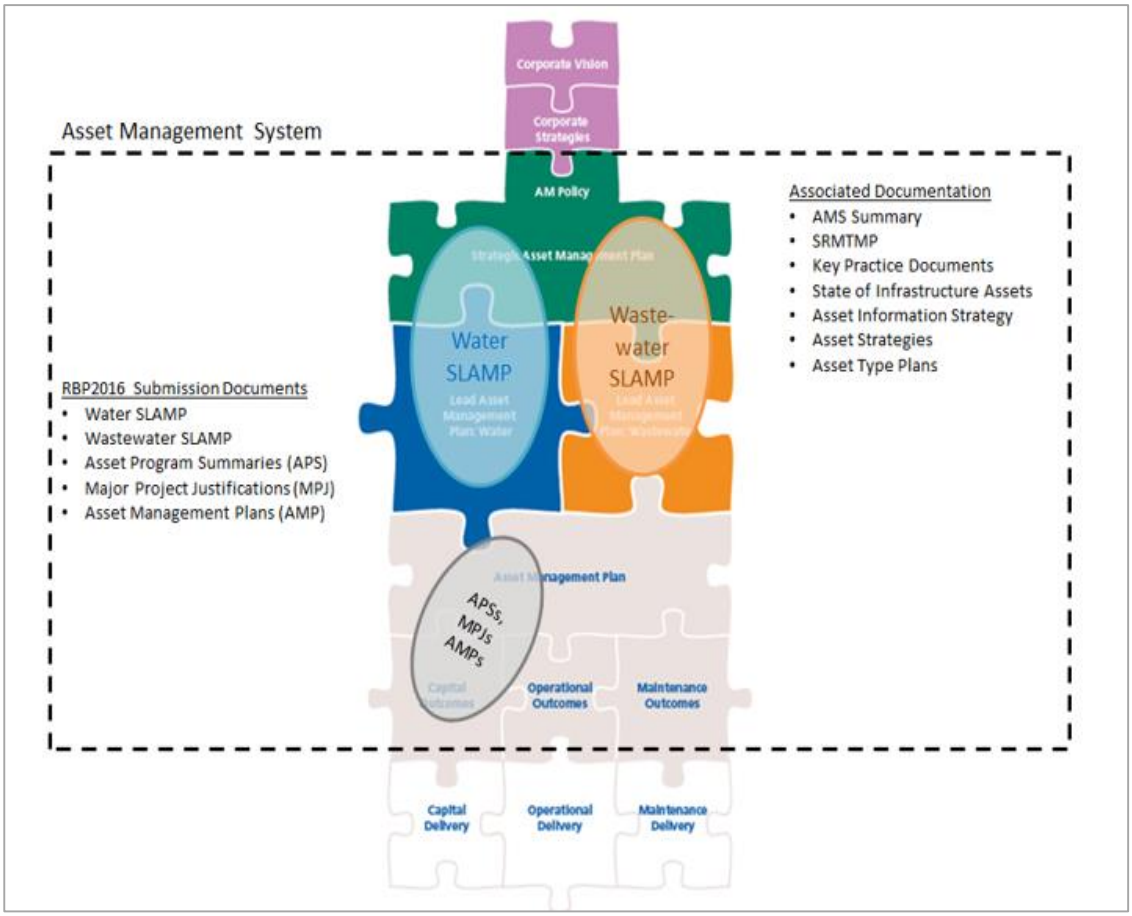


Figure 6-2 SA Water's current AMS architecture

We observe that the positioning of outcomes within the future structure is low down the hierarchy. We believe it would send a more customer-centric message if the outcomes were seen to be a driver of policy, corporate strategy and all levels of asset management plans. We note that the main documents acknowledge the importance of customers, but the headlines appear not to reflect this.

SA Water's Asset Management System architecture has been reviewed and shaped to ensure that is has close alignment to ISO55000. The future architecture was determined and then the current architecture plotted against that. This has highlighted some improvement opportunities that SA Water indicate will be addressed over the next three years; this is a realistic, evolutionary approach.

In order to continue on the asset management journey, it may be necessary to reconsider the position of asset management within the organisation. In its ISO55000 context, asset management is across the whole organisation. It is important to ensure that an asset management framework covers all activities, as required by ISO55001; in particular those impacting on capex vs operating expenditure trade-off and cost, risk and performance optimization over all the lifecycle phases of an asset occurring within the period of responsibility of the organization. The documented asset management system signals appropriate responsibilities, activities and hierarchy, but asset management appears somewhat lost within the organisational structure.

The Publically Available Specification for the optimised management of physical assets (PAS55) states that asset management represents a cross-disciplinary approach to achieve sustained and best value-for-money in the selection, construction acquisition, utilisation, maintenance and renewal/disposal of physical infrastructure, plant and equipment. Similarly, ISO 55000 states that asset management is the coordinated activities of an organization to realise value from assets over their life cycle in delivery of its objectives. The Asset Management System should be a set of interrelated or interacting elements of an organization to establish policies and objectives, capabilities, people, resources, processes, information and technology to achieve those objectives. Therefore asset management requires integration of engineering, business

management, finance and IT. The position of asset management in the SA Water organisation is within one of four functions within the Strategy and Planning, itself one of six business groups reporting to the Chief Executive. This does not signal an integrated approach.

The Asset Management System Summary (document WC0129) considers the capital-planning component of the Asset Management process. The document indicates the journey of SA Water to full ISO55000 alignment and the structure of supporting documentation from Corporate Vision to capital, operational and maintenance delivery. The document describes the way SA Water manages its infrastructure to deliver the required Levels of Service (LOS) at an optimal Life Cycle Cost (LCC) and at an acceptable level of risk, referring to SLIBs (service level impact to beneficiaries); a very high level of consideration – not customer outcomes per se. Both the future and interim/current AMS architecture pay no obvious heed to how the strategy should be aligned with customer preferences.

6.3 Asset Management Policy

The Asset Management Policy is sourced from international best practice and reflects the importance of customers' and asset management's position within the overall strategic management framework. It sign-posts a risk-based approach and the need for comprehensive optioneering when considering refurbishment or renewals. Responsibility for resourcing and alignment of asset management is at Chief Executive level and the hierarchy of responsibility for the various stages of application is defined.

It is a fundamental requirement that the Asset Management Policy (vis RBP Attachment D) document has a clear line of sight with SA Water's corporate aims and objectives; we believe that this is achieved. The purpose and principles within the policy are consistent with SA Water's Vision, Strategic Purpose and Strategic Plan.

The Asset Management Policy is a simple document demonstrating Board level endorsement of sound asset management principles, which identifies the responsibilities of all management levels. Although the stated purpose of the Asset Management Policy includes mention of the management of the assets to satisfy customer service commitments, the extent to which customer preferences should be accommodated is not enshrined within the policy.

The document appears to be predicated on SA Water carrying out industry best practice asset management (PAS55, ISO55000 et. al.) and providing its service based upon a position of being best placed to understand the technicalities of what is in the best interests of the customer. That is, it is the policy of SA Water to shape its asset management strategy and activities, with the priorities of customers being a consideration rather than the dominant driver.

6.4 Asset Management Planning

SA Water's SLAMP documents indicate the following strategy that has determined RBP2016 capital expenditure:

- *Develop a Capital Submission based on the Technical Capital Plan (TCP) that contains only essential expenditure for the portfolio of projects and funding lines that are designed to deliver the required levels of service at an acceptable level of risk.*
- *Implement the Capital Delivery Efficiency program to change the way we deliver the capital portfolio and enable the TCP, and the customer benefits linked to it, to be delivered for a lower cost.*
- *Better understand what the customers & key stakeholders value, so that Business KPI's can be refined and capital expenditure better targeted during RBP2016 and beyond*
- *Review short-term expenditure against long term trends to ensure short-term decisions do not have a detrimental effect on the long term investment including consideration of operating expenditure as part of whole of life costs.*

There is clear mention of the customer benefits and their measurement and associated targeting of capital expenditure going forward. That is, the SLAMP documents demonstrate SA Water's awareness and alignment to achieving outcomes, in terms of both customers and the environment. The stated strategy is to include in the plans only essential expenditure, implementing an efficiency program linked to customer benefits and stakeholder value, balancing current and future expenditure.

The 4 Key Performance Outcomes (KPOs) are SA Water's highest level outcomes, which revolve around the employees, customers, regulators and owners, in terms of safety, satisfaction, compliance and returns, respectively. While broadly in line with the England and Wales (E&W) model for business plan preparation, we note that the UK version of Outcomes is entirely focused on customers (including their preferences concerning the environment), with regulatory considerations, shareholder returns and staff conditions implicit therein. The Service Level Impacts to Beneficiaries (SLIBs) identified are more akin to the E&W Outcomes and the Business Measures to the much more plentiful E&W Performance Commitments. SLIBs have been aligned with the corporate heat map.

Although there is clear line of sight through the SLAMPs to the overall business objectives, the linkage between what SA Water is trying to achieve and demonstrable customer preferences is less apparent. SA Water is strongly signalling its self-belief in developing its asset management planning approach; it knows its assets and how they should be utilised, enhanced and maintained.

We make the observations set out in Table 6-1 on the Strategic Lead Asset Management Plan (SLAMP) for water.

Table 6-1 Coverage of Strategic Lead Asset Management Plan for water

Business Outcomes	Covers	Does not cover
Source (water)	Quality	Availability or resilience
Network (water)	Breaks	Network quality
Tap (water)	Interruptions and pressure complaints	Durations of interruptions and actual pressure provided
Sink (waste)	Overflows (internal flooding)	External flooding
Network (waste)	Environmental notifications and mains breaks and chokes	Breaks and chokes separately
Dispersion (waste)	EPA compliance	Unplanned maintenance

We make the following further observations:

- Dam safety dominates the Source (water) planning. Though lower financial impact, the programed replacement of bores may need to be considered. There has been a trend of falling maintenance expenditure due to the resolved drought backlog and improved asset knowledge.
- Network priorities are shown as mains renewal. Further focus is needed on aligning with positive customer outcomes. Proposed expenditure is lower than recent years.
- Priority is being given to large industrial meters. This should be focused on meters where there is a material revenue benefit. Tap investment is much lower, as the meter replacement backlog has been completed.
- Sink priorities seem appropriately aimed at multiple blockages as the number of blockages appears high and there should be a positive link to overflow performance. Sink expenditure (historical) appears low when compared to numbers of blockages reported (<$200/blockage). Overflows (internal flooding) performance is similar to the UK, where it is regarded as unacceptable and is the focus of planned activity.

- The Network (waste) priority on better information and better targeted maintenance activity is appropriate. Network projections show continuing base load after the rise in recent years due to pumping station refurbishments. Network (waste) bundles reporting of chokes and breaks. This is reasonable insofar as the customer is unlikely to care about *why* the sewage is flooding into their property. However, chokes are symptoms of operational practice (jetting etc.) and breaks are about asset condition. It is unhelpful to consider both together for the purposes of planning.
- Dispersion prioritisation is based on responding to EPA imperatives, which are unavoidable, and on managing aging infrastructure. The historic performance needs to be better understood and related to planned activities so as to target activity on a risk basis. Dispersion costs show reducing breakdown costs due to preventative maintenance at Bolivar WWTP. The future program is increasing to accommodate significant WWTP upgrades.

Our comments on SA Water's asset condition and use of asset condition information are set out in Table 6-2.

Table 6-2 Status of asset condition information

Condition	Comment
Source (water)	Entirely focussed on dams and the associated societal risk.
Network (water)	The network is generally in good condition. The focus is on 15% of tanks in poor condition.
Tap (water)	Tap only covers the small meter inaccuracy issue.
Sink (waste)	Focused on blockages per connection. The reported figure of 8% of connections having experiencing a blockage in the last 3 years appears very high.
Network (waste)	Network generally in good condition.
Dispersion (waste)	Dispersion generally in good condition.

6.5 Risk management

An area identified as an improvement opportunity following the RBP2013 Submission was the way the risk-based capital rationing process was conducted. Previously, the risks associated with different capital expenditure profiles were determined by one or two knowledgeable people. This approach was generally sound, but lacked transparency and repeatability and it relied heavily on those experienced people.

For RBP2016 capital planning, a risk-based approach was introduced that incorporated a number of changes to the approach for determining the Technical Capital Plan (TCP) and evaluating the risk associated with different expenditure profiles. The key changes noted by SA Water were such that there is now or has been:

- *A review and upgrade to the corporate risk management methodology that includes scoring of risks and includes a revised Corporate Heat Map (CHM) that better align consequence columns to services being provided and improved their consistency across columns.*
- *A shift from asset centric capital planning to business/beneficiary-centric planning. A new concept was introduced into the capital planning process that linked proposed expenditure to the service level impacts to beneficiaries (SLIBs).*
- *There is strong alignment between the KPOs, SLIBs and consequence columns in the CHM (primarily for the key drivers of the program/project) that ensures consistency and the ability to compare across product services, which expresses these in terms of stakeholder impacts to LoS (Level of Service) as opposed to asset management measures.*
- *Significantly improved the application and understanding of risk to provide effective input to determine the most efficient capital solution through 1:1 discussions and 'Asset Management Unit (AMU) wide risk*

management training' for all AMU staff on how to apply the corporate risk management process to capital planning.

- *The impact on risk rating associated with the capital expenditure being proposed is identified for every major project and funding line that comprises the capital plan.*
- *Polarisation of risk ratings into high consequence and high likelihood events to crystallise the worst case (Reactive Capital Only) and most likely scenarios (Optimal Investment) to aid in justification of investment required.*
- *Mapping Asset Program Summaries (APSs) and Major Project Justifications to SLIB categories to provide clarity on why we are planning to spend capital and who will benefit. That also provides a direct link to a consequence column on the corporate Heat Map.*
- *The impact on O&M activities (e.g. does the planned work result in OPEX savings, or what the impact is on OPEX budget if the planned work is not done, or only partly done) also informs the overall decision regarding the risks to be addressed.*
- *The aggregation of expenditure by SLIB so that a conversation can occur at the senior management level about the risks in terms of impacts to service (business consequences) associated with different expenditure profiles.*
- *Alignment with the Corporate Risk Register, particularly those strategic and long term operational risks that are influenced by investment of capital in assets.*
- *'Stress testing' the TCP to explore the level of resilience with or without the proposed level of expenditure.*

SA Water acknowledges a key area of improvement moving forward is to consolidate the recent changes to risk-based capital planning so it becomes business-as-usual. The above listed changes align with what we saw, but are variable in the extent to which they are either effective or just a step along the asset management journey.

Good progress has been made in establishing a risk-based approach and thinking in terms of the likelihood and consequences of asset failures. However, at this time, the consideration of asset condition seems to be a surrogate for likelihood of failure rather than the product of detailed analysis of historical performance and the cocktail of variables that impact upon assets. Similarly, the consequence of asset failure appears to give scant allowance for mitigation and operational exigence. We accept that it is likely that more detailed consideration will be given to both likelihood and consequence before final capital expenditure approval is given for each project.

The shift from asset-centric to business/beneficiary-centric planning is movement in the right direction. We believe that financial prudence and WHS considerations should be implicit in any asset management plan – although we accept the need to monitor progress in achieving targets in these areas. SA Water exists to provide customers with water supply and sewerage services. The prioritisation of its activities should reflect this.

The risk-based approach implemented to date provides SA Water with a means of prioritising activities within an asset or system grouping. However, prioritisation between asset groupings or systems would not be supported by the current approach.

For capital maintenance activities, there are separate and distinct considerations before a judgement can be made on whether a program is efficient. These revolve around the need for the work (Is there a problem?), the appropriateness of the work (Is the solution appropriate?) and the pricing of the work (Is the cost reasonable?). In high level terms, we have seen the evidence that there are problems to be dealt with and there is work to be done. The unit costs we have seen accord broadly with what we would expect, but the overall quantum and timing of the capital maintenance expenditure is ultimately a function of the Board's appetite for risk.

There appears to have been considerable improvement in asset condition and performance knowledge since the RBP2013 review and this has been sourced to populate the risk mapping, which is carried out at a corporate and project level. In our review of individual schemes, we have found a common theme that the

outturn effect on customers is not reflected in the matrices. It seems likely that the individual project risk matrices are overstating the risk as a result of not accommodating the realities of operational responses and mitigation measures activated when asset failures occur.

For the risk analysis of large dams, SA Water follows the Australian National Committee on Large Dams (ANCOLD) methodology. We understand that recent developments of ANCOLD has consequence analysis that is less conservative. The inspection and analysis of large dams is a very specialist technical area and the consequences of the total failure of a large dam can be catastrophic. However, if there are no indications of structural failure in the dam, then the mode of failure is likely to be the overtopping damage from inadequate spillway design. There are mitigation measures available (draw down – assuming adequacy and operability of the washout arrangements, which should be regularly checked; emergency pumped drawdown; downstream evacuation etc.).

SA Water's risk analysis on major mains appears to be based upon a 2004 document which may not align with current best practice/technology. Mains can be fixed if alternative supplies are available for long enough. Robust contingency planning is essential. Full option appraisal needs to consider mitigation, alternative supplies, customer impact and willingness to pay for secure supply.

6.6 Asset Information Systems

SA Water has three main asset registers for infrastructure assets. Two are used for operational, planning and strategic purposes; they are the geographic information system (GIS) and Maximo 7. The third is used for financial asset valuation purposes and is the corporate Fixed Assets Register (FAR). The key asset information systems within SA Water are summarised in Table 6-3 below.

Table 6-3 SA Water's asset information systems

System	Functionality
Corporate Geographic Information System (GIS)	Spatial information repository for use in asset management, operations and customer enquiries Supports a number of core applications, upstream and downstream applications including: AquaMAP (based on the ESRI eView product) and MaximoMAP (the GIS component of Maximo)
Maximo	Manage the maintenance and operation of SA Water's network assets Data store for non-pipe assets such as treatment plants and headworks (pipe assets and minor fittings are stored in the GIS) Provides information needed to (i) generate long and short-term asset plans; (ii) plan and schedule preventive, reactive and condition-based maintenance; (iii) optimise resource utilisation; (iv) measure key customer and operational charter performance indicators.
Fixed Asset Register (FAR)	Performs the valuation and depreciation calculations for all assets except major plant, minor plant and the following major infrastructure asset groups (i.e. Major Dams, Wastewater Treatment Plants, Water Treatment Plants)
Customer Services Information System (CSIS)	Manages the billing for water and wastewater products and services Supports core business functions (i.e. Customers and Property Maintenance, Meters, Customer Applications, Billing, Receipting, Recovery, Financial Controls, Conveyancing and Adjustments, Pending Work Queue (PWQ), Audit Controls and Reports)

Also included in the Asset Information key practice document (KPD) is the Customer Services Information System. SA Water's Customer Service Information System (CSIS) manages the billing for water and wastewater products and services. The KPD notes a range of additional core business information support functions within the CSIS, including: Customers and Property Maintenance; Meters (reading and maintenance); Customer Applications; Billing; Receipting; Recovery (debt); transfer of information between billing and the General Ledger; Conveyancing and Adjustments; Pending Work Queue; and Audit Controls and Reports. There is no explicit reference to complaints or the asset performance outcomes being experienced by the customers other than for meters.

The Outcomes section of the Asset Information KPD considers the: Asset Knowledge Standards; Asset Information Systems; Asset Data and Knowledge; and Asset Information Strategy. The KPD notes the areas that went well and the progress made and acknowledges the areas in need of further improvement. The document remains silent on the subject of customer outcomes, although it does reference “Sophisticated asset replacement prioritisation models” and “Improved use and accessibility of SCADA data to support asset management planning and decision making” as areas for improvement. We believe there needs to be a significant shift to accommodate information to support a customer centric asset management approach rather than just improving the quality, quantity and timeliness of asset data.

6.7 Asset Management Outcomes

SA Water explained that the capital program is now focussed on achieving customer outcomes. This was not robustly demonstrated and SA Water acknowledges that the journey is at its early stages. The basis of prioritisation of projects is the NPV and engineering considerations. There has been limited attempts to monetise customer benefits to prioritise between activity types. A project with a strong economic (operating expenditure and capex) case takes precedence over customer priorities.

In common with the E&W water industry, SA Water has defined Outcomes for Success. These attempt to have the customers at the heart of the business and draw together the interests of the customers and the state as a whole.

The “Your Say” customer engagement initiative risk assessment had as its highest ranking risk the potential for inadequacy of the consultation activities. This indicates a realistic and pragmatic acceptance by SA Water that it is on a journey towards achieving a full uninterrupted line of sight from corporate and customer expectations through to the full range of asset management activities.

As things stand, SA Water’s meeting its customers’ needs is not driven by differentiated customer needs. SA Water is being influenced by the broad customer and stakeholder requirement that prices remain stable. It is allocating its resources within that constraint based upon in-house engineering judgement rather than aligning prioritisation of activities with customer preferences. There is scope for future “Your Say” initiatives to develop further an understanding of the different extent to which customers are willing to pay for different types and levels of service. There also needs be further consideration of how extreme but rare service level failures (like sewer flooding events) can be accommodated in customer surveys without the extremes of response that would be received from those who had been flooded compared with those who never even considered it a possibility.

We noted that sewer flooding (internal overflows) are dealt with out of the “maintenance” budget, rather than being explicitly dealt with by capital schemes. SA Water does not have a particularly bad record for internal overflows, but we were still surprised to see the lack of focus on these very unpleasant (for the customers concerned) occurrences. The asset condition (collapses) and asset performance (blockages) measures drive capex for rehabilitation; the customer impact measure (flooding) does not.

The approaches used by SA Water to manage and rehabilitate the sewerage systems appear developed in terms of maintenance, and CCTV survey is carried out in support of targeting collapses and blockages. Though collapses and blockages can contribute towards internal overflows, inadequate capacity and mechanical failures can also lead to internal overflows and the numbers of customers affected by whatever cause varies depending on the location of the failure. In the UK, where there has been a continuing shift towards customer-driven service provision, standards for sewer flooding are becoming increasingly challenging and identified as the highest priority across the industry in detailed customer consultation.

The continued tendency towards an asset-centric approach to asset management is manifested by SA Water, with sewer flooding appearing to be a very low priority on the basis that it is rare, often of limited commercial impact, and expensive to deal with. The customer consultation process needs to be able to accommodate performance areas that would be considered abhorrent by those suffering it, but unlikely to be experienced by the vast majority of customers. It is not clear that customers would be willing to tolerate sewer flooding to the extent implied by the SA Water asset management program.

Similarly, the SA Water approach to dealing with odour from its works and pumping stations does not appear to consider the “unfortunate minority”. Odour failures do not appear to be dealt with in a directly measurable way, with project deferral being triggered by fall-off in the level of complaints. No account is made for whether the fall-off in complaints is a function of customers “getting used to” the smell or losing hope that their complaints would ever be heeded.

6.8 Key Practice Documents (KPDs)

We note that within the Key Practice Documents (KPDs) that the focus is on traditional engineering value judgements to balance level of service, risk and lifecycle costs and that alignment with detailed customer aspirations is at best inferred. Notwithstanding this, the suite of KPDs forms a good base for the asset management journey and it is set up in a way that acknowledges the evolving process. For example, there is acknowledgment of the potential for operating cost solutions to problems and it is accepted that optimised life cycle decision making is not an exact science and needs to be responsive to changing environmental, political and therefore by inference, customer requirements.

6.9 Conclusion

The conclusions from customer surveys carried out as part of the RBP2016 development appear to be fairly narrow – customers do not particularly wish to pay more (or less) for improved (or reduced) level of service provision. This broadly reflects the findings of customer research we have seen carried out in other jurisdictions. The key elements absent from the conclusions of the customer research is granularity and preference for different areas of focus, albeit within the same overall levels of expenditure.

Aligning with the expectations of ISO55000, SA Water drew attention to the work it had carried out since RBP2013 on establishing line of sight throughout the asset management process from Board level policy and strategy to activities carried out and their impact on the service received by customers. This is an important step in the right direction.

Of note and particular relevance to operational costs, but of significance to asset management and capital program considerations is SA Water’s acknowledgement that it has not had a “typical” year for 10 years or more. The expenditure on the Adelaide Desalination Plant drew upon available funds and led to deferment of non-critical expenditure.

With the construction of mains that link the supply areas on the north and south side of Adelaide city, it is now more possible to seek optimal resource use. A further important consideration is the service headroom that the improved connectivity and availability of water from the ADP provides. This headroom means that sustained outages can now take place at some treatment works, storage facilities and pumping stations that were previously critical to maintaining the supply to substantial parts of the metropolitan area. Avoiding the need to “work live” will facilitate more efficient operational and capital maintenance activities as well as asset inspection. The situation remains unchanged for rural areas where there is little available resource flexibility.

The capital maintenance activities proposed for the RBP2016 are substantially dealing with backlogs and removing or reducing the number of assets with what it has been decided is an unacceptable risk of failure. Activities have been prioritised and the duration and phasing of the programs influenced by SA Water’s appetite for risk and the desire to maintain customer charges at the current level. We saw some examples of how the budget is reduced to reflect situations where the need has been reassessed through challenge or changed circumstances. Generally, the documented approach appears to compare the “do nothing” option to the “do the project” option or proactive versus reactive maintenance costs.

The existing SA Water approach to asset management is well set up to respond to the customer and other stakeholders’ preference for stable bills and levels of service maintained at their current levels in term of both requirements and outturn. We believe SA Water should continue on its asset management journey and develop its response to customer preference within its business as usual.

SA Water accepts that as things stand, it is almost impossible to determine whether it has optimised the lifecycle cost for a particular level of service and at an acceptable risk. However, it can justifiably say that, for the capital planning process:

- Transparency and understanding of the decision making process has significantly improved over the past three years.
- Decisions are better informed and being made at the right level in the organisation.
- Decisions are subject to wider and deeper scrutiny than in the past.

SA Water has stated that it will make improvements both corporately and specific to asset management to arrive at a 3-year improvement plan. We believe this demonstrates a realistic understanding of its position upon its journey and an ethos of striving for continuing improvement.

7 Capital planning processes and capital cost benchmarking

7.1 Efficient capital delivery

During the RBP2013 period, SA Water commenced its Efficient Capital Delivery program to realise ongoing efficiencies in capital expenditure. Four 'projects' comprise the Efficient Capital Delivery program:

7. Establish method(s) for determining the most effective capital delivery strategy
8. Develop and implement a comprehensive program management methodology
9. Improve and integrate the estimating function for capital planning and delivery
10. Develop enabling capability in people, culture and technology.

The framework for this program is set out in Figure 7-1.

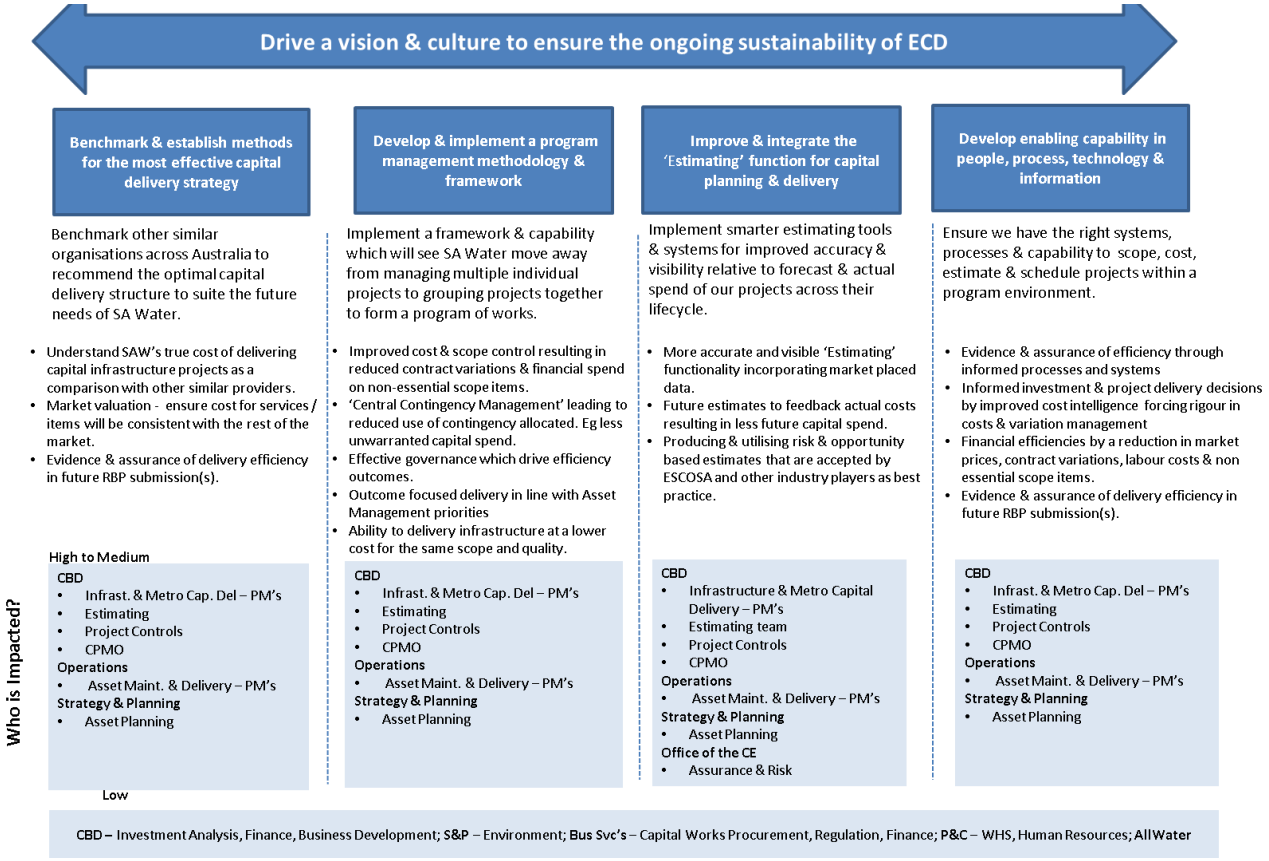


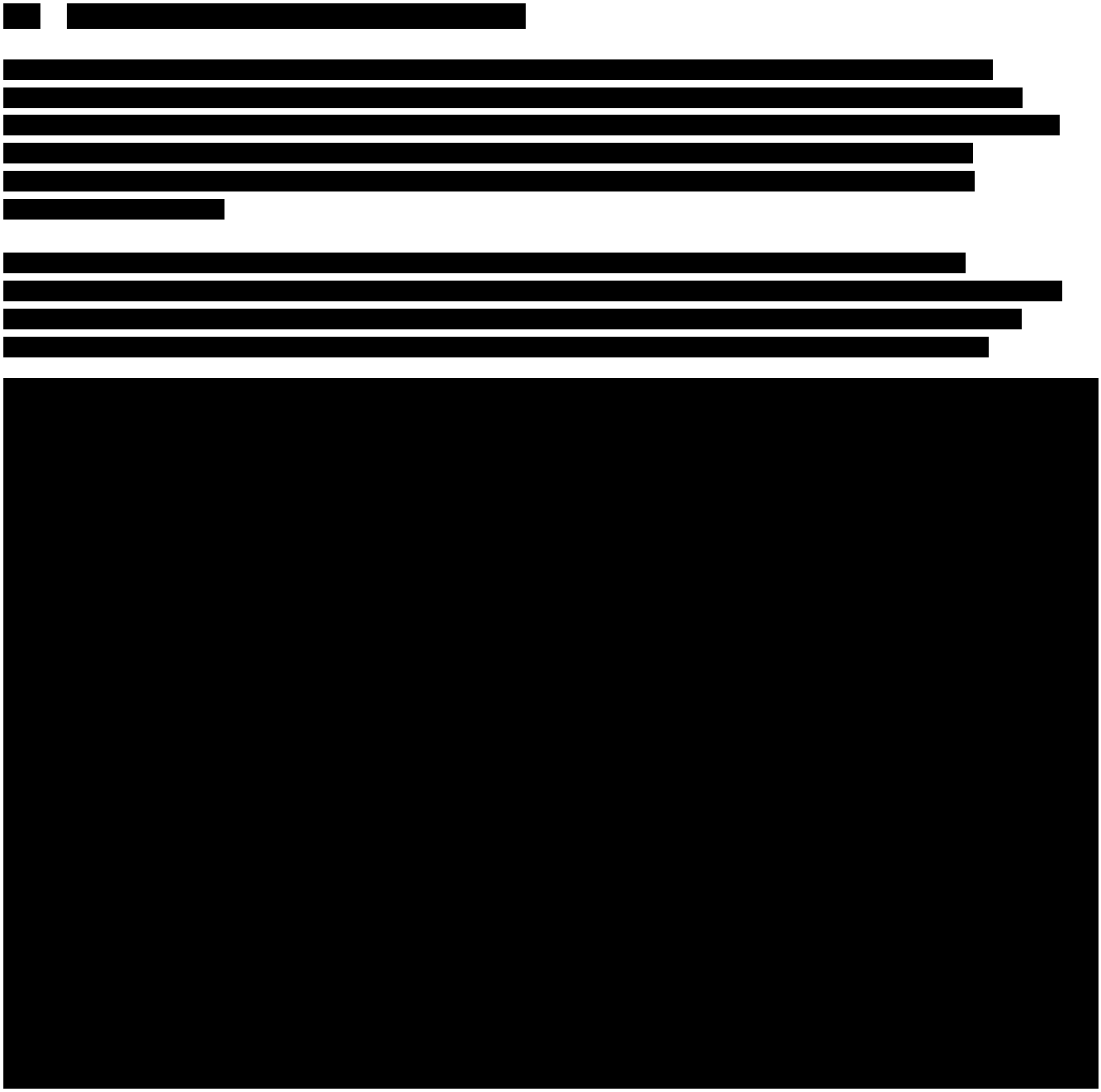
Figure 7-1 Efficient Capital Delivery program framework

One of the most significant changes we have seen that has resulted from this program and wider business transformation across SA Water is the attempt to establish line of sight from business activities to outcomes for customers. In the capital delivery context, this means planning with a focus on services, products and customer preferences. The SLIB / service level impact to beneficiaries discussed in Section 5 is the manifestation of this.

The initiatives to support Efficient Capital Delivery detailed by SA Water represent good practice and as a successfully implemented, coordinated program, would represent a leading approach in this area. The initiatives span the planning and delivery cycle and in that way, are complementary. This will assist SA Water to achieve its targets as where one initiative may be less successful than anticipated, another initiative may be more so.

Our concern regarding the Efficient Capital Delivery program in the context of our expenditure review is the extent to which the initiatives have been able to influence the expenditure forecasts included in the RBP2016 submission, due to the timing of their implementation. We note for example that the revision of the Cost Estimating Guidelines resulting from this program were approved in March 2015 and that the risk-based estimating approach was implemented after that time. With SA Water's RBP2016 submission being delivered at the beginning of September 2015 (and based on numbers finalised in early 2015), there has been limited time to bed down, learn from and realise the benefits of the improved processes. However, the 5% capital efficiency target applied by SA Water provides the goal that the full implementation and ongoing improvement of the Efficient Capital Delivery initiatives must deliver.

Given SA Water's concerted efforts to improve in this area and its resulting comprehensive program of work, we have sought to move beyond consideration of process and subject the outcomes, in this case, SA Water's cost estimates, to review. In the following sections we detail the findings of our benchmarking of a sample of SA Water's capital cost estimates and it's owner's costs.



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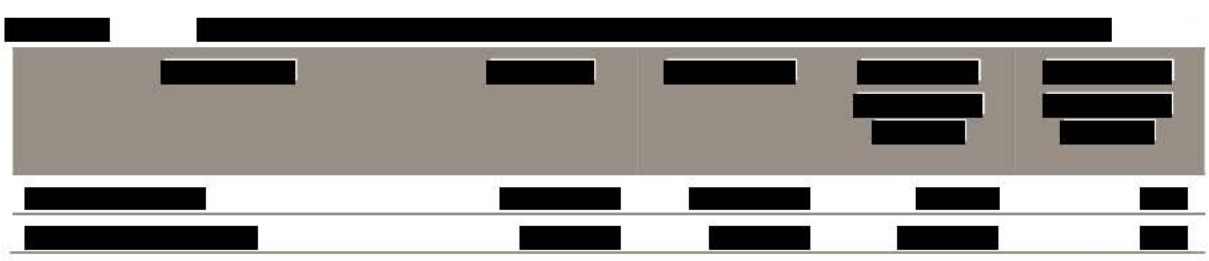

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8 Operating expenditure

8.1 The base year 2014/15

The base year is 2014/15 and within the RBP is a December 2014 year end forecast. At the time of our review the base year out-turn had yet to be formally confirmed through financial audit opinion. We were aware that there may be movement compared to the Plan assumptions in respect of base year and the consequent implications for absolute levels of efficiency proposed. Subsequent to our review meetings, SA Water has adjusted its base year analysis to reflect its latest position together with adjustments to its assumptions on movements to the base within the second regulatory period.

In our review of the cost allocation methodology (CAM), we noted that there were necessary adjustments to reflect the review of the allocation of costs between the regulated and non-regulated business particularly in respect of new connections and in the allocation between water and sewerage services. For the review SA Water has undertaken of actual performance compared to the RBP 2013 assumptions, consistency of allocation to the RBP2013 has been made. For the purposes of defining the base year for RBP2016 the revised allocations have been applied and thus there are two base year figures, the first applied to comparing actuals against determinations, the second in respect of future forecasts.

We noted that KPMG has undertaken a limited assurance on SA Water CAM and concluded:

> *"….we have not become aware of any matter that would lead us to believe that, in all material aspects….Baseline year financial data inputs for the period 1 July 2014 to 30 June 2015 and the comparative period 1 July 2013 to 30 June 2014….have not been accurately input from SA Water's financial system and allocated in accordance with the principles of the SA Water Cost Allocation Model."*

This provides some comfort that the base year applied in the RBP reflects fully the costs attributed to the regulated business although we note that the methodology has not been subject to a reasonable assurance review which we consider would have been appropriate for an area of this importance. KPMG did not review the application of the CAM in respect of forecast years and we comment on individual cost drivers in this respect in our review of additional operating expenditure.

We discussed with SA Water whether 2014/15 could be considered a 'typical' or 'normal' year and noted that apart from the adjustments related to the accounting treatment of the ADP SA Water has not made any adjustments related to 2014/15 actual costs. We were not aware that there have been any exceptional items identified by SA Water in accounting for base year costs. SA Water told us that the base year had largely embedded within it the full year effects of the business transformation process that SA Water has implemented during the first regulatory period and which is reflected in its analysis of outperformance compared to the RBP2013 determinations.

In response to our request for further information, SA Water confirmed that there was some $1.1M restructuring/separation costs within the base related to the ongoing business transformation program. SA Water has assumed that this level of cost per annum will continue for each of the four years in the second regulatory period related to delivery of the ongoing efficiency program which we understand is partly facilitated by the proposed IT investment program.

Our initial conclusions were that in the absence of any evidence to suggest 2014/15 base year costs as adjusted for the ADP costs and the cost cost base of SA Water and a reasonable starting point in reviewing costs. However, subsequent to our review meetings SA Water together with proposed adjustments to its assumptions related to regulatory period. These are summarised

Table 8-1.

Table 8-1 Summary of changes to operating expenditure forecasts from RBP2016 proposal

		2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Total per RBP2016	Water	296.900	323.593	327.643	328.578	326.614	324.371
	Wastewater	127.800	128.529	131.076	131.262	131.086	129.766
	TOTAL	**424.700**	**452.122**	**458.720**	**459.840**	**457.700**	**454.138**
RML Adjustment	Water	-	(0.032)	(0.037)	(0.036)	(0.035)	(0.034)
	Wastewater	-	(0.016)	(0.018)	(0.018)	(0.017)	(0.017)
Updated ADP Capitalisation for 14-15	Water	17.800	-	-	-	-	-
	Wastewater	-	-	-	-	-	-
ADP OPEX Reduction (Remodeling)	Water	[redacted]					
	Wastewater	-	-	-	-	-	-
Removal of asset write-offs/Land devaluations	Water	(2.144)	(1.587)	(1.613)	(1.574)	(1.597)	(1.558)
	Wastewater	(1.056)	(0.782)	(0.795)	(0.775)	(0.787)	(0.767)
Regulatory consultants base expenditure update	Water	-	(0.389)	(0.389)	(0.389)	0.259	(0.260)
	Wastewater	-	(0.192)	(0.192)	(0.192)	0.128	(0.128)
Customer engagement base expenditure update	Water	-	(0.205)	(0.112)	0.155	(0.176)	(0.205)
	Wastewater	-	(0.101)	(0.055)	0.076	(0.086)	(0.101)
Updated 14-15 base year	Water	(1.536)	(1.536)	(1.536)	(1.536)	(1.536)	(1.536)
	Wastewater	(5.364)	(5.364)	(5.364)	(5.364)	(5.364)	(5.364)
Normalising of base year	Water	-	5.353	5.353	5.353	5.353	5.353
	Wastewater	-	0.797	0.797	0.797	0.797	0.797
Updated Total	Water	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Wastewater	121.380	122.872	125.450	125.786	125.757	124.186
	TOTAL	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

We note that the overall impact of these adjustments for the second regulatory period is to reduce proposed operating expenditure by some $26M over the period ranging from a reduction of $5.6M in 2018/19 to a reduction of $7.5M in 2017/18. The very large proportion of these adjustments fall within the wastewater services which appears to reflect that in the puts and takes identified by SA Water it is the 2014/15 base year out-turn that is driving this reduction which for water services is largely balanced by the 'normalising' of the base year, but that is not the case for wastewater services.

We are surprised at the level of the adjustments resulting from the base year out-turn analysis. At our first review meeting with SA Water we asked the question whether the 2014/15 base year represented a 'typical' year of costs and whether there were any exceptional or non-recurring cost issues that needed to be taken into account. The response from SA Water was that they felt 2014/15 in so far as there ever could be a 'typical year' was representative. At later meetings there was no indication that the Q2 forecasts for 2014/15 that underpinned the RBP would be significantly different from the year out-turn. But, a forecast is a forecast and we accept that there may well be variances once out-turns have been confirmed.

What is also notable is that of the $6.1M of costs shown in the summary spreadsheet that SA Water has identified should be added back into the base to 'normalise' the year, some $5.4M relates to water services compared to the base year 'underspend to forecast' of $1.6M whereas for wastewater services some $0.8M is identified for adding back into base compared to the base year 'underspend to forecast' of $5.4M. It is not clear from the supporting documentation what in particular has led to the wastewater out-turn figure being so significantly lower than the Q2 forecast. In addition, the figures in Table 1 'Opex underspend in 2014/15

which will occur in RBP 2016' in document PS0006 appear inconsistent with the spreadsheet in that for water it identifies $4.4M and for wastewater $0.9M.

We cannot comment upon the specific adjusted figures being quoted in the spreadsheet related to the 2014/15 base year as we have not had the opportunity to review these in detail and in any event our focus has been on the additional costs in RBP2016. However, we should comment that in the context of SA Water's supporting evidence in relation to unfilled vacancies there is no mention of whether additional costs have been accrued in relation to covering for those unfilled vacancies, for example in relation to overtime or contracted services.

We note that SA Water has updated the position in relation to the Your Say Program and Regulatory Contracted costs. The downward revision of the Your Say costs followed a challenge by us as to the extent that these costs were reflected in the base year. We consider that these downward adjustments reflect our view that SA Water is being open and transparent in its analysis.

The movement in base year costs presumably impacts upon the efficiency savings on base within the RBP and it is not clear whether these have been reflected anywhere in SA Water's updated analysis.

8.2 Data analysis

The following graphs, reflecting SA Water's RBP, summarise SA Water's performance relative to the first regulatory period determination assumptions and the proposed movements in the second regulatory period.

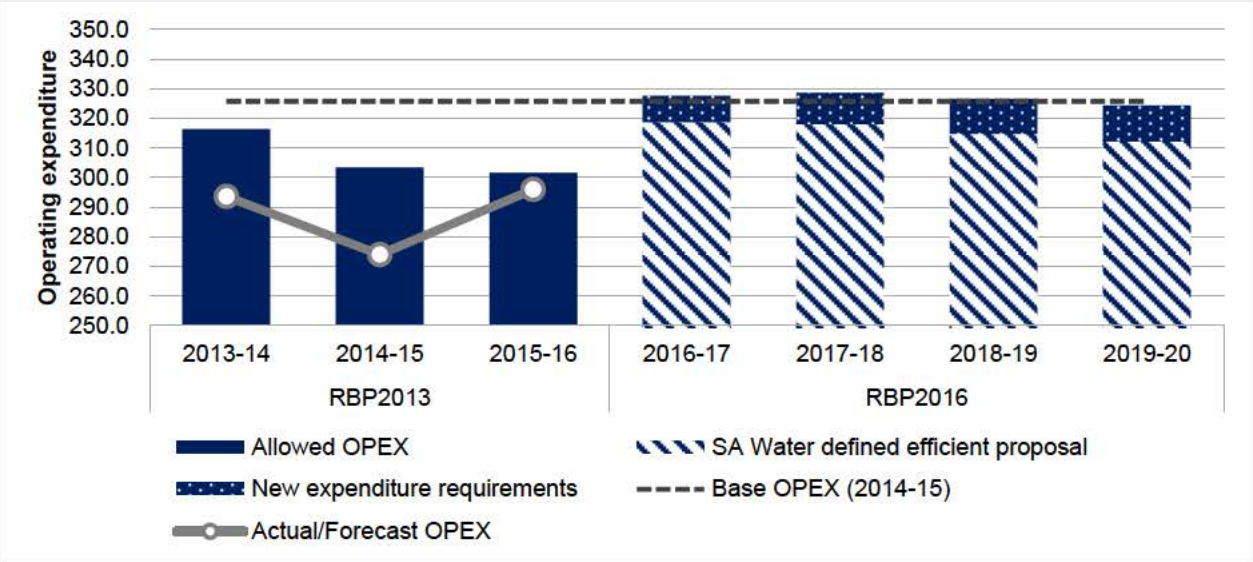


Figure 8-1 Actual and forecast operating expenditure - water

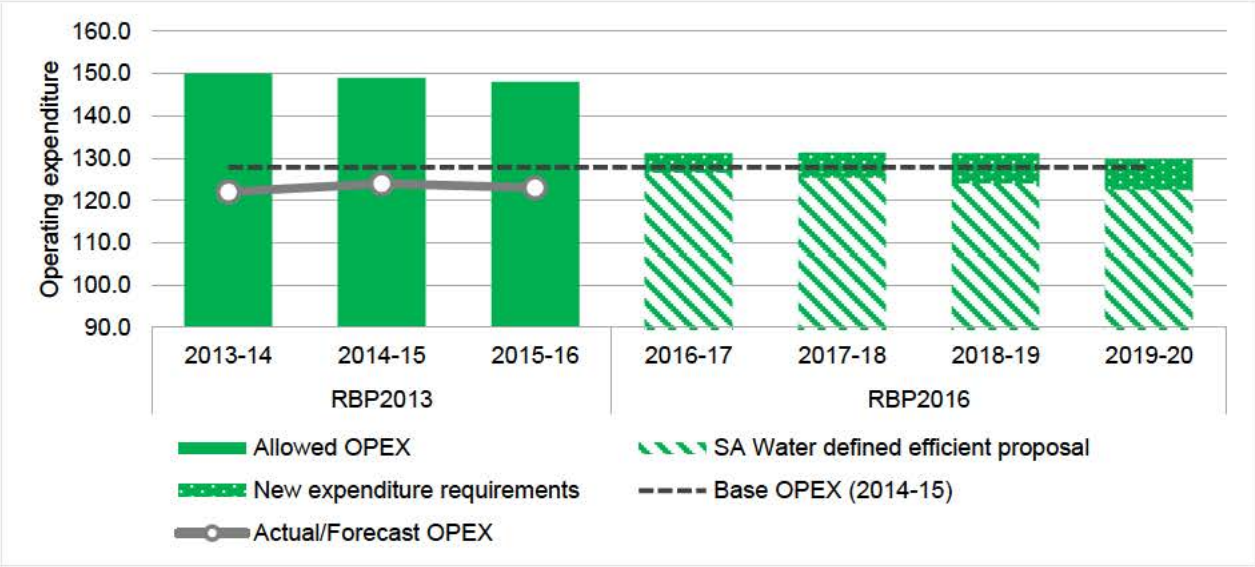


Figure 8-2 Actual and forecast operating expenditure - wastewater

We note that SA Water has significantly outperformed the operating expenditure assumptions that underpinned the first regulatory period determinations. Our experience in England and Wales is that, in the first four regulatory periods covering a period of 20 years, in general companies significantly outperformed the regulatory determinations in respect of the operating cost assumptions reflecting both the business transformation programs that companies initiated and the mechanisms that the regulator applied to incentivise companies to outperform.

SA Water is proposing an overall operating expenditure profile for the second regulatory period that is generally stable with additional costs being largely balanced by proposed efficiencies. SA Water told us that the business transformation program initiated in the first regulatory period, and that has resulted in significant savings reflected in the base year, continues to be embedded. There remains uncertainty as to the specifics of how the proposed efficiencies are to be delivered albeit that a significant proportion are predicated upon and facilitated by the proposed IT investment program. We discuss below the individual elements of the assumed additional costs and efficiencies, but we think these need to be considered in the context of the business uncertainties and associated risks that SA Water has identified in its RBP and discussed with us.

We do not believe that the base year should be described in absolute terms as 'prudent and efficient'. It represents a point in time in the journey that SA Water is making. Indeed, we might expect that there will be longer term benefits that will arise from the business transformation program initiated in the first regulatory period and as SA Water develops further its asset management strategy and associated business processes and supporting systems. We have noted a significant culture change compared to what we reviewed in 2012 in the way in which SA Water is seeking to address its cost base issues and that there has been business owner sign-up to the level of proposed savings that have been assumed to be facilitated through the IT investment program.

We have noted that SA Water is proposing to manage any cost escalation issues related to the key cost drivers of power, materials and contracted services within the CPI envelope of the regulatory determinations. The exception is SA Water perspective on labour cost escalation and we discuss this in more detail below.

At our review meetings with SA Water we expressed the view that we were surprised that there appeared to be no specific focus on energy in the RBP documentation. The implication of this is that SA Water is assuming that it will manage power costs along with contracted services and materials within the framework of the CPI envelope and subject to the overall general efficiency target of 1% per annum. As a general principle, that is consistent with what we have observed within England and Wales, although at various times companies in England and Wales have sought to argue for specific recognition of movement in energy

prices. This generally was in a period where escalating energy costs were being forecast. Managing costs within the CPI envelope does provide opportunities for companies to potentially benefit in terms of outperformance through efficiencies gained through effective and efficient procurement of services.

Power costs represent some 13% of operating costs (excluding depreciation and interest charges) in the base year. This is not inconsistent with what we observe in England and Wales. What drives the cost is the combination of price and volume. Thus, the assumption underpinning the SA Water RBP is that over the second regulatory period total power costs will remain broadly stable and consistent with the 2014/15 base. We know that power costs will fluctuate on a year by year basis reflecting requirements in particular for pumping, which will be a reflection of demand and weather, and movements in the case of SA Water of the spot prices at which it purchases power and any network charges. This raises the issue of whether 2014/15 base year can be viewed as representative of SA Water's cost base which in turn raises the issue of whether SA Water has optimised fully the supply/demand balance and the associated mix of resources inputting to supply. We have concluded that the 2014/15 cost base is a reasonable starting point for assessing the movement in costs in the second regulatory period. Thus, any additional benefits to arise from more optimal management of the supply/demand balance would be seen as contributing towards the delivery of the 1% general efficiency target.

Our review meetings with SA Water confirmed the importance SA Water attaches to managing its pumping regime to benefit from the lowest spot prices available. Energy price will be a key input to the optimisation model. Similarly the issues related to the future management of the ADP, although our understanding is that ADP energy requirements are effectively committed through long term contracts. However, what is clear is that if more effective optimisation is possible then this should result in lower energy costs and given that such costs represent such a significant part of the operating expenditure base then one might surmise that savings are likely to be material.

Given that the base year is a reasonable starting point and that SA Water is not seeking a power cost escalator, then should power price and/or base volume increase above CPI then that risk rests with SA Water. If it goes the other way then it will generate 'efficiency' savings. This needs to be a consideration in the judgement of whether the 1% general efficiency saving is sufficiently challenging.

We understand that self-generation of electricity meets a very small part of SA Water’s overall power requirements. Our experience is that in recent years a number of companies have been investing significantly in self-generation renewables associated primarily with digestion at sewage treatment works, but more recently with wind and solar energy. This is predicated on a cost benefit basis and we think that further research by SA Water perhaps in association with ESCoSA could usefully help inform potential for such initiatives moving forward from the second regulatory period.

SA Water’s approach to energy cost and volume management means that any price and volume fluctuations to the base going forward would be managed within the CPI element of the price determination. SA Water is not seeking specific recognition for any adjustments to the base year position other than what may have been provided for in the opex implications for growth, for example increased pumping associated with higher volumes. Historically, movements in energy prices has been uncertain and hedging strategies have been a way of managing the risk. SA Water is accepting in its second regulatory proposal that it will manage that uncertainty through its procurement and price management strategy. We consider that this is the appropriate approach for a well-managed utility with the technical capability and purchasing power of SA Water. Reductions in price and or volume experienced through the second regulatory period would contribute to delivery of the overall efficiency target. Increases would place additional challenge on other cost drivers in delivering the efficiencies. There will be year on year fluctuations, a key factor being the level of pumping required dependent on weather patterns. SA Water did not identify any exceptional power cost issues in relation to its base year 2014/15 and thus we assume that the power costs in that year are a reasonable basis on which to plan for managing such costs going forward.

We recognise also that in its assessment of the operating cost implications of capital investment that some significant savings have been identified, for example in relation to the pressure management initiative. These

are over and above the general efficiency savings and to a degree balance the additional operating expenditure arising from major capital schemes.

8.3 Labour cost escalation

SA Water is proposing a 0.5% above inflation labour price escalator which has the impact on operating cost shown in Table 8-2.

Table 8-2 Proposed labour cost escalation

Labour cost escalation	16/17	17/18	18/19	19/20
Water	0.8	1.2	1.5	1.9
Sewerage	0.3	0.5	0.7	0.9
Total	1.1	1.7	2.2	2.8

SA Water in its business case in support of the proposed labour price escalator states:

"Cost is driven by market conditions for labour and employment, which is an external factor largely beyond SA Water's control"

SA Water employed BIS Shrapnel to undertake a study of the likely labour cost escalator for the RBP 2016. This study utilised national and regional labour cost indicators in coming to their forecasts. BSI Shrapnel concluded:

"Overall, South Australia utilities WPI growth is forecast to average 3.9 per cent per annum (0.1 percentage points lower than the national utilities average of 4 per cent) over the four years from 2016/17 to 2019/20 inclusive."

Their conclusions are summarised on a year by year basis as shown in Table 8-3.

Table 8-3 BSI Shrapnel report conclusions for labour cost escalation

Labour Cost Escalator %	16/17	17/18	18/19	19/20	Average
EGWWS WPI – South Australia	3.5	3.8	4.0	4.4	3.9
EGWWS WPI – Australia	3.6	3.9	4.1	4.3	4.0
CPI headline	2.7	2.5	2.5	2.5	2.5
Real Price change South Australia	0.8	1.3	1.5	1.9	1.4
Real Price Change Australia	0.9	1.4	1.6	1.8	1.4

Source BIS Shrapnel Report Executive Summary

SA Water in its Business Case summarises its position as detailed in Table 8-4. The expected real labour cost increase figures are based on the BSI Shrapnel report. This demonstrates that SA Water is proposing lower real labour increases than recommended by BSI Shrapnel.

Table 8-4 SA Water position on labour cost escalation

Cumulative Real Costs %	16/17	17/18	18/19	19/20
Expected real labour cost increases	0.9	2.3	3.9	5.7
Proposed real labour cost increases	0.5	1.0	1.5	2.0
Implied cost savings	(0.4)	(1.3)	(2.4)	(3.7)

Subsequent to our review meeting SA Water provided further evidence in relation to the implications of its incremental pay framework. SA Water stated that:

SA Water employees whose positions are classified from SA Water level 1 to SA Water level 7 in the SA Water classification structure are employed within the scope of the SA Water Corporation Enterprise Agreement (EA). A small number of staff whose positions are classified as SA Water level 8 and 9 have maintained EA conditions.

The classification levels in the Enterprise Agreement have three increment steps which provide automatic annual wage increases for employees who complete their first and second year of continuous employment at the classification level.

When an Enterprise Agreement employee reaches the third step of the SA Water classification structure they will remain at that level while they are employed at that classification.

Results

An analysis of payroll data records for a 3 year period covering 2012/13, 2013/14 and 2014/15 has been undertaken focussing purely on those employees covered by the Enterprise Agreement who are entitled to receive an annual "step increase" in their salary levels…. highlighting the average step increases actually paid over these years as a % of total base salaries to be 0.91% for 2012/13, 0.71% for 2013/14 and 0.70% for 2014/15.

Our view is that over a longer period of time the incremental step increases will largely balance through staff turnover and that management of such costs are a matter that should effectively be managed within the base for the reasons we discuss below.

SA Water states:

> *"We can control the efficiency of our labour which we have put forward separately as part of our overall expenditure proposal"*

Comparing its proposed real labour cost escalator of 0.5% to its general efficiency savings of 1% per annum much of which will relate to headcount savings SA Water translates this into a net labour cost reduction from the base as shown in Table 8-5[17].

Table 8-5 SA Water position on proposed labour cost increase and volume savings

Cumulative real Cost Change %	16/17	17/18	18/19	19/20
Proposed real labour cost increase	0.5	1.0	1.5	2.0
Proposed labour volume savings – general efficiency	(1.0)	(2.0)	(3.0)	(4.0)
Net labour reduction from base year	(0.5)	(1.0)	(1.5)	(2.0)

The assumption underpinning this analysis undertaken by SA Water is that the general efficiency saving is related to labour volume metrics which may include headcount and hours worked.

SA Water acknowledges in its Plan that at RBP2013 ESCoSA did not specifically allow for labour price escalation. The principle applied is that well managed and efficient companies do have some control on the implications of market conditions and that it should be for SA Water to manage those issues within its overall cost base.

There is a key matter of principle as to whether the labour cost escalator, albeit lower than forecast by BSI Shrapnel, should effectively be allowed as a specific cost adjustment. There is an argument that by not making a specific allowance for labour cost escalation, there is more of an incentive for SA Water to manage its labour costs within the overall framework of operating expenditure cost management. In the UK it has been the practice of the regulator not to generally accept labour cost escalators on the basis that labour

[17] This table is extracted from SA Water's business case for labour cost escalation (WO008).

costs should be managed within the RPI envelope. In the most recent determination in 2014, Ofwat for the retail determinations removed the automatic RPI inflator on the basis that in a developing retail competition environment companies should become more efficient and that only where convincing evidence as to the company's competitive position within the regional economy would an escalator be allowed. In the event only two companies were allowed a cost pressure increase.

8.4 New or unavoidable operating expenditure increases from the base year

8.4.1 Unavoidable external requirements – Water Industry Licence Fee

This cost proposal is based upon advice from the Department of Treasury and Finance relating to licencing fees for the second regulatory period. It is a cost driver over which SA Water states it has no control in that failure to pay the licence fee would be illegal. We recognise that this is a matter that SA Water has no management control over.

SA Water summarises its proposed operating expenditure as shown in Table 8-6.

Table 8-6 Proposed increased operating expenditure - Water Industry Licence Fee

Operating expenditure - $M	16/17	17/18	18/19	19/20
Total Expenditure	**4.253**	**4.128**	**4.058**	**3.989**
Allocated to water	2.795	2.713	2.667	2.622
Allocated to sewer	1.377	1.336	1.314	1.291
Allocated to excluded services	0.081	0.078	0.077	0.076
Allocated to non-regulated	-	-	-	-

The annual reductions are due to fees being set in fixed nominal terms over a regulatory period.

8.4.2 Unavoidable external requirements – Past Service superannuation liability

These costs relate to the value of the liability and the payments required to fund it and are determined by Super SA with actuarial reviews every three years, the last conducted in June 2014. The option adopted by SA Water and agreed with the Department of Treasury and Finance is repayment by 2033/34 consistent with the timeframe committed to by the SA Government for the repayment of its unfunded liability.

The costs proposed by SA Water are shown in Table 8-7.

Table 8-7 Proposed increased operating expenditure - Past Service superannuation liability

Operating expenditure - $M	16/17	17/18	18/19	19/20
Total Expenditure	**1.122**	**1.133**	**1.144**	**1.155**
Allocated to water	0.716	0.723	0.730	0.737
Allocated to sewer	0.353	0.356	0.360	0.363
Allocated to excluded services	0.020	0.020	0.021	0.021
Allocated to non-regulated	0.033	0.033	0.033	0.033

These costs pass through as SA Water has no control over the requirement.

8.4.3 Unavoidable external requirements - Water Treatment Plant Residuals

The additional operating expenditure relates to changes in EPA standards for the production and use of waste derived fill. If SA Water does not amend its disposal process for water treatment residuals it will be in breach of the EPA standards with potential exposure to penalties including fines up to $2m. SA Water told us that it was planned to submit its Code of Practice for the disposal of the residuals in January 2016. It is

currently stockpiling the residuals at a number of works awaiting EPA approval of the Code of Practice. It has estimated costs as follows:

- Stockpile Disposals $1.8M non-recurring
- Residual Disposal Ongoing $2.6M

SA Water has confirmed that all of the stockpile disposal costs will be accounted for prior to the second regulatory period, but that these are not reflected fully in the 2015/16 forecasts.

SA Water told us that it was not seeking the full amount of the on-going disposal costs shown in its current estimates as these may reduce with the finalisation of the Code of Practice.

SA Water's proposals are summarised in Table 8-8.

Table 8-8 Proposed increased operating expenditure - Water Treatment Plant Residuals

Operating expenditure - $M	15/16 RBP2013 period	16/17	17/18	18/19	19/20
Total Expenditure	**2.238**	**2.200**	**2.200**	**2.200**	**2.200**
Allocated to water	2.173	2.136	2.136	2.136	2.136
Allocated to non-regulated	0.065	0.064	0.064	0.064	0.064

We queried the15/16 costs and SA Water responded that:

> *The $2.2m per year from 15/16 onwards is for the ongoing WTR disposal only. Additionally the 15/16 year should have included the $1.8m for the disposal of the stockpiled WTR's. Therefore our overall operating expenditure proposal in 15/16 is $1.8m lower than it should be.*

Our understanding is that this understating of 15/16 costs should not impact the base year.

SA Water states that its allocation of costs has been made consistent with the CAM. However, given that water residuals disposal expenditure relate solely to the residuals arising from the water treatment works process it does not seem appropriate that a proportion should be allocated to non-regulated.

There will be a degree of uncertainty related to disposal costs estimates and this is recognised by SA Water in its judgement that application of the Code of Practice may well result in downward costs of some 14% compared to the original estimate.

8.4.4 Unavoidable external requirements - Safety, Health, Wellbeing

SA Water is seeking funding of [redacted] over the period to facilitate a reduction in safety, health and wellbeing risk by three initiatives:

1. The identification and risk assessment of hazards related to asset condition and with the linking engineering solutions in order to maximise the benefit of WHS capital spend for this and the next regulatory proposal
2. Continuation of hazardous manual tasks analysis and risk reduction activities
3. Establishment of an effective strategy and risk control process for fatigue management across all affected business units

In addition a further $100K over the period is proposed to conduct annual audit of the safety management system and high risk programs to validate compliance as required by all Crown agencies.

The risk of a significant safety incident is one of the 20 core risks identified in the corporate risk register.

SA Water estimate that based upon current performance, incidents costs $250K per annum in direct and indirect costs.

SA Water in its business case states that costs are current market rates for external WHS specialists and that SA Water costs are absorbed within current headcount.

SA Water states that cost have been allocated consistent with the CAM and are summarised in Table 8-9.

Table 8-9 Proposed increased operating expenditure - health and safety costs

Operating expenditure - $M	16/17	17/18	18/19	19/20
Internal Costs	[redacted]	[redacted]	[redacted]	[redacted]
Other	0.020	0.020	0.020	0.020
Total Expenditure	[redacted]	[redacted]	[redacted]	[redacted]
Allocated to water	[redacted]	[redacted]	[redacted]	[redacted]
Allocated to sewer	[redacted]	[redacted]	[redacted]	[redacted]
Allocated to excluded services	[redacted]	[redacted]	[redacted]	[redacted]
Allocated to non-regulated	[redacted]	[redacted]	[redacted]	[redacted]

We note that whilst in the business case SA Water says that SA costs are subsumed within the existing base, the very large majority of additional cost is shown as internal costs.

SA Water identifies that incidents currently cost the business some $250k per annum in direct and indirect costs. It is not clear to what extent the proposed initiative will lead to savings on this cost and suggest that SA Water put in place monitoring to track the level of savings against spend during the regulatory period. We assume that any savings achieved will contribute towards the unidentified savings assumed in the general efficiency assumption.

8.4.5 Unavoidable external requirements - Training

This proposal relates to the reinstatement of training programs put on hold in the base year resulting from the business transformation program at some [redacted] per annum and the funding required to meet the minimum standards of competence required of field operators who treat/sample drinking water for human consumption of [redacted] over the regulatory period. Costs for the field operator program have been calculated based upon the scheduled fees of Regulated Training Organisations. Training costs and their proposed allocation is set out in Table 8-10.

Table 8-10 Proposed increased operating expenditure -Training

Operating expenditure - $M	16/17	17/18	18/19	19/20
Contracted Delivery	[redacted]	[redacted]	[redacted]	[redacted]
Internal Delivery	0.611	0.701	0.654	0.643
Total Expenditure	[redacted]	[redacted]	[redacted]	[redacted]
Allocated to Water	[redacted]	[redacted]	[redacted]	[redacted]
Allocated to Sewer	[redacted]	[redacted]	[redacted]	[redacted]
Allocated to Excluded Services	[redacted]	[redacted]	[redacted]	[redacted]
Allocated to Non-Regulated	[redacted]	[redacted]	[redacted]	[redacted]

Subsequent to our review meeting SA Water provided benchmarking data taken from Mercers Effectiveness Survey, showing dollars per employee. The sample size from utilities was four organisations. SA Water told us that if it were to apply Mercer's Utilities average of $1587.09 its annual cost would be $2,377,143 (1497.8 x 1587.09). Using their top end figure of $2695.45 it would be more like $4,037,245. This compares to the

SA Water current budgeted spend per employee for 2015/16 of $1,055.64 based on the training budget of $1,624,626.

We think that these additional costs have been reasonably justified in the context of the reduced training in the base year and the requirements associated with the National Certification of Water Operators.

SA Water states that costs have been allocated according to the CAM. The generic allocation appears to have been applied such that the training costs associated with the field operators who treat/sample drinking water have been allocated across all four categories rather than all to water. Taking 2016/17 as an example the costs have been allocated across the four categories as follows:

- Allocated to water – 60%
- Allocated to sewer – 30%
- Allocated to excluded and non-regulated – 10%

If it is assumed that the training costs of [redacted] in that year related to field operators who treat/sample water should be allocated 100% to water then the allocation would be as follows:

- Allocated to water - [redacted] higher than allocated in the business case
- Allocated to sewer - [redacted] lower than allocated in the business case
- Allocated to excluded and non-regulated - [redacted] lower than allocated in the business case.

We think that over the four year period the allocation to water has been understated by some [redacted] and that to sewer, excluded and non-regulated overstated.

8.4.6 Improved customer support and experience – Customer assist program

This additional expenditure relates to the phased introduction of a new customer assist program with the objective of maximising cash flow and reducing default payments. The program relates to 'can't pay' not 'won't pay'. SA Water view key success factors to include a decrease in the number of days customers are on the program, a decrease in average debt per hardship customer and a reduction in default payment arrangements. The proposed approach is matching funding such that the hardship customer pays for a period of time which is then matched by SA Water at an average of $150.

SA Water told us that the Customer Engagement Programme demonstrated customer support for funding hardship support measures at $1 addition per annum per customer with 64% support from customers completing an online survey and 71% support from customers taking part in customer survey workshops.

The proposed social tariff of $1 per customer generates $745,000 per annum when fully implemented. SA Water is proposing a two year phased introduction starting in 2016/17 as follows:

- Year 1, 2016/17 – restricted to pension concessions and acting as a learning year covering 900 pension concessions at an average $150 per customer, total $135,000
- Year 2, 2017/18 onwards – expand to the whole customer base with a total 4,000 hardship customers at an average $150 per customer including the Year 1 pension concessions at a total cost of $600,000 per annum.

In addition there is an internal delivery cost of one FTE at an assumed annual cost of $70,000.

The business case for this initiative does not seek to quantify any business benefits that may arise from improved cash flow and reductions in default payment arrangements. However, it seems unlikely that these would be material in the context of the overall operating expenditure.

SA Water summarises this initiative as per Table 8-11.

Table 8-11 Proposed increased operating expenditure - Improved customer assist program

Operating expenditure - $M	16/17	17/18	18/19	19/20
Internal delivery	0.070	0.070	0.070	0.070
Matching funding	0.135	0.600	0.600	0.600
Total expenditure	**0.205**	**0.670**	**0.670**	**0.670**
Allocated Water	0.131	0.428	0.428	0.428
Allocated Sewerage	0.064	0.211	0.211	0.211
Allocated to Excluded Services	0.004	0.012	0.012	0.012
Allocated to Non-Regulated	0.006	0.019	0.019	0.019

There is an argument that as excluded services and non-regulated business fall outside of the operating expenditure envelope that the costs associated with this initiative should be spread in total across the water and sewerage services and not to the excluded and non-regulated services. However, the costs involved are small and may be considered as not material.

In conclusion, the business case for this initiative appears to be supported by the customer research and we note that it can be flexed to suit a required budget. The assumption has been made that an additional FTE will be required in relation to internal delivery over and above what can be subsumed within the existing organisation. We might expect that the lessons learnt from year 1 of implementation will confirm or otherwise requirements related to internal delivery.

8.4.7 Improved customer support and experience – Your say program

SA Water is proposing some $800,000 over 3 years related [redacted] associated with its proposed Customer Engagement Program 2016 to 2020. This program is aimed to meet ESCoSA requirements to:

- Undertake adequate customer consultation in the development of its RBP and engage meaningfully with its customers to determine the most efficient levels of service
- Consult with its customers on significant expenditure proposals and proposed changes to service standards
- Undertake scenario testing of all service standard targets proposed, to ensure that customers are given the opportunity to at least consider whether they would prefer to accept higher/lower levels of service in exchange for higher/lower bills.

SA Water states that the program design will be informed by a post implementation review of the Customer Engagement Program for RBP2016. It is assuming:

- Reduced contractor spend using internal communication expertise and internal management expertise
- Reduced contractor spend leveraging existing research program methodology and upgraded communication utilising SA Water's new web technology as a consultation portal.

SA Water is proposing the contracted spend profile detailed in Table 8-12. The assumption is thus that internal costs associated with the Program will be subsumed within the existing base year expenditure.

Table 8-12 Proposed increased operating expenditure - Your Say program

Operating expenditure - $M	16/17	17/18	18/19	19/20
Total Expenditure [redacted]	**0.143**	**0.557**	**0.045**	**-**
Allocated to Water	0.091	0.356	0.029	-

Allocated to sewerage	0.045	0.175	0.014	-
Allocated Excluded Services	0.003	0.010	0.001	-
Allocated to Non-Regulated	0.004	0.016	0.001	-

There is an argument that as excluded services and non-regulated business fall outside of the operating expenditure envelope that the costs associated with this initiative should be spread in total across the water and sewerage services and not to the excluded and non-regulated services. However, the costs involved are small and may be considered as not material.

We asked for confirmation of what level of non-recurring contracted costs for RBP2016 are in the base year 2014/15. The additional information provided (RD16035.2) regarding customer engagement costs in the base shows $0.325m in the 2014/15 base. The RBP is proposing a total spend on customer engagement in the second regulatory period of $0.750m, the same as in the first period. However, this is shown as additional to the base. The RBP profile of expenditure is as follows:

16/17 - $0.143m
17/18 - $0.557m
18/19 - $0.045m
19/20 - $0.000m

In other words the RBP2016 is counting the customer engagement costs twice, once in the base and once in the additional expenditure. In so doing it is overstating the proposed costs by some $0.555m over the second regulatory period. We note that in the adjusted operating expenditure provided by SA Water subsequent to the review meetings that this double counting has been corrected.

[redacted]

8.4.8 Network Growth – Growth in water demand

The additional costs relate to the estimated operating cost impact of licensed water sales demand over the second regulatory period.

The costs are derived by applying the monthly demand model output into the SA Water's Optimisation Model to determine operational cost impacts as a result of the change from 190GL per annum to 194.5GL per annum. SA Water assume that water sources to satisfy the demand increases are catchments/ reservoirs and River Murray water.

SA Water state that this initiative will provide for reduced prices for customers. While operating expenditure will increase, variable costs will be recovered from the additional volume of water sold. That also includes for recovery of fixed costs resulting in a minor decrease in the cost to customers of each GL of water supplied.

[redacted]

[redacted]

On the basis that the additional costs would be more than balanced by the additional revenue from the additional volume of water sold then we would expect to see this reflected in the revenue analysis of the RBP.

8.4.9 Network Growth – Capital Plan Impacts

The following table summarises the material implications of capital schemes on operating expenditure. There are others of lower benefit or cost.

[redacted]

We note that the reduced operating costs associated with the pressure management initiative appear to assume that the effect is immediate. However, as detailed in our project review in Appendix A, the initiative is being carried as an incremental project with lessons learned from the first of the three areas to be covered being applied to the following two. The effectiveness of the overall initiative is as yet unproven and may be optimistic and therefore there is some risk that these savings will be achieved.

We asked for clarification of the Murray Bridge additional operating expenditure. In response to RD16045 SA Water states:

> *"The OPEX costs reflected in Table 1 of SC0045, for the second regulatory period (2016/17-2019/20), are for continued operations of the existing WWTP. They broadly comprise of pumping costs and desludging of both the Imhoff tanks and lagoons. Refer to Appendix H of SC0045, specifically the "Assumptions" tab for information on operational expenditure assumptions. Please note that this is not additional cost and included in the base cost"*

Our interpretation of this, in particular the last sentence, is that the costs are in the base. Yet in the business case related to additional operating expenditure arising from capex the Murray Bridge Operating expenditure

is shown as additional. If these costs are in the base then the net operating expenditure arising from capex should be reduced as follows:

16/17 - $0.376m
17/18 - $0.380m
18/19 - $0.383m
19/20 - $0.387m

As detailed in Appendix A, we recommend that the operating expenditure arising from the Mandated Growth Wastewater Networks SFL be adjusted to take into account better information provided by SA Water and an adjustment recommended by us. The recommended adjustment is set out in Table 8-15.

[redacted]

8.4.10 Network Growth – Recycled Water Supply

This relates to the operating expenses to be incurred by SA Water as a result of the transfer of the Virginia Pipeline Scheme to SA Water and its ongoing operation from 1 January 2018.

SA Water state that this initiative will reduce customer prices as the non-rates and sales revenue generated exceeds the operating expenditure.

The estimated cost and revenues are summarised below

[redacted]

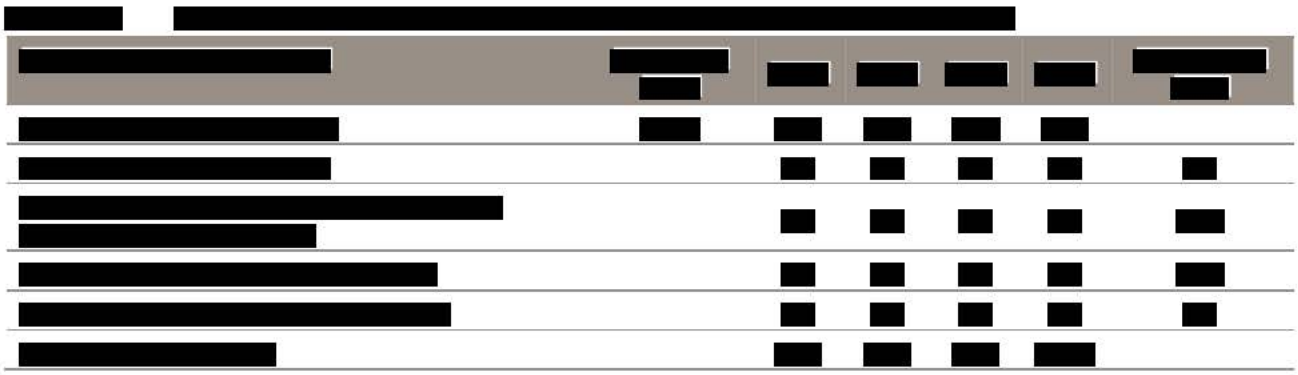
We note that 2017/18 represents a half year costs and revenues to reflect the date of implementation being mid-year.

SA Water states that the costs have been allocated consistent with the generic CAM. Although the allocation to non-regulated is relatively small, as this is a specific initiative related to the provision of recycled water we should question whether it is appropriate to allocate a proportion of the costs to non-regulated.

On the basis that the additional costs would be more than balanced by the additional revenue from the additional volume of water sold then we would expect to see this reflected in the revenue analysis of the RBP.

8.4.11 Technology Investment – IT Business Change Projects

Table 8-17 summarises the IT operating expenditure arising from capex and the associated business benefits[18].



Note that the annual operating cost increase by 2019/20 in the RBP chapter 13 table 13.1 of $2.8M relates to IT capex in the second regulatory period. The assumption seems to be that the 2016/17 additional operating expenditure relates to IT expenditure in regulatory period 1.

There appears to be an operating expenditure variance totalling some $2.9M over the regulatory period comparing the KPMG assurance report to the RBP fairly evenly profiled over the four year regulatory period. We understand that the difference between KPMG and RBP is the 2016/17 operating expenditure addition, whereby SA Water has included an additional $0.8M above the KPMG assumed change in the base. We understand that this relates to the full year impact of IT projects in 2015/16.

8.5 General efficiency

The values presented in this initiative have been calculated to provide an incremental 1% per annum reduction in operating costs for both water and wastewater services over the second regulatory period when combined with the efficiencies results from SA Water's information technology investment. The savings are before new cost increases and the impacts of the ADP are incorporated.

Table 8-18 summarises the proposed savings. The general unidentified savings do not include those associated with the IT technology investment that are covered separately. It is the two together that deliver the 1% efficiency.

Table 8-18 Summary of IT enabled savings and general savings

Operating expenditure - $M	16/17	17/18	18/19	19/20
Total savings excluding IT	**1.024**	**2.561**	**4.721**	**7.234**
Allocated to water	0.362	1.412	2.845	4.403
Allocated to sewer	0.663	1.150	1.876	2.832
Total savings IT	**3.65**	**6.41**	**9.26**	**11.44**

[18] Sourced from CX0002 page 48 – KPMG Report and SA Water RBP pages 91 and 163

It is not yet clear how the non-IT savings in this initiative will be realised. The IT savings are predicated on business ownership of the savings related to the specific IT projects delivering those savings. We discuss the IT capital program in Section 9.4.

SA Water states[19] that maintaining service levels to customers will be challenging under the lower resource levels proposed. However SA Water also comments that it is committed to maintaining levels of service to customers. It states also that it is highly likely that operating expenditure reductions in addition to those proposed in the initiative will result in an adverse impact on service levels to customers.

8.6 Relative Efficiency – Continuing and catch-up considerations

SA Water asked KPMG to benchmark its operating costs, using 2013/14 National Performance Report data, against a peer group of Australian water utilities. SA Water considers the most powerful benchmarking method to be multi-dimensional efficiency analysis, which combines three key drivers of productivity – customers, length of pipe and demand (CLD) – to assess relative efficiency. This demonstrates that for both water and sewerage operating costs that SA Water is more efficient than the average of the peer group. This is similar in principle to the evidence that SA Water provided as part of its RBP2013 proposal where it argued that because it was at the perceived forefront of efficiency there was very limited or no scope for further efficiency gains. As SA Water recognises in its RBP2016 proposal it significantly outperformed the efficiency challenge that was set as part of the RBP2013 determinations. This highlights that whilst the CLD analysis is an indicator of relative efficiency in itself it is not a robust basis on which to determine efficiency headroom.

Andrew Worthington of Griffith University in his National Water Commission sponsored paper 'Productivity, efficiency and technological progress in Australia's urban water utilities' published in October 2011 noted that:

> *For the most part, the input-output relationship modelled in urban water utility behaviour follows a production approach. This principally views water utilities as producers of physical water outputs, typically the volume of potable water and/or the number of properties supplied with water as a function of operating expenditure. Past studies have generally made little allowance for qualitative outputs such as customer satisfaction and water quality.*
>
> *Problematically, this specification is often the result of limited data availability and the inability of some methodologies to reflect the regulatory obligations of water utilities to provide water to households in their services areas. It also seldom reflects the capital-intensiveness of water utilities or the fullest range of input factors upon which they draw in the production process.*

We think this reinforces the limitations in respect of CLD analysis and the difficulties in seeking to set the efficiency challenge in the context of the perceived frontier. Our experience in the United Kingdom is that there is a much more mature econometric modelling approach that more fully takes account of specific regional factors as a sound basis on which the rationale for efficiency judgements can be applied.

In England and Wales, the regulator Ofwat as part of the Periodic Review of Prices 2014 process developed a number of benchmarking models to assist its understanding of efficient costs. These models were the starting point of its understanding and companies had the opportunity to provide Ofwat with high quality evidence to demonstrate that their costs are efficient, even if they appeared relatively high compared to the results of the modelling. Most companies were able to show there were factors not properly captured by Ofwat modelling and where appropriate special allowances were made for these costs. A key feature of the Ofwat approach was an upper quartile efficiency challenge where cost allowances were derived on the basis of comparative efficiency, using benchmarking models and applying an upper quartile efficiency challenge on all companies' wholesale costs, to both incentivise efficiency and share the benefits of these efficiencies with

[19] As set out in WO0010

customers over the short and longer term. This modelling approach was applied to totex (that is the total of operating and capital cost) and was a significant development from the previous catch-up and frontier movement that had been applied by Ofwat at previous price reviews and which were applied separately to operating expenditure and capex. Such comparative modelling is not possible at the moment within Australia given the limited benchmarking data available.

Given the limitations of the CLD analysis we have taken a pragmatic view of SA Water's proposed efficiency assumption of 1% per annum in the context of the business transformation program implemented in the RBP2013 period supported by the proposed IT investment program.

The initial but significant savings arising from the business transformation program are embedded in the 2014/15 base year. In our discussions with SA Water the comment was often made by business managers about the journey SA Water was taking and it seems likely that further medium and longer terms benefits arising from the transformation program will accrue during the second regulatory period although we recognise that it is difficult to quantify these at this stage. Our experience is, and there is a growing body of academic research in support of this view, is that ongoing business transformation (gradual or step-change) is an important driver in realising business efficiency.

Whilst there is business owner sign-up to delivering the savings that are planned to arise from the investment in information technology and more generally implementation of the digital strategy there remain significant risks and uncertainties both in the timing and volume of those savings. A significant part of the general efficiency savings are predicated on successful delivery of the IT program.

A significant proportion of the operating expenditure cost base, [redacted] is accounted for by the Allwater contract. As part of our review SA Water was asked to provide an estimate of the target savings over the second regulatory period arising from the 'incentive mechanism' amendment to the contract between SA Water and Allwater, made this year. SA Water responded:

> *"Any potential savings in the second regulatory period resulting from amendments to the Allwater incentive mechanism have been factored into the 1% general efficiency savings….*
>
> *The general intent of the change is therefore to reduce SA Water's bottom-line cost while allowing for increased financial incentives for the Alliance, but not at the detriment of SPIs. In the very least the change to the model would allow the Alliance to earn financial incentives by targeting budget underspends instead of targeting exceptional performance against SPIs.*
>
> *Initially the change is for one year only. The 2015/16 financial year will therefore be a trial to ensure the appropriate balance between service quality and cost is retained. If successful it shall be implemented permanently and will assist in reducing the unit cost of service delivery each financial year to the end of the second Regulatory Period.*
>
> *In part, success will be demonstrated by the Alliance achieving its budget for 2015/16 or better. There is therefore no estimate of the targeted savings over the second Regulatory Period as yet".*

Thus, SA Water has already recognised that there are potential savings arising from contract management that will contribute towards the unidentified element of the 1% efficiency savings.

One of the key issues in reviewing the RBP2016 submission is understanding the relationship between cost, service level and risk. SA Water itself has only been able to comment on the issues arising in very generic terms reflected in the general efficiency business case that it will seek to maintain service levels at the planned level of expenditure and that any further reductions beyond those planned will result in deteriorating service levels.

Given that there may well be additional medium and long term business benefits arising from the business transformation program (coupled with contract renegotiation) and assuming that the IT benefits will be

delivered we think that there is a case for a more challenging efficiency target to be applied in years 3 and 4 of the regulatory period. We recommend a profile that the 1% company assumed target applies for years 1 and 2 of the coming regulatory period and that an additional 0.5% be applied for years 3 and 4 for the non-IT related efficiencies. We propose that the efficiency target is not applied to the IT area because we consider that SA Water has set sufficiently challenging targets for savings in this area (see Section 9.4.1 for discussion on the IT capital projects for which the largest operating cost savings are expected to be realised). We have calculated this additional efficiency target as being 50% of the general efficiency savings proposed by SA Water.

8.7 Recommendation

Our overall conclusions with respect to operating expenditure are:

- That the base year position 2014/15 as defined by SA Water is a reasonable basis on which to forecast costs for the second regulatory period.
- We believe that SA Water, consistent with the first regulatory period determinations, should manage labour cost escalator issues within the overall CPI framework along with the other key cost drivers of power, materials and contracted services
- We have noted a number of adjustments that we think should be applied to the additional costs to the base that SA Water has identified in its RBP. These include some cost allocation issues in relation to the way in which costs have been allocated between the regulated business and non-regulated and excluded services and between water and sewerage services.
- We recognise that a general efficiency target applied across the totality of the operating expenditure base will impact differing elements of the cost base at differing levels of efficiency. This will reflect factors such as the degree of management control over those cost drivers, the potential headroom in service delivery, the degree to which the benefits from the proposed IT investment program are realised and from the ongoing business transformation program and the flexibility afforded by contract negotiation. SA Water comment that there is uncertainty related to how the proposed 1% per annum efficiency is to be realised. However, given that there is business owner sign-up to delivery of the IT facilitated business benefits, that SA Water is already pursuing potential savings through its contract management and that there are likely to be further medium to longer term business benefits arising from the business transformation program initiated in the first regulatory period we believe that a more challenging efficiency target is appropriate towards the latter end of the second regulatory period.

Our recommended level of efficient operating expenditure has been derived as follows consistent with our review methodology:

- **Adjustments for better information provided by SA Water**

  SA Water advised adjustments to the base year as discussed in Section 8.1

- **Adjustment to reflect our assessment of the prudence, timing and efficient level of expenditure of specific projects**

  We propose the following specific adjustments to operating expenditure items:

  - Removal of duplicated operating costs for Murray Bridge as detailed in Section 8.4.9
  - Reduction in operating expenditure for the Mandated Growth SFL as detailed in Appendix A and Section 8.4.9 to reflect a proposed reduction in capital expenditure in this area
  - Transfer of allocated costs of $100k per annum from sewerage to water to reflect our assessment of the appropriate allocation of costs

- **Adjustment of any top down factors applied to expenditure categories where we believe that the factors applied by SA Water are unreasonable.**

Removal of the allowance for real labour escalation as detailed in Section 8.3.

- **Efficiency**

  Acceptance of SA Water's proposed efficiency target of 1% per annum (compounding) for the first two years of the RBP2016 regulatory period but applying an additional efficiency target equal to 50% of the general efficiencies identified by SA Water for the last two years of the regulatory period to reflect the level of ongoing efficiencies we consider that SA Water will be able to achieve.

Our recommended level of efficient operating expenditure is summarised in Table 8-19.

Table 8-19 Recommended efficient operating expenditure

Operating expenditure - $M	Water				Sewer			
	16/17	17/18	18/19	19/20	16/17	17/18	18/19	19/20
Proposed operating expenditure	327.6	328.6	326.6	324.4	131.1	131.3	131.1	129.8
SA Water Adjustments	(1.0)	(2.1)	(0.3)	(0.5)	(5.6)	(5.5)	(5.3)	(5.6)
Expenditure Adjustment								
- Labour cost escalation	(0.8)	(1.1)	(1.5)	(1.9)	(0.3)	(0.5)	(0.7)	(0.8)
- Murray Bridge WWTP					(0.4)	(0.4)	(0.4)	(0.4)
- Cost Allocation	0.1	0.1	0.1	0.1	(0.1)	(0.1)	(0.1)	(0.1)
- Mandated growth SFL					(0.3)	(0.4)	(0.5)	(0.6)
Additional efficiency adjustment off base	-	-	(1.4)	(2.2)	-	-	(0.9)	(1.4)
Recommended efficient operating expenditure	326.0	325.5	323.5	319.9	124.3	124.4	123.2	120.8
Variance (recommended - proposed)	(1.7)	(3.1)	(3.1)	(4.5)	(6.8)	(6.9)	(7.9)	(8.9)
Variance (%)	-0.5%	-0.9%	-1.0%	-1.4%	-5.2%	-5.2%	-6.0%	-6.9%

9 Capital expenditure

9.1 Overview

In the RBP2013 regulatory period from 2013/14 to 2015/16, SA Water's actual and forecast capital expenditure totals $841M or $280M per year. For the RBP2016 period, SA Water proposes a capital expenditure program totalling $1,262M or $315M per year over the four year period[20]. The forward program for RBP2016 is more than 12% per year higher than the RBP2013 actual and forecast expenditure. However, it is lower than the average annual capital expenditure over the last five years ($373M) and this is mainly due to expenditure related to the Adelaide Desalination Plant (ADP). Figure 9-1 shows SA Water's historical and proposed capital expenditure by cost driver. Information Technology is itemised separately[21]. Also, costs related to ADP capitalisation and cash contribution are excluded from the graph below. This figure shows that SA Water proposes increased average annual capital expenditure across all drivers for the RBP2016 period compared with RBP2013.

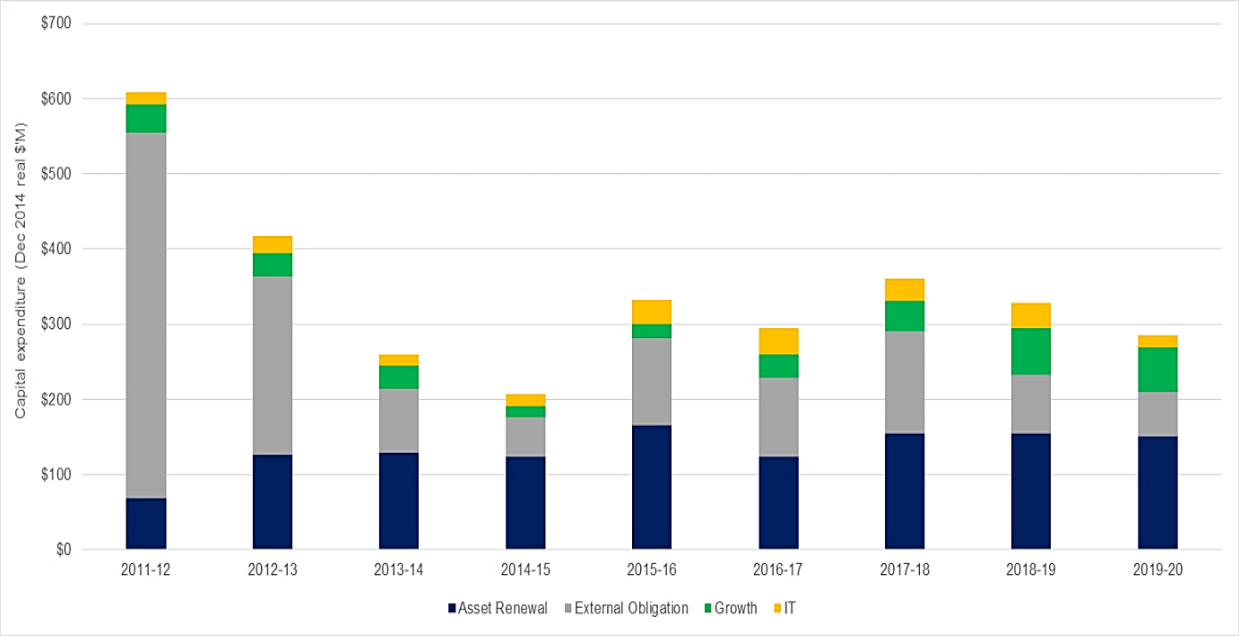


Figure 9-1 Capital expenditure by cost drivers 2011/12 to 2019/20

Figure 9-2 shows historical and proposed capital expenditure by service type. Expenditure on the water service is proposed to increase by 4% from $164M p.a. in the RBP2013 period to $171M p.a. in the RBP2016 period. Expenditure on the wastewater service is proposed to increase by 22% from $95M p.a. in the RBP2013 period to $115M p.a. in the RBP2016 period. Expenditure on IT is proposed to increase by 35% from $21.4M p.a. in the RBP2013 period to $28.8M in the RBP2016 period.

[20] Capital expenditure is shown net of contributions and net of cost associated with capitalising proving costs of the Adelaide Desalination Plant

[21] SA Water did not use the drivers of renewals, growth and external obligations in developing its RBP2016 program. However, it is possible to present expenditure by these categories by making reasonable assumptions.

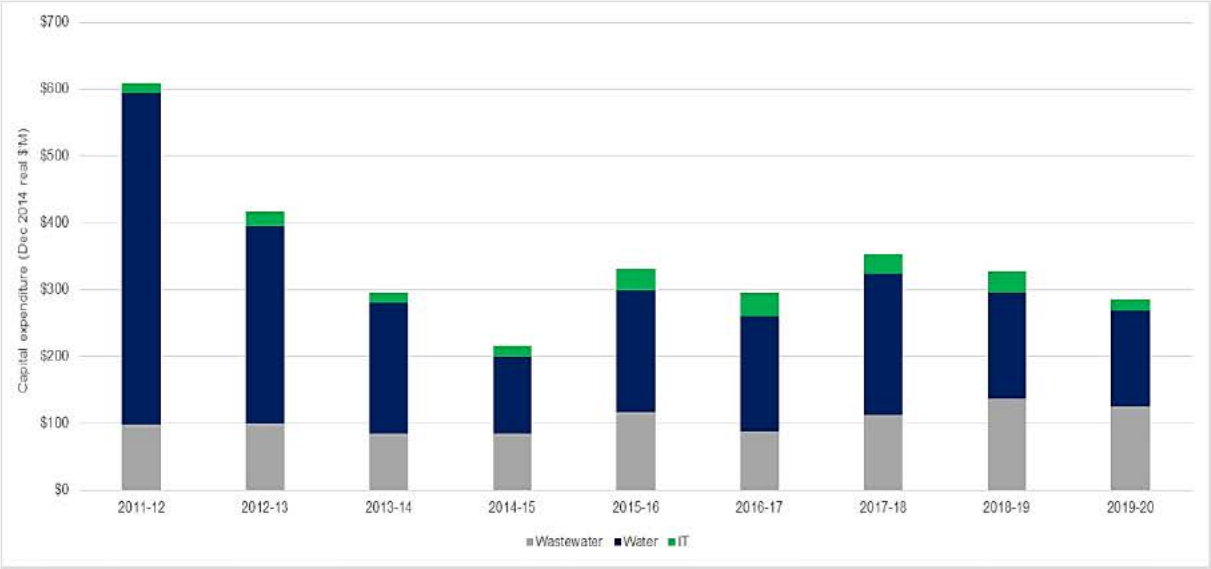


Figure 9-2 Capital expenditure by service 2011/12 to 2019/20

Following release of its RBP2016 submission, SA Water has put forward adjustments to both its capital and operating expenditure proposals to reflect better information being available. Table 9-1 summarises the changes made to SA Water's historical and proposed capital expenditure.

Table 9-1 Summary of advised adjustments to SA Water's capital expenditure

	RBP2013			RBP2016				
Capital expenditure (Net of contributions)	13/14	14/15	15/16	16/17	17/18	18/19	19/20	RBP2016 total
RBP2016 as submitted 31 August 2015	**267.0**	**289.8**	**328.7**	**281.2**	**351.0**	**327.9**	**283.9**	**1243.9**
High Level update 24 September 2015	29.8	-54.9	11.5	22.0	11.3	8.4	9.7	**51.3**
Revised net capital expenditure at 24 September 2015	**296.8**	**235.0**	**340.2**	**303.2**	**362.3**	**336.3**	**293.5**	**1295.3**
Further updates advised 3 November 2015:								
ADP proving costs updated to actuals	1.1	-17.8						0.0
Port Wakefield Federal Government Grant (update to actual)		0.4						0.0
ADP rebate from SAPN	-0.1							0.0
Augmentation contributions identified	-2.6	-2.8	-3.7	-3.7	-3.7	-3.7	-3.7	-14.7
Wastewater Extensions contributions identified			-3.4	-3.4	-3.4	-3.4	-3.4	-13.8
Water Extensions contributions identified			-1.6	-1.6	-1.6	-1.6	-1.6	-6.3

Capital expenditure (Net of contributions)	RBP2013 13/14	14/15	15/16	RBP2016 16/17	17/18	18/19	19/20	RBP2016 total
Total impact of 3 November update	*-1.6*	*-20.3*	*-8.7*	*-8.7*	*-8.7*	*-8.7*	*-8.7*	*-34.8*
Revised net capital expenditure at 3 November 2015	**295.2**	**214.7**	**331.5**	**294.5**	**353.6**	**327.6**	**284.8**	**1260.5**

The adjustments made in September 2015 were largely to reflect better information on the timing and outturn costs of work in progress. The largest single impact of the September 2015 update was deferral of $18.64M of expenditure related to the safety upgrade of Kangaroo Creek Dam out of the RBP2013 period and into the RBP2016 period. The 3 November 2015 update recognised a total of $34.8M of additional capital expenditure contributions for the RBP2016 period.

9.2 Historical expenditure

9.2.1 Variance of historical expenditure to RBP2013 Determination

SA Water's actual capital expenditure (and forecast outturn for 2015/16) for the RBP2013 period totals $841M. This is $207M (20%) lower than the $1,048M in capital expenditure allowed for in SA Water's revenue determination in 2013. Average expenditure per year of $280M was $69M per year lower than the determination.

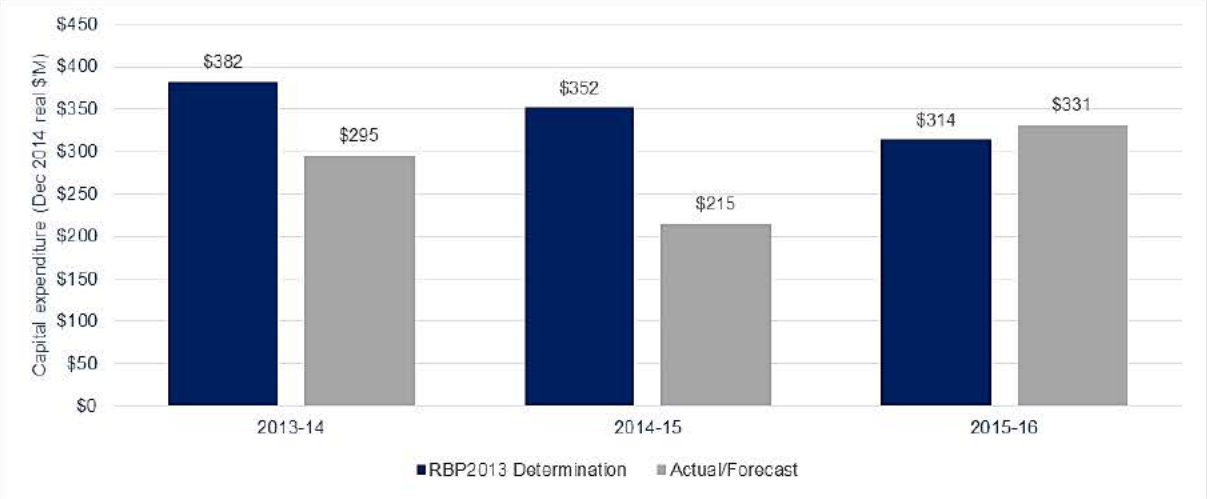


Figure 9-3 Variance of historical expenditure to RBP2013 Determination

Table 9-2 summarises the variance of capital expenditure across the RBP2013 period by driver.

Table 9-2 Variance of RBP2013 capital expenditure by driver

	RPB2013 Actual/Forecast	RBP2013 Determination	Variance ($M)	Variance (%)
Asset Renewal	419	551	-133	-24%
External Obligation	253	242	12	5%
Growth	63	139	-76	-55%
IT	64	56	8	14%
ADP Capitalisation	51	60	-9	-15%
Cash Contributions	-9	n/a	-9	n/a

	RPB2013 Actual/Forecast	RBP2013 Determination	Variance ($M)	Variance (%)
Total	**841**	**1,049**	**-189**	**-20%**

This analysis shows that:

- Expenditure on asset renewal was 24% lower than that forecast at RBP2013. An important question is to determine the reason for the underspend. If the underspend is due to SA Water having a better understanding of its asset deterioration and performance, then this is a prudent approach. If the underspend has occurred without this knowledge, there is a risk that asset condition will deteriorate faster in future years than if the expenditure had been made, leading to higher costs for managing the assets across their life cycles. However, much of SA Water's asset base is long lived meaning that these trends do not become apparent for a number of years. It would also be prudent for SA Water to reduce expenditure while it gains a better understanding of the relationship between expenditure on renewals, asset deterioration and performance.
- Expenditure on growth related projects was 55% lower than forecast suggesting that actual population growth was lower than that forecast at the time of the 2013 determination. It is prudent for SA Water to have not pursued expenditure where the trigger for the expenditure was no longer present.
- Expenditure on external obligations was 5% higher than forecast. Further analysis of expenditure by this driver (See Table 9-3) shows that expenditure has varied due to a combination of underspend on projects identified at RBP2013 (-$83.9M), deferrals (-$84.9M) and new projects not identified at RBP2013 (+$180.5M). We acknowledge that this analysis is likely to magnify the reasons for the variance as it is likely that the underspend and deferrals did occur, but in a different form or nomenclature and have therefore been classified as being not identified at RBP2013. It is not possible to make this distinction based on the information we have been provided.

Table 9-3 Analysis of reasons for variance in external obligations expenditure

	No. of Projects	RBP2013 Determination ($'M)	RBP2013 Actuals/Forecast ($'M)
Project planned in RBP2013 and executed accordingly	71	156.8	72.9
Project deferrals (100% of capex allowed for)	83	84.9	0.0
Unplanned projects executed during RBP2013 period	344	0.0	180.5
Total expenditure driven by External Obligations		**241.7**	**253.3**

SA Water has analysed the underlying reasons for the variances in its outturn expenditure for RBP2013 compared with that forecast at the time of the Determination. This analysis is summarised in Table 9-4[22]

Table 9-4 SA Water analysis of underlying reasons for variance in RBP2013 capital expenditure

	Sewerage	Water	Total
First determination capital expenditure allowance	**381.9**	**620**	**1001.9**
Prudent capital planning (deferral)			

[22] This data is sourced from Table 5.4 and Table 9.4 of SA Water's RBP2016 submission. Note that the total outturn forecast for capital expenditure for the RBP2013 period included by SA Water in its RBP2016 ($825M) differs to that cited elsewhere due to updated information provided by SA Water after it had made its submission.

Renewals	-27.3	-33	-60.3
Growth and obligations	-24.1	-69.1	-93.2
Efficiency	-15.9	-12.3	-28.2
Market movement	-5.5	-8.5	-14
Reprioritisation	13.4	5.6	19
Forecast savings	-59.4	-117.3	-176.7
Forecast actual capital expenditure	**322.5**	**502.7**	**825.2**

We consider that SA Water's ability to identify reasons for the variance in its expenditure in the RBP2013 period is a sign of its maturing capital delivery processes and we note that continuing this analysis and rigour into RBP2016 will assist it to deliver efficient costs. There will inevitably be subjectivity in an analysis of this type. For example, we consider that 'market movement' is better considered alongside efficiency, as SA Water has some ability to manage its exposure to changes in market conditions through its contracting approaches.

To complement this analysis of the trends in capital expenditure over the RPB13 period, we have reviewed a sample of historical capital expenditure projects. The findings from this analysis is detailed in Section 9.2.2.

9.2.2 Findings from review of sample of historical capital expenditure projects

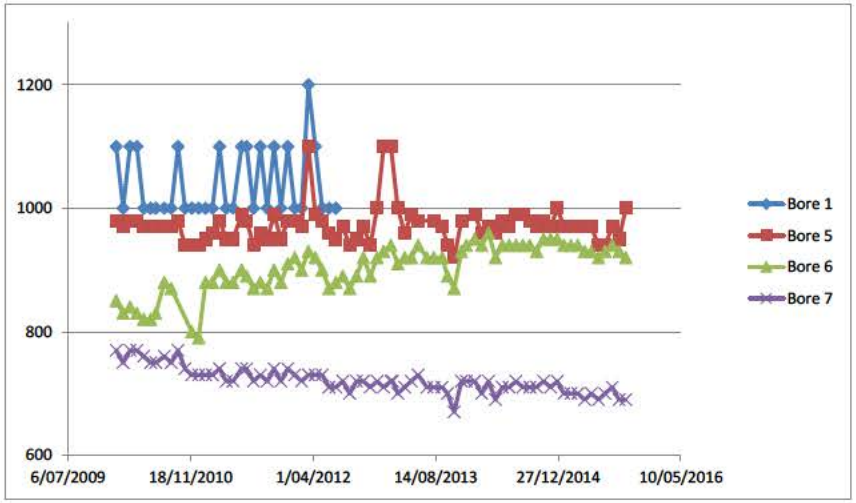
We are required to review a sample of completed (or in progress) capital expenditure projects to determine whether they represent a prudent and efficient investment. This assessment will assist ESCoSA in determining the amount of expenditure undertaken in the RBP2013 period that should be included in SA Water's Regulated Asset Base. A sample of projects was selected, in consultation with ESCoSA, with a focus on projects where actual and/or forecast expenditure had significantly exceeded that forecast at the time of the RBP2013 Determination. The findings of this review of projects is set out in Table 9-5. The figures for actual/forecast expenditure are based on figures put forward for the State Budget. As discussed in the table, there are a number of instances where the actual and forecast expenditure varies from this figure. ESCoSA will determine the values to include in the Regulated Asset Base based on the latest available information.

Table 9-5 Findings from ex-post review of capital expenditure projects

Project	Project Name	Actual / Forecast	RBP2013 estimate	Variance to RBP2013 estimate	Observations
C6384	Purchase additional Murray water licence	16.00	-	+16.00	We have also reviewed this project as an element of the proposed capital expenditure program. Our findings are detailed in Appendix A and a summary is in Section 9.3.2.
C2147	Port Wakefield WS Upgrade (Upper Wakefield)	12.34	1.04	+11.30	This project involves construction of around 47km of water mains (21km of 300mm ND and 26km of 250mm ND) from the Upper Wakefield Storage to Port Wakefield. The pipeline allows water to be supplied to industry in the area, particularly poultry and copper mining. SA Water had been aware of this potential development opportunity but had not included it in its RBP2013 program of works. The expenditure was brought forward following receipt of a Regional Development Australia Fund grant applied for by the local council which subsidised the construction of the scheme. SA Water undertook financial analysis which shows that the grant funding makes the scheme cost beneficial based on assumed future revenue from the new customers served by the pipeline. The grant funding contributed $4.894M to construction and reduced the cost to SA Water to $11.524M. We reviewed the tender evaluation report which we found to be comprehensive and demonstrated significant rigour in obtaining a competitive price for the works. We conclude that the expenditure for this project is prudent and efficient.
C8206	Bolivar WWTP Upgrade Northern access road	5.85	1.52	+4.33	The northern access road at the Bolivar WWTP is used primarily for transporting treated biosolids off site. Truck movements average around one per hour. Safety issues have been noted with the

Project	Project Name	Actual / Forecast	RBP2013 estimate	Variance to RBP2013 estimate	Observations
					access road, particularly when vehicles are passing on the road which is mostly one lane wide. SA Water progressed a design for an upgrade to the road that would include two lanes which would therefore overcome the problems identified with passing. The estimate included with SA Water's RBP2016 submission ($[redacted]) is based on this two lane design. SA Water challenged the proposed design to identify if a more cost effective solution could be found. As a result, an alternative design has been prepared which addresses the safety concerns without requiring two lanes for the full length of the road, e.g. through strengthened verges, traffic controls and passing bays. The design and cost estimate have yet to be finalised but SA Water expects the cost to be around $[redacted], almost $[redacted] less than the estimated put forward with its RBP2016 submission. We consider that this project is a positive example of SA Water seeking to control capital costs. We consider that the expenditure for the revised design is likely to be prudent, subject to the construction being competitively procured.
C7166	Robe Bore No 1 Renewal	3.64	-	3.64	The town of Robe is supplied by a number of groundwater bores. Over the years it has been observed that the salinity of the groundwater increases with depth and a number of boreholes (TWS 2,3 and 4) have been abandoned due to high salinity (>1800mg/L recorded in TWS4). The aquifer has a zone where salinity is 800-850mg/L and this is the target zone for production. SA Water provided us with a technical note from 2005 which described the history of groundwater bores in the area and their performance with respect to salinity. The technical notes concludes that new production bores will be required within five years as the salinity in the existing boreholes become unacceptable. This project involves the construction of two new production bores in the Robe bore field. SA Water had expected at the time of its RBP2013 submission that the boreholes would not be required in the current regulatory period. However, declining performance has led to SA Water bringing construction of the new bores forward. We requested SA Water provide the results of water sampling test for salinity at the production bores from the last five years. This data is shown in the figure below.

Project	Project Name	Actual / Forecast	RBP2013 estimate	Variance to RBP2013 estimate	Observations



This figure shows that:

- Bore 1 has levels of Total Dissolved Solids (TDS) typically from 1000-1100mg/L. Above 900mg/L of TDS is considered poor quality and above 1200mg/L is considered unacceptable/unpalatable as an aesthetic guideline. This Bore was abandoned in 2012.
- Bore 5 consistently records TDS levels between 950 – 1000mg/L. SA Water reports that this bore also has a restricted flow rate of around 5L/s.
- There has been steadily increasing level of TDS in Bore 6, rising from around 800mg/L in late 2009 to around 950mg/L in 2015.
- Bore 7 displays a slowly decreasing trend in TDS levels and current levels are around 700mg/L (600-900mg/L is considered 'fair' quality).

This data supports SA Water's contention that this project has been required as a result of deterioration in abstracted water. TDS levels at Bore 5 and 6 have deteriorated to be in the 'poor' category. Only one bore, Bore 7, is producing water that is better than 'poor' quality. We consider that this demonstrates that there is a need for this work and that the investment is therefore prudent. SA Water also notes that new bores are required to meet peak demand in holiday periods.

Project	Project Name	Actual / Forecast	RBP2013 estimate	Variance to RBP2013 estimate	Observations
					We note that the monitoring data shows that the two new bores have recorded levels of TDS of 710mg/L at Bore 8 (two samples in August 2014) and 620-630mg/L at Bore 9 (two sample in June 2015). SA Water noted that due to the uncertainty over how bores will perform, that developing new bores involves drilling test bores and if the test bore was found to produce an acceptable flow rate of water of acceptable quality, then the test bore would become a production bore. Within this scope, SA Water has drilled three test bores and of this three test bores, two have been accepted as long term production bores. We agree that this is an appropriate approach to developing new bores. We requested SA Water to provide the tender evaluation report for construction of the new bores. SA Water advised that the following contracts were let: 1. *Site Levelling and Install Bore Pad at Robe CS7411. O/N 626816.* 2. *Drilling Bore at Robe CS7375. O/N 627224. Original contract let to Diverse Resources and was cancelled due to constant delays. Paid for bore casing and associated kit ($138k) to pass onto new contractor. Advice sought from Procurement regarding the evaluation report.* 3. *Drill production bores and 3 test bores at Robe. This was let to Thompson Drilling; initial production bore was not successful so 3 test bores were drilled to locate viable sites. Final bore (now called bore 8) was drilled at one of the test bore sites. O/N 635030. This contract was let initially without a formal contract; refer to attached document "PMF302 – Thompsons (revised).docx"* 4. *SAPN – ON638429. See attached email "FW: Robe SAPN Offer"* 5. *New Bore 8 pad, track and drilling under road. O/N 638995. Refer to attached document "C7166 PMF301 Robe Bore 8 Site Pad.pdf"* 6. *Drill Robe Bore 9. CW8043R. Contract let to Thompson Drilling. Advice sought from Procurement regarding the evaluation report.* 7. *Bore No9 Pad and turnaround area, access road and track, drilling under road. O/N 642878. Refer to attached docs "RFQ C7166-02 Robe Bore 9 Site Works.dotx"; RFQ C7166- 02 Robe Bore 9 Site Works Recommendation.dotx"; "PMF301 RFQ C7166-02 (signed).* ▪ *Robe Bores Pumping Main CO8185. Contract let to Raymond Koczak Plumbing Service. Advice sought from Procurement regarding the evaluation report.*

Project	Project Name	Actual / Forecast	RBP2013 estimate	Variance to RBP2013 estimate	Observations
					Procurement of this project faced a number of difficulties including that the first drilling contractor was stood down following delays and that the second drilling contractor was appointed "in (an) emergency situation as they were the only driller available at the time and could deliver the scope of works within the timeframe available". Further, the work has been let in a piecemeal fashion with site works and a rising main let under separate contracts to different contractors. Under these circumstances, it would be expected that the cost of works may include some inefficiencies, for example, having to pay a premium for the second drilling contractor to be available at short notice. However, SA Water reports that the outturn cost for this project is expected to be $2.63M, $1.0M less than initial forecasts and representing a significant saving. We therefore conclude that this investment is prudent and efficient, but that the procurement history suggests that there is scope for SA Water to improve how it has procured these works.
C2482	Bolivar WWTP SCADA & Control Sys Upgrade	5.51	3.14	2.37	SA Water has a SCADA strategy prepared in 2008 which recommends consolidation of SCADA systems and upgrades over a period of time. SA Water had planned to spend $3.14M in the RBP2013 period on upgrading the control system at the Bolivar WWTP but now plans to spend $4.59M over the three years (note this is lower than the figure in the table due to the table being based on State Budget figures). SA Water advised that the total project cost is around $[redacted] and that a further $[redacted] is planned to be spent in the RBP2016 period under project C4512 Bolivar ASR SCADA Controls UG Stg 2. The scope of work is based on a 2011 strategy for upgrading the control systems at the plant agreed between SA Water and United Water. The strategy for the work was revised in April 2014 and the following activities proposed.

	Scope	Project duration in months	Total project cost including sunk costs	Pre project risks	The Bolivar Asset Planners Observations
C2482 Bolivar ASR stage 1	DLR's 2 & 4 Primary Effluent Pumping Station (which includes the primary sludge gallery) &	26	$5.78*	Extreme 2 High 47 Med 21 Low 1	A mixture of control assets with some older equipment. There is an opportunity gain some synergy by delivering the PEPS area with the C1467 Bolivar WWTP Pre-Aeration Tanks Concrete Rehabilitation (due for

Project	Project Name	Actual / Forecast	RBP2013 estimate	Variance to RBP2013 estimate	Observations					
						Sludge Digestion Plant				operational hand over in 2016/17). The digestion plant contains mainly older control assets which are situated in a hostile environment.
					Bolivar ASR stage2	DLR's 1 & 3 Main Pumping Station (Includes Power house & Inlet Screen) & Activated sludge Reactor plant	40	$[redacted]#	Extreme 1 High 44 Med 21 Low 3	The Main Pumping station has mostly a new control system installed as part of C1522 MPS M&E upgrade. The Inlet works equipment was installed in 1998 thus 16 years old therefore the controls assets are nearing the end of their useful asset lives. Most of the equipment operates in a hydrogen sulphide environment which accelerates the corrosion. A capital project to upgrade the inlet works is planned for RBP2016-20. The projects objective will be to renew and improve the civil and M&E assets.
					We consider that the work undertaken is supported by a sound strategy for SCADA upgrade across all SA Water sites and for this site specifically, as reflected in the April 2014 upgrade strategy document. We therefore consider that the works are prudent. The project costs have exceeded the estimate at the time of RBP2013, however SA Water has revised downward the outturn cost compared with earlier State budget estimates. We consider that, based on SA Water's approach to procurement, the expenditure is also efficient.					
C6258	Wingfield Capelli Rd WWPS021 Upgrade	4.74	2.45	2.29	The need for this project was identified at the time of RBP2013. However, the scope of the project has changed since this time due to further investigations which have found the pump station to be in structurally worse condition that previously identified. The preferred option is now a new pump station rather than an upgrade of the existing. This is the preferred option on a whole of life cycle cost basis. We reviewed the documentation supporting this decision and consider that this is a prudent decision. We have reviewed the project cost as part of our capital cost benchmarking exercise in Section 7.2. This found that the original cost estimate and the outturn cost were substantially higher than the					

Project	Project Name	Actual / Forecast	RBP2013 estimate	Variance to RBP2013 estimate	Observations
					benchmark estimate. We recommend that the prudent and efficient cost for this project is considered as $3.3M.
C4455	Kingscote Upgrade WS Network	1.95	-	1.95	The scope of this project was to relay mains within Kingscote township. The driver for relaying the mains is their condition and performance. We requested SA Water to provide details of complaints in recent years that might be attributable to poor performance (e.g. low pressure). SA Water provided a schedule of more than 40 complaints reported from the last three years. SA Water also provided a technical memorandum from July 2013 presenting the results of testing fire hydrants in the town. The testing found that, of 13 hydrants tested, the flows ranged from 1.5L/s to 20L/s with a median value of 7.5L/s. Testing was undertaken at night time when demand was lower. Hydraulic modelling was undertaken which suggested that for the characteristics of the network (topography, main diameters, etc.) internal restriction of the pipes was likely leading to reduced pressure. Condition assessment of selected mains was undertaken through cutting out sample cross sections for inspection and CCTV survey. These condition assessments confirmed that there was deterioration present in the mains although it is not clear to what extent the condition assessment was undertaken or is representative of the population of mains. We consider that there is sufficient justification for SA Water to have invested in mains upgrade at Kingscote. The Additional Project Funds Submission dated November 2013 states that SA Water budgeted $785k for mains relays in 2013/14 but that this budget was increased by $1.1M to support an "accelerated program" of government initiative to support the construction industry. It is questionable therefore whether the full amount of expenditure is justified if SA Water had first proposed a lower amount. SA Water addresses this question in its FFA document where it states: *It is fair to assume that most of the water mains in Kingscote are of a similar poor condition; however it is not feasible to relay the entire township. Modelling Engineers have selected a scope that will give the greatest pressure increases to critical (and highest use) customers relative to the budget. This will ensure the project outcomes are achieved and provide best value for money for SA Water.* We agree with this assessment and consider that SA Water has selected a prudent scope of works to address the observed problems with low water pressure.

Project	Project Name	Actual / Forecast	RBP2013 estimate	Variance to RBP2013 estimate	Observations
C9458	MOE replacement	1.94	-	1.94	
C9338	SharePoint Upgrade and Records Management Implementation	3.97	-	3.97	The scope for this project was to move SA Water's Managed Operating Environment (MOE) from Windows XP to Windows 7. This move was required due to Windows withdrawing support for Windows XP from April 2014. Because the Windows XP environment would not be supported by Microsoft, it becomes more vulnerable to security threats as security patches are no longer produced. Also, application vendors will also move away from supporting their applications on the Windows XP environment. We consider that there is a clear need for this expenditure and it is therefore prudent. SA Water advised that the project costs were higher than anticipated because it did not anticipate that scale of work that would be required to identify existing applications and whether they were needed on the new MOE and if so, whether they could be supported. After identifying the need for this work, SA Water engaged a consultant to who used software that 'discovered' more than 3,000 applications in use across the business. SA Water undertook to rationalise these applications and identify how to deploy those that were needed to the new MOE. The end result was that the number of applications was reduced to around 400. We agree with SA Water's assessment that the reduced number of applications will provide business benefits. We have reviewed the internal project delivery documentation including the breakdown of costs and consider these to be robust. We conclude that this represents prudent and efficient investment.

9.2.3 Conclusions

We have noted that SA Water's actual (and forecast for 2015/16) capital expenditure is significantly less than that allowed for by ESCoSA at the RBP2013 Determination. SA Water has identified that the underspend is due to both deferral of expenditure and efficiencies in delivering capital expenditure. We have not identified any systemic issues in our review of SA Water's processes and a sample of historical capital expenditure that raise concerns over SA Water's ability to efficiently deliver capital expenditure to meet its business needs.

However, we identified two project-specific issues in our review of a sample of historical capital expenditure projects where we consider that the expenditure incurred does not meet the criteria of being prudent and efficient. These instances were:

- For the Wingfield Capelli Rd WWPS021 Upgrade (C6258), we found that the expenditure incurred was significantly higher than benchmarks for construction of pumping stations of this design and size. We recommend that the efficient costs for this project are $3.3M.
- For the SharePoint Upgrade and Records Management Implementation project (C9338), we found that expenditure on the records management solution was not prudent as it had not met the project objective. We therefore recommend that the prudent and efficient level of expenditure for this project is $3.420M, $0.554M less than that incurred by SA Water.

9.3 Proposed capital expenditure

9.3.1 Drivers for proposed capital expenditure

SA Water's capital expenditure program for the RBP2016 period total $1,268.8M (net of contributions and ADP capitalisation). $685.2M (54%) of the proposed program is for the water service, $468.5M (37%) is for the wastewater service and $115.2M (9%) is for information technology. The overall program by SLIB is shown in Figure 9-4.

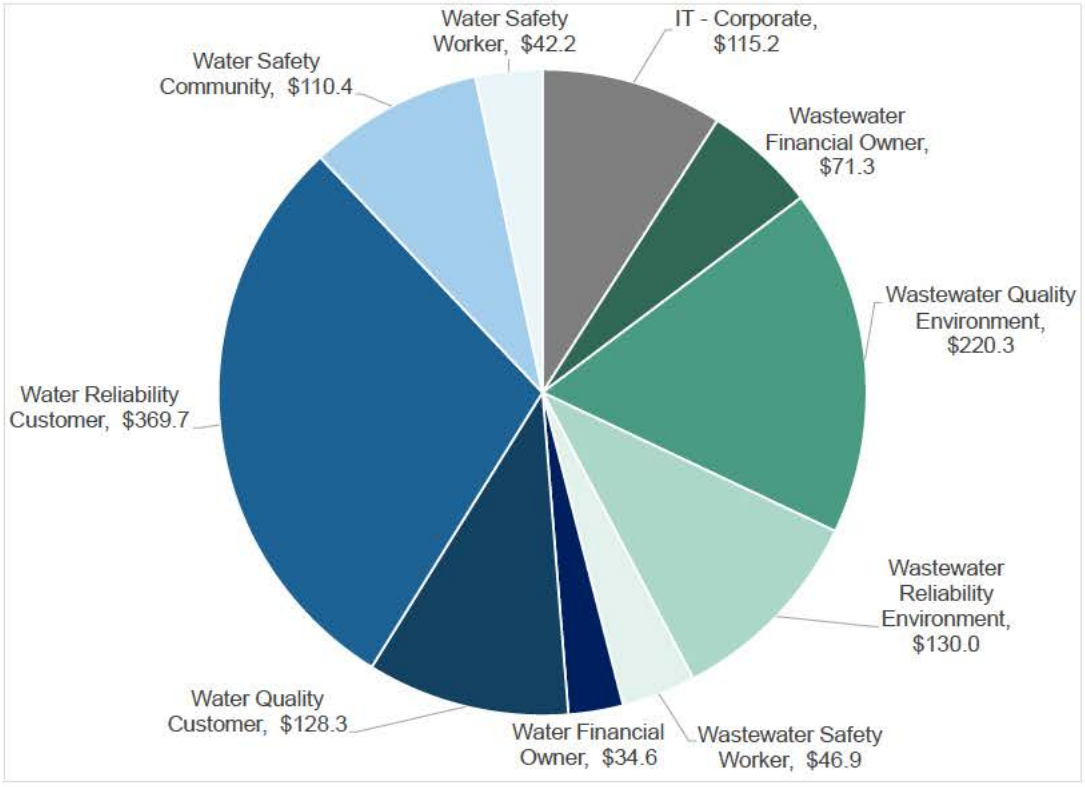


Figure 9-4 RBP2016 capital expenditure program by SLIB

The largest value SLIB is for Water Reliability Customer ($369.7M) followed by Wastewater Quality Environment ($220.3M). These two SLIBs comprise almost half (47%) of all capital expenditure.

The largest ten projects by value proposed for RBP2016 comprise 44% of the total program. These projects are detailed in Table 9-6.

Table 9-6 Major capital projects for RBP2016 period

Project name	Total RBP2016 capital expenditure ($M)
Structures WN Renewal SFL	98.3
Water Retic SFL	77.9
Kangaroo Creek Dam Safety Investigation	74.3
Murray Bridge WWTP Relocation	66.6
Mandated Growth WW Network SFL	48.9
Structures Management - Treatment Plants SFL	43.1
WHS Improvement Water SFL	38.0
Improve Environmental Performance SFL	37.2
WHS Improvement WW SFL	37.0
Metro WWTP - M&E Unallocated SFL	33.8

Eight of the largest expenditure lines are for programs of work, predominantly renewals. The two specific projects are the Kangaroo Creek Dam Safety Upgrade ($74.3M in RBP2016 period) and the Murray Bridge WWTP relocation ($66.6M in RBP2016 period).

The Kangaroo Creek Dam Safety Upgrade was reviewed at the time of the RBP2013 review and commenced in this period, but is being completed in the RBP2016 period. The purpose of this project is to provide upgrades to the dam to meet ANCOLD safety requirements. We reviewed the risk assessment and found it to be in accordance with the ANCOLD Guidelines on Risk Assessment (2003). It is noted that these guidelines are due to be updated in 2016 and SA Water states that it had delayed the project to ensure that the design accounted for the revised guidelines. We reviewed the options assessment undertaken by SA Water and found that it had initially considered 12 options to meet the required level of risk. From this initial feasibility assessment, four options were selected for more detailed analysis and a preferred option was selected largely on cost that involved balancing the widening of the spillway with raising the embankment.

The preferred option was taken to concept design where a further three sub options were considered. Of the three sub options, the preferred option was a risk-based upgrade with dam raising. This option is the preferred option as it complies with ANCOLD Guidelines and is the cheapest of the three sub options. It is noted that the options analysis process has been comprehensive undergoing at least three rounds of optioneering. During the assessment of the final three options, two contractors were engaged under an Early Contractor Involvement (ECI) Contract to work with the designer to provide constructability and estimating advice. Costs estimates of the preferred option were also independently checked. Based on this, the solution development is considered to be satisfactory.

9.3.2 Findings from review of sample of proposed capital expenditure projects

To complement our review of the trends in SA Water's capital expenditure and the review of process detailed in earlier section of this report, we have analysed a sample of capital expenditure projects that are proposed for the RBP2016 period. The projects reviewed are detailed in Table 9-7.

Table 9-7 Sample of capital expenditure projects to be reviewed (Not including IS projects)

Asset Strategy	Program Name	Project No.	Project Name	Expend. 16/17-19/20 ($M)
Mechanical & Electrical Equipment	M_E Plant Management - Wastewater Treatment Plants	CF210	Metro WWTP - M&E Unallocated SFL	33.850
Safety	Occupational Health and Safety Improvement		WHS Improvement WW SFL	36.999
Structures	Structures Management - Wastewater Treat Plants		Structures Mgt - Treatment Plants SFL	43.130
Pipe Networks	Wastewater Network Management - Trunk Mains	CF176	Trunk Mains Rehabilitate SFL	9.992
Pipe Networks	Pressure Management Initiatives	CF088	Pressure Management Initiatives - SFL	[redacted]
Structures	Structures Water - Networks	CF147	Structures WN Renewal SFL	98.311
Pipe Networks	Water Network Management - Reticulation Mains		Water Retic SFL	77.857
Networks Growth	Growth - Wastewater Networks		Mandated Growth WW Network SFL	48.852
Networks Growth	Growth - Wastewater Networks	C1336	North Lefevre Peninsula WW Diversion	[redacted]
Treatment Plant Growth	Growth - Wastewater Treatment Plants	C3001	Murray Bridge WWTP Relocation	66.578
Treatment Plant Growth	Growth - Wastewater Treatment Plants		Bolivar Capacity Growth Upgrade	[redacted]
Environmental Improvement	Improve Environmental Performance		Improve Environmental Performance SFL	37.186
Water Resource Sustainability	No Asset Program (Water Licences)	C6384	Purchase additional Murray water licence	[redacted]
Water Quality Management	Water Quality - Network	C3497	Orroroo WQ Improvement	12.754

Our detailed findings from the review of these projects is included in Appendix A. A summary of our findings on each projects is set out following:

M&E Plant Management - Wastewater Treatment Plants ($33.850M)

SA Water owns six Metropolitan wastewater treatment plants and the M&E Management - Wastewater Treat Plants project includes: switchboards and transformers; generators; pumps and compressors; chemical dosing equipment; motors and gearboxes; valves and actuators; control equipment & VSDs; screens and scrapers; and diffusers. SA Water assessed 4% (by number) of wastewater treatment M&E assets to be in condition grade 4 or 5, based upon condition assessments performed to Level 1 on 53% of the WWTP M&E asset base. Level 2 assessments have been carried out on 20% of the condition grade 4 and 5 assets identified from the Level 1 inspections. The Level 1 data was used for a risk assessment which identified 3.8% of Metro WWTP M&E assets to be high risk of failure. The same assessment using the much smaller (1% versus 53%) Level 2 sample data yielded a result of 31%. Our observation is that it is not clear that the scale of the problems indicated is reflected in the historic performance. That is, the scope for mitigation is not being fully reflected. SA Water is adamant that actual failure rate history of the M&E assets would support the risk model's inferred failure rate. Failure rate data was considered at a high level for the compilation of the program and this data can be made available from Maximo. We accept that there is a recorded history of asset failure, but do not see such direct correlation between asset failure and Business KPI failure. There is a slow start with activity levels increasing to reflect

the historical rate on asset installation. This is a very coarse approach, which provided a scale of expenditure rather than a prioritised list of specific schemes. Implicit to this is the lack of direct connection between the scale of expenditure and the level of service achieved. However, this is an improvement on the previously applied age based approach to WWTP M&E expenditure. We consider that SA Water is maturing in its approach to this area and that the proposed program is appropriate.

Occupational Health and Safety Improvement ($36.999M)

This program is focused on bringing safety standards on wastewater operational sites up to current standards, whether required as the result of asset deterioration or infrastructure that was built to the standards of the day, which would not be acceptable today. SA Water wants to carry out construction works to move from reliance on safe working practices (which will remain) to creating a safe working environment. The number of individual construction assets that could be worked on means that a risk-based approach will be taken and priority given to assets where the risk is most significant. The approach being adopted is that expenditure is split evenly between water and wastewater services. Expenditure levels have been broadly at half of the proposed level since 2008/09. Without very detailed analysis of the whole SA Water operational asset stock it is impossible to challenge the scale of expenditure proposed. A risk-based approach is being taken to identify the activities to be carried out in RBP2016, and implicit in that is the fact that not everything is being done during the period. The scale of expenditure and the appetite for risk is a matter of policy and it would be difficult to argue the level of reasonableness of the program, insofar as it is inevitable that accidents will continue to occur, albeit at a lower level than may have otherwise been the case.

Structures Management - Wastewater Treat Plants ($46.434M)

This program is aimed at ensuring that wastewater treatment structural assets are maintained and able to support the waste treatment plants achieving compliance with EPA and Department of Health license requirements. The approach to program development is based upon seeking the best whole of life solutions to achieve this and takes a risk-based approach in part based upon asset condition. SA Water assesses that 8% of wastewater treatment structures assets are in Condition Grade 4 or 5 and is concerned that there is a risk that SA Water could invest in rehabilitation of these assets too late, resulting in significant additional costs to its owner the government, and eventually its customers. The RBP2016 expenditure presented by SA Water of $12.3M/year (pre-efficiency) compares to RBP2013 expenditure of $11.5M/year, if the [redacted] Bolivar WWTP expenditure is excluded. The costs associated with the remedial process are well known from historical costs and the scheme breakdown is built from the bottom up. The asset stock is well known, although the condition remains uncertain until the tanks are drained down and fuller inspection can be carried out. There is an asymmetry between the upper and lower bound cost of an individual project. That is, if the condition is better than anticipated, the cost of cleaning the receiving surface and the application of surface covering will be marginally less than anticipated, whereas a significantly greater expense could be incurred should extra remedial work or even replacement be required. However, we believe the program is large enough for costs to balance out, insofar as the costs align with historical outturn experience.

Wastewater Network Management - Trunk Mains ($9.992M)

SA Water has over 667 km of wastewater trunk mains across the metropolitan and country regions. This program covers the wastewater trunk mains which have a high or extreme risk under the corporate heat map. Typical issues of reliability include assets that deteriorate with age leading to structural failure leading to sewage overflows to the environment, public exposure to untreated sewerage and collapsing infrastructure and high reactive repair costs. This program covers wastewater gravity mains ≥300 mm diameter. The SA Water knowledge of its assets and their condition makes the selected program content prudent and at a much lower cost than the likely outturn of a “do nothing” option. The rehabilitation techniques are known and readily available. We

believe the work needs to be done, although the categorizing of the risk levels sounds alarmist when compared to the outturn in recent years. We requested a build-up of the lengths and unit costs in order to benchmark the reasonableness of the expenditure proposed, and the costs proposed by SA Water closely align with those we built up.

Pressure Management Initiatives [redacted]

Three pressure zones in the east of metropolitan Adelaide have been selected for pressure modulation, a more flexible and adaptive approach than the typical pressure management strategy of pressure reduction. Each is to be rolled out sequentially, with the first acting as a pilot for the other two. Only zones where the payback on investment is <10 years were selected. The three proposed pressure management areas are currently responsible for c16% of the total Metro bursts figure. Pressures are to be reduced to 20-25 metres (more depending upon topography), and the proposal is to have open systems rather than breaking down into DMAs with single feeds. We consider that the works are justified, although we note that there is some risk that customer complaints may increase when the pressure is reduced, and that the likely scale of the complaints is not well known, relative to the potential for benefits from decreased bursts and reduced operating expenditure costs.

Structures Water - Networks ($98.311M)

SA Water has focused its Water Networks Structures Renewal effort on its larger storage facilities during the RBP2013 period: Happy Valley #1 (100 ML); Happy Valley #2 (100 ML); Paskerville (62 ML); and Upper Paskerville (100 ML). The RBP2016 program is 51% by value focused on the smaller (≤10ML) storage facilities: Metro Storages (35 No.) and Country Storages (24 No.) at $53.3M. These have been identified as having intolerable risk of failure and condition grades 4 and 5. The Metro Storages (16 No.) and Country Storages (44 No.) that have been inspected and found to have tolerable risks of failure and condition grades 4 and 5 at ($33.4M of potential work) have not been included in the program. We believe that this is a prudent approach. The use of a risk matrix approach to scheme prioritization was explained and demonstrated. The level of sophistication applied to the development of the Structures WN Renewal SFL project is adequate for the RBP2016 period when the focus will be on resolving the backlog. The build-up of a backlog puts into question the earlier asset management practices, and it is comforting to see the effort that has been put into inspecting these key assets in order to identify and prioritize expenditure.

Within the work identified, there needs to be urgent consideration of the criticality of the assets, as potentially offset by mitigation measures. Where network vulnerability is confirmed, operational response plans should be developed to be used in the event of failure before the backlog has been resolved. For the development of future programs, the risk matrix needs to consider mitigation and a full range of options. The process to determine cost of repairs is set out in an Estimating Document. Based on the asset condition inspection work done to date, we believe that the 'Contingency/Emerging Issues' allowance of $10M (pre-efficiency) is adequate to cover uncertainty in this program, and recommend that the further $12M 'Undefined – Based on condition assessments planned' funding line should be removed.

Water Network Management - Reticulation Mains ($78.530M)

This program is for renewal of reticulation water mains (<375 mm). We note that the program is aimed at maintaining a performance standard that is worse than the level that appears to be comfortably achieved at present in the Metro area. We believe the current performance should be reflected in revised and more challenging targets for the Metro area. We are comforted that SA Water appears to have good and detailed knowledge of the materials used throughout the reticulation system and the responsible managers we met appeared to have a good grasp of what needed to be done. The capital expenditure on mains reticulation shows a rising trend. The proposed annual expenditure level for RBP2016 (years 1-4) is 20% higher than RBP2013, 75% higher than 2008/09-2012/13, and 317% higher than 2003/04. SA Water is proposing a further 60% increase for years 5-24. We believe that the 20% increase above current levels is questionable and

the further increase in year 5 and beyond should be deferred until the evidence of performance deterioration is more robust. On balance, we consider that SA Water's self-imposed efficiency target of 5% is sufficient challenge for the upcoming period but note that future increases must be based on a demonstrated understanding of performance and service delivery.

Wastewater Networks - Mandated Growth WW Network SFL ($48.852M)

The wastewater mandated growth program is to provide access to the wastewater network to new customers in infill and extension areas. SA Water advised that the costs put forward in its regulatory submission for this program were in error and that the total annual expenditure should have totalled $4.65M per annum, $8.33M per annum less than submitted for in the RBP. Its proposed total is based on historic expenditure of $2.15M per annum as well as a further $0.5M per annum to promoted recycled water schemes and $2.0M per annum to promote infill development. We consider that the amount to encourage infill development should be lower and in line with historic levels of $1.12M. We recommend that $3.77M per annum be accepted as the prudent and efficient level of investment for this program, $9.22M lower than the RBP submission data. There is a flow on impact to operating expenditure due to the error identified by SA Water and our adjustment. We recommend that operating expenditure be reduced by $0.33M per annum to $0.65M per annum accordingly.

North LeFevre Peninsula WW Diversion [redacted]

The purpose of the North LeFevre Wastewater Diversion is to determine the best approach to manage wastewater collection from the growing residential and commercial water use on the LeFevre Peninsula. We consider that there is a clear need for these works as evidenced by the monitoring data and analysis of odour complaints. SA Water has conducted options analysis and identified that the preferred option is to augment the existing network through upgrade of pump station WWPS013 and construction of a rising main to pump station SE939. We consider that the options analysis undertaken is robust. We requested SA Water to provide evidence of the odour complaints and surcharging referred to in its supporting documentation and we found that this information confirmed the need for the works.

Murray Bridge WWTP Relocation ($66.578M)

SA Water has undertaken considerable work since RBP2013 to confirm the need to relocate the Murray Bridge WWTP from its current location. The Environment Protection Authority has issued an annexure to the Environmental Authority for the site which imposes conditions for odour that will only be able to be met by moving off the site or upgrading to a different treatment process. SA Water has completed an options analysis that determined that the most appropriate option was to relocate to a new site and construct a new conventional activated sludge treatment plant. We have reviewed this options assessment and consider it to be robust. We have benchmarked the estimated capital cost and found that the cost for the treatment plant works was significantly higher than two benchmark data sets. We recommend that the capital expenditure forecast be reduced by $7.00M in the RBP2016 period and $7.18M in the following regulatory period to allow for efficient costs.

Bolivar Capacity Growth Upgrade [redacted]

This project is driven by the hydraulic capacity of the inlet works and clarifiers at the Bolivar WWTP being forecast to be exceeded in recent years. SA Water has used actual growth rates from recent years for its projections, which has led to lower forecasts than other sources, in turn enabling it to push back the timing for this work, which is prudent. The need for the work is confirmed by the performance of the clarifiers which are exceeding performance targets for suspended solids, noting that there are lagoons for treatment before disposal. We consider that this investment is both prudent and efficient for the RBP2016 period.

Improve Environmental Performance SFL ($40.134M)

The Improve Environmental Performance program includes numerous initiatives to address environmental issues at wastewater treatment plants. The initiatives cover areas including effluent salinity, biosolids reuse and network infiltration. The program of works is based on prioritisation by the EPA and agreed by SA Water. We requested SA Water to provide a breakdown of the costs associated with each initiative in this program. Costs were provided as a range. The sum of the upper bound costs is $7.86M less than the costs put forward by SA Water in its RBP2016 submission. We therefore consider that the allowable expenditure be reduced by this amount. Further, we note that SA Water has included $4M for energy efficiency initiatives. We consider that energy efficiency initiatives should only be pursued where there is a clear cost beneficial business case and with no cost impact to customers (cost reduction should be the target). We therefore consider that, without a corresponding reduction in operating costs, this expenditure should not be allowed. We therefore recommend a total reduction of $11.86M to SA Water's proposed expenditure for this program.

Purchase additional Murray water licence [redacted]

SA Water is proposing to rebalance its portfolio of River Murray water entitlements so that it holds a greater proportion of entitlements from New South Wales and Victoria than it currently holds. This is because these entitlements have a demonstrated higher level of historical allocation and are therefore considered more reliable and better able to meet demand at a lower cost. We reviewed historical allocation records and the market conditions and confirm that New South Wales and Victoria (Victoria especially) have consistently higher allocation levels than South Australia. SA Water noted that it will undertake the portfolio rebalancing when market conditions suit and this may require several years. We consider that SA Water's approach is prudent. SA Water advised that it had not made allowance for the sale of annual allocation water from its purchased entitlements in its operating expenditure forecasts. SA Water's business case notes that purchased entitlements have historically only been used for drought years. At current market prices for allocation water, the annual proceeds from the sale of all of SA Water's available allocation would realise around $7M in revenue in the allocation year. This estimate is highly sensitive to the market price for allocation water (currently $250 - $300/ML). Prices for allocation water are currently trending upwards due to drier conditions in the Murray Darling Basin. The revenue that SA Water could reasonably receive will depend on the level of risk it is willing to take across the season, accounting for the probability that it may require some allocation water.

Orroroo water quality Improvement ($12.754M)

SA Water is proposing to construct a pipeline to provide high quality water to the town of Orroroo, which is currently supplied by water from two local bores that have high levels of salinity. SA Water is not obliged to do this under the Safe Drinking Water Act; it proposes to do this to improve the quality of service provided to customers in the town. However, evidence, including a customer survey, suggests that residents do not use the local water supply to meet drinking needs, instead relying on rainwater tanks. Customers observed that they were more likely to use higher quality water on their gardens than for drinking.

SA Water considers that a pipeline from the town of Peterborough for a capital cost of $12.82M (pre-efficiency) is a better option than a local desalination plant. We consider that the options assessment methodology used by SA Water and its consultant is sound. However, we have concerns that:

- SA Water has not properly defined the problem: it is not clear that the population want or need high quality water for drinking; it is possible that customers would be satisfied with a non-potable supply
- The input data to the options assessment for the pipeline is low and that the actual outturn cost may be twice as high as the estimate provided.

Given these concerns, we conclude that this project is not prudent on this basis of the information supplied.

9.4 Information Technology capital expenditure

SA Water proposes capital expenditure of $115.2M on information technology in the RBP2016 period. This level of expenditure is an increase of 35% from the $21.4M per year in the RBP2013 period to $28.8M per year in the RBP2016 period. The profile of capital expenditure in information technology across RBP2013 and RBP2016 is shown in Figure 9-5.

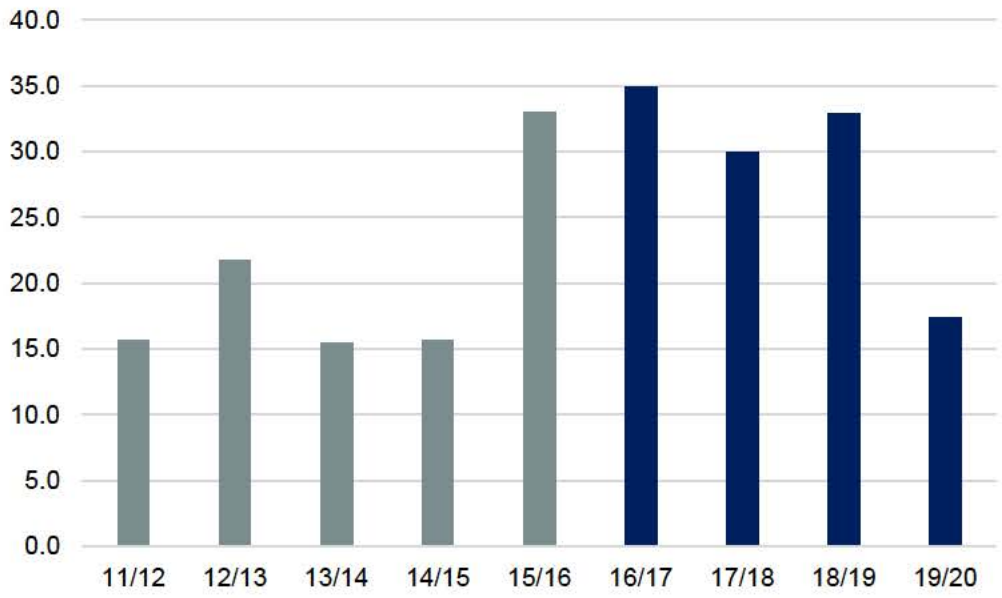


Figure 9-5 Information technology capital expenditure profile

This figure shows that SA Water's increased investment in information technology commenced in the current year, 2015/16. In the four years before this year, average annual investment in information technology was $17.1M. For the four years from 2015/16 to 2018/19, capital expenditure on information technology is forecast to increase by 91% to $32.7M before decreasing to the historic average in 2019/20.

In its RBP2016 submission, SA Water states: "*As we move towards 2020 we will boost investment in technology to improve our customers' experience, drive efficiencies across our business and future proof our technology… We acknowledge customers are concerned about affordability. The proposed technology capital plan includes $33 million of technology enabled initiatives to deliver operational savings of $11 million per year by 2020. These operational savings will help keep water and sewerage prices as low as possible.*"

Drawing on the work of Cardno and Atkins in expenditure reviews of water utilities in Australia and the United Kingdom, we have assembled the information technology capital expenditure benchmark data set out in Table 9-8.

Table 9-8 Information technology capital expenditure benchmarking

Period	Utility	Information technology capex / Total capex
2015-2020	Northumbrian Water	3.15%
	Yorkshire Water	4.30%
	Severn Trent	5.00%
	Anglian Water	5.00%

Period	Utility	Information technology capex / Total capex
2014/15	NCC Utilities	4.50%
	UK plc	2.50%
2012-2016	Sydney Water	5.60%
2016-2020	Sydney Water	7.40%
2012 -2015	**SA Water**	**7.60%**
2016 - 2020	**SA Water**	**9.10%**

This analysis shows that SA Water's historic and proposed level of capital expenditure for information technology is higher than the peer group. SA Water's proposed level of capital expenditure for information technology for the RBP2016 period is much higher than the peer group, being almost double some of the comparators. However, we note that SA Water has explicitly linked its investment in information technology to efficiency savings. It has committed to realising a $10.9M per annum reduction in operating expenditure by 2019/20 through this investment. This equates to a 2.3% reduction in operating expenditure.

The largest ten projects in the forward program for information technology capital expenditure total $77.5M over the RBP2016 period and comprise two thirds of all capital expenditure in this area. These projects are set out in Table 9-9. This table also details which information technology projects were reviewed by us in detail. Our findings are set out in the following section.

Table 9-9 Largest information technology capital expenditure projects for RBP2016

Project	2016-17	2017-18	2018-19	2019-20	RBP2016 Total	In sample ?
18. IS ICT Assets Lifecycle Program	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	Yes
39. Field Process Reengineering	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	Yes
16. IS Business & Management Application Lifecycle Program	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	Yes
33. Digital Program	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
40. SCADA Architecture & Security Review & System Renewal	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
36. CSIS Review	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
19. Information Security Program	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
70. Business IT System Enhancements Program	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
47. HRMS Capability	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
21. Information Management Program	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	Yes

9.4.1 Findings from review of sample of information technology capital expenditure projects

Our findings from the review of a sample of information technology capital expenditure are as follows:

18. IS ICT Asset Lifecycle Program [redacted]

[redacted]

[redacted]

39. Field Process Reengineering [redacted]

[redacted]

16. IS Business & Management Application Lifecycle Program [redacted]

[redacted]

21. Information Management Program [redacted]

[redacted]

9.4.2 Conclusion on information technology capital expenditure

In 2015/16, SA Water commenced a program of increased investment in information technology which will lead to investment over a four year period being almost double the previous four years. SA Water states that the investment is to "*improve our customers' experience, drive efficiencies across our business and future proof our technology".* It has backed up this statement by committing to operating expenditure efficiencies explicitly from this investment in information technology that rise to $10.9M per annum in the last year of the RBP2016 period.

However, SA Water's historic and proposed level of investment in information technology is the highest of the group of water utilities in Australia and United Kingdom against which we benchmarked capital expenditure in this area. We note that SA Water has not applied the same efficiency target to information technology as was applied to the wider capital expenditure program (i.e. a flat 5% reduction). We consider that not including information technology within this capital expenditure target sends the wrong message to the business that efficiencies are not being sought in this area. Given that SA Water's information technology expenditure compares unfavourably with its peers, we recommend that SA Water's prosed information technology capital expenditure be subject to continuing and catch-up efficiency targets.

9.5 Capital cost escalation

As set out in its *Final Framework and Approach* and discussed in Section 1.6, ESCoSA will escalate costs based on the Consumer Price Index (CPI) to arrive at its Final Determination in nominal terms, unless it can be determined that circumstances exist that justify escalation at a rate below or above CPI. We are required to provide an appropriately supported view on the reasonableness of SA Water's assumptions on cost escalation of capital costs across the price determination period, within the context of overall efficiency.

SA Water has presented its forward capital expenditure estimates in the agreed price base of December 2014. SA Water has not proposed any real escalation of forecast capital costs. SA Water commissioned a review of capital expenditure indexation for the current regulatory period[23]. This review selected relevant Produce Price Indices prepared by the Australian Bureau of Statistics to assess the impact of movements in change of input prices to SA Water's capital expenditure in 2013/14, 2014/15 and 2015/16 (forecast). Three scenarios were analysed and for all scenarios, it was found that capital costs had decreased (and were forecast to decrease) in real terms over the current regulatory period. The average annual decrease in capital costs in real terms was estimated as being between 0.7% - 1.5%.

That capital costs have decreased in real terms in the current regulatory period leads to the question of the likely path in real terms of capital costs in the upcoming regulatory period. Forecasting economic variables is a challenging exercise made more difficult by continuing volatility and uncertainty in macroeconomic conditions in Australia and internationally. Figure 9-6 compares historical movement in a number of output Produce Price Indices (PPIs) relevant to SA Water. Rawlinson's Building Price Index for Adelaide is also included in the analysis along with the CPI for Adelaide. Note that the CPI data and the Rawlinson's Building Price Index are both for Adelaide and the other indices are state-wide.

This figure shows that the Building Construction PPI, Non-Residential Building Construction PPI and the Rawlinson's Building Price Index have all increased at a slower rate than CPI since early 2012. The Roads and Bridges Construction PPI has increased at a rate faster than CPI over this period.

[23] PWC, Capital expenditure indexation review for the first regulatory period, March 2015.

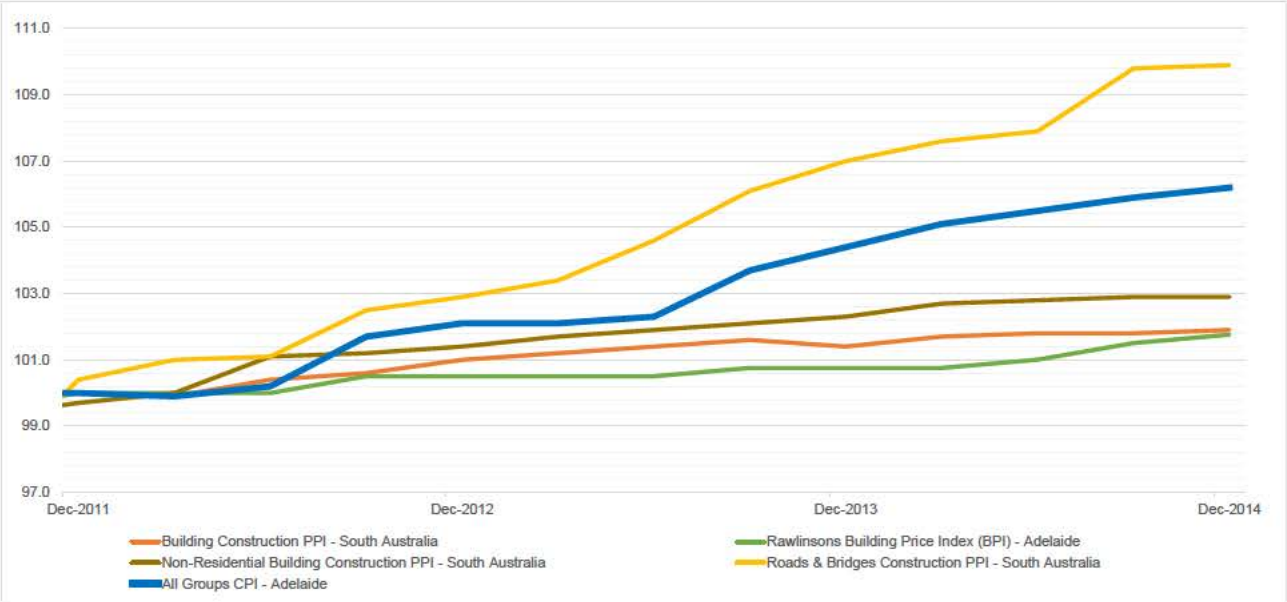


Figure 9-6 Historical movement in Producer Price Indices

Movement in the indices since June 2013 is summarised in Table 9-10.

Table 9-10 Summary of movement in Produce Price Indices

	Average annual movement June 2012 – June 2015	Average annual movement relative to CPI
Consumer Price Index (Adelaide)	2.2%	-
Building Construction PPI (South Australia)	0.8%	-1.4%
Non-Residential Building Construction (South Australia)	0.6%	-1.6%
Rawlinson's Building (Adelaide)	0.7%	-1.5%
Roads and Bridges Construction (South Australia)	2.6%	0.4%

The South Australian State Government's 2015/16 Budget Statement[24] notes:

> *In South Australia, GSP is forecast to increase by 2 per cent in real terms in 2015–16, following expected growth of 1¾ per cent in 2014–15. The trade–exposed sectors are expected to pick up as the dollar depreciates further and consumer spending improves. The lower Australian dollar and very accommodative monetary policy will support new investment.*
>
> *However, the state will continue to face a range of challenges over the next few years arising from the significant structural adjustment task ahead when car manufacturing stops in 2017. Further challenges include falling commodity prices which are affecting mining operations in South Australia.*

We consider that it is likely that construction costs faced by SA Water will continue to increase at a rate lower than CPI over the coming regulatory period, noting that there is significant uncertainty over possible movements in the later years of the regulatory period. We do not propose that a specific adjustment be made to the allowed levels of SA Water's future efficient capital expenditure to account for the probability that

[24] Available at: http://servicesa.cdn.on.net/releases2015/2015-16%20BP3%20-%20Budget%20Statement.pdf

capital costs will rise more slowly than CPI. However, we have considered this in the context of the overall efficiency that SA Water is likely able to achieve which we discuss further in Section 9.6.

9.6 Efficiency

Our methodology for determining efficient capital expenditure applies the concept of a frontier company to determine the scope for SA Water to achieve continuing and catch-up efficiencies over the review period.

SA Water has committed to achieving a 5% reduction in capital expenditure over the RBP2016 period. This efficiency target was applied across all projects (except for information technology projects) after each area of the business had put forward their forecast expenditure requirements. We note that this sends a clear message to the business that cost control is an imperative in delivering the forward capital works program and we believe that it demonstrates that SA Water is maturing in its approach to delivering customer value.

In assessing the scope for efficiency gains in the delivery of capital expenditure over the coming period, we have considered the following:

- SA Water has demonstrated through the RBP2013 period that it is able to realise substantial efficiencies in capital delivery. Its analysis identified that it reduced expenditure compared with the RBP2013 Determination by 4.2% through being more efficient and through taking advantage of favourable market conditions. SA Water also achieved net deferrals (i.e. when accounting for expenditure that was brought forward) of 13.4% compared with the RBP2013 Determination.
- As set out in Section 9.5, capital costs have increased at a rate less than CPI in recent years and there is sufficient reason to consider that this will continue over coming years. This is a favourable tailwind that will assist SA Water to efficiently deliver capital works.
- While the capital cost benchmarking exercise detailed in 7.2 showed good agreement between SA Water's cost estimates and the benchmark costs in some areas, there was considerable variance in other areas suggesting that SA Water's estimating processes are still maturing and will likely assist it to deliver more efficient outcomes in the RBP2016 period.
- We note that many of the initiatives being rolled out under the Efficient Capital Delivery program (and wider Business Transformation program) will reach maturity during the RBP2016 period.
- SA Water's owner's costs applied to capital projects are significantly higher than two benchmarks as set out in Section 7.3. We consider that SA Water will be able to achieve cost savings through tighter control of these costs in coming years.

We recommend that SA Water be set a continuing efficiency target of 0.25% per annum. This is lower than our recommendation for the RBP2013 Determination which was based on an earlier study commission by Ofwat in the United Kingdom. There are limited studies available that quantify movement at the frontier. A recent comprehensive survey[25] considers a wide sample of global firms and suggest that movement at the frontier has averaged 3.5% per annum for firms at the frontier in the manufacturing sector and 5.0% in the service sector. Across all firms, i.e. not just those at the frontier, movement has been less pronounced averaging 1.7% per annum in the manufacturing sector and 0.3% per annum in the services sector. We therefore consider that 0.25% is a conservative and achievable forecast of the continuing efficiency SA Water will be able to realise over the coming regulatory period. The lower target is also consistent with more recent regulatory decisions in Australia. We note that there is significant desire in the Australian water industry, the wider Australian economy and internationally to pursue innovation to reduce the cost of service delivery. SA Water is well placed to drive, participate in and benefit from innovation in the water sector and the wider economy.

We consider that SA Water's self-imposed efficiency target of 5% applied to capital expenditure is broadly appropriate in magnitude as a catch-up efficiency challenge. However, we consider that a compounding efficiency factor is more appropriate as this reflects that efficiency will be gained primarily through sustained

[25] Frontier firms, technology diffusion and public policy: micro evidence from OECD countries, OECD Productivity Working Papers No. 02, November 2015.

improvements in process. Therefore, we recommend that a catch-up efficiency 2% per annum be applied in place of SA Water's flat 5% efficiency reduction.

We believe that SA Water will achieve this target through tighter control of owner's costs, improved cost estimating processes feeding into procurement and a likely real deflation in capital costs.

However, we consider, as set out in Section 9.4.2, that the capital efficiency target needs to be applied to information technology to ensure that productivity is a focus and to improve SA Water's performance relative to its peers.

9.7 Recommendation

We are required to recommend a prudent and efficient level of capital expenditure for the RBP2016 period. In making this recommendation, we have applied the methodology set out in Section 1.5. Our analysis has included review of SA Water's processes relating to capital expenditure estimating and delivery, as well as benchmarking and review of a sample of capital expenditure projects.

We recommend the following adjustments to SA Water's proposed capital expenditure program:

- **Adjustments for better information provided by SA Water**

  SA Water advised that it had identified double counting in its estimated costs for the Mandated Growth WW Network SFL (9121). Our review of this project is set out in Appendix A. The impact of the double counting was to increase the expected costs by around $7.5M per annum. Removing this double counting reduces the overall RBP2016 capital expenditure program by $30.25M.

- **Adjustment to reflect our assessment of the prudence, timing and efficient level of expenditure of specific projects**

  We propose the following specific adjustments to capital expenditure items:

  - Removal of $12M of expenditure for the Structures Water Network Renewal program as this was a duplicated contingency.
  - Reduction of the amount allowed under the Mandated Growth Wastewater Network program to encourage infill development ($0.9M per annum). This revised level of expenditure is consistent with historic levels.
  - Reduction in the estimate of efficient costs for the Murray Bridge WWTP relocation to reflect benchmark costs for a conventional activated sludge treatment plant ($7.0M in the RBP2016 period).
  - Exclusion of costs for the Orroroo water quality improvement project ($12.8M) as it does not pass the prudence test on the information available.
  - Reduction of expenditure for the Improve Environmental Performance program to align with the detailed cost breakdown provided by SA Water, and to remove $4.0M of expenditure for energy efficiency initiatives. We consider that energy efficiency should only be undertaken if the investment has a positive financial payback.
  - Reduction of $1.11M in the proposed expenditure for the Tailem Bend to Keith Pipeline Storage costs to reflect efficient costs as per the findings of the capital cost benchmarking detailed in Section 7.2.

- **Adjustment of any top down factors applied to expenditure categories where we believe that the factors applied by SA Water are unreasonable.**

  None identified

- **Efficiency**

  We propose the following adjustments for capital expenditure efficiency:

- We propose that capital efficiency targets be extended to information technology expenditure as detailed in Section 9.4.2.
- As set out in Section 9.6, we propose that SA Water's proposed capital expenditure be subject to a continuing efficiency target of 0.25% per annum.
- We recommend that SA Water's proposed flat capital efficiency of 5% be replaced by a compounding efficiency factor of 2% per annum.

Table 9-11 details our recommended prudent and efficient capital expenditure following the application of the adjustments and efficiency factors outlined above. The starting point is the proposed capital expenditure following the adjustments advised by SA Water on 3 November 2015 as detailed in Section 9.1.

Table 9-11 Recommended prudent and efficient capital expenditure ($M)

	16/17	17/18	18/19	19/20	Total
Proposed capital expenditure	294.5	353.6	327.6	284.8	1,260.5
Adjustments for better information provided by SA Water					
Mandated Growth WW Network SFL	-7.8	-7.9	-7.7	-7.8	-31.2
Expenditure adjustment					
Structures WN renewal SFL	-1.5	-3.7	-3.7	-3.0	-12.0
Removal of amount to encourage infill development for Mandated Growth WW Network SFL	-0.8	-0.8	-0.8	-0.8	-3.3
Murray Bridge WWTP relocation			-3.5	-3.5	-7.0
Removal of Orroroo water quality improvement	-1.3	-8.2	-3.1	0.0	-12.6
Reduction to Improve Environmental Performance program	-1.4	-3.4	-4.8	-4.5	-14.2
Reduction to Tailem Bend to Keith Pipeline proposed expenditure		-1.1			-1.1
Add back SA Water 5% flat efficiency factor	14.09	17.58	15.19	13.13	60.0
Total - Adjusted proposed capital expenditure	*295.8*	*346.0*	*319.0*	*278.3*	*1,239.1*
Efficiency adjustment					
Continuing efficiency	0.25%	0.25%	0.25%	0.25%	
Catch-up efficiency	2.00%	2.00%	2.00%	2.00%	
Total cumulative efficiency (compounded)	2.25%	4.45%	6.60%	8.70%	
Efficiency adjustment	-6.7	-15.4	-21.1	-24.2	-67.3
Recommended efficient capital expenditure	**289.2**	**330.6**	**298.0**	**254.1**	***1,171.8***
Variance (recommended - proposed)	*-5.4*	*-23.0*	*-29.6*	*-30.7*	-88.7
Variance (%)	*-1.83%*	*-6.50%*	*-9.04%*	*-10.79%*	*-7.04%*

Notes on calculation of efficient capital expenditure

1. The capital expenditure "added back" to account for SA Water's flat 5% efficiency target is that set out in document WC0000a.
2. No specific adjustment is required to apply the capital efficiency target to IT expenditure because the amount added back under Note 1 does not include any efficiencies related to IT expenditure but the continuing and catch-up efficiencies are applied to IT expenditure.

Report

APPENDIX

A

CAPITAL EXPENDITURE PROJECT REVIEW SUMMARIES

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PROJECT SUMMARY: METRO WWTP – M&E UNALLOCATED SFL

PROJECT DETAILS

Project Name	Metro WWTP - M&E Unallocated SFL
Project C Number	CF210
Project ID Number	7900
Program Name	M_E Plant Management - Wastewater Treatment Plants
SLIBS	Wastewater Quality Environment
High Level Category	Asset Renewal

SCHEME CONCEPT

The underlying investment driver for this program is to maintain the condition of Mechanical and Electrical (M&E) assets such that they perform sufficiently to meet wastewater effluent quality targets, and ensure no intolerable risks of M&E asset failure are present.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project C Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
CF210	0.000	0.000	0.000	0.000	2.060	5.608	8.966	8.889	10.387

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

The approach to program development is based upon seeking the best whole life solutions to achieve this and takes a risk-based approach, in part based upon asset condition. SA Water is concerned that there is a risk that they could invest in rehabilitation of these assets too late, resulting in significant additional costs to its owner the government, and eventually its customers.

SA Water owns six Metropolitan wastewater treatment plants and the M&E Management - Wastewater Treat Plants project includes: switchboards and transformers; generators; pumps and compressors; chemical dosing equipment; motors and gearboxes; valves and actuators; control equipment & VSDs; screens and scrapers; and diffusers. SA Water assessed 4% (by number) of wastewater treatment M&E assets to be in condition grade 4 or 5, based upon condition assessments performed to Level 1 on 53% of the WWTP M&E asset base. Level 2 assessments have been carried out on 20% of the condition grade 4 and 5 assets identified from the Level 1 inspections. The Level 1 data was used for a risk assessment which identified 3.8% off Metro WWTP M&E assets to be high risk of failure. The same assessment using the much smaller (1% versus 53%) Level 2 sample data yielded a result of 31%.

The risk matrix is used to determine the priority of projects. We queried what constituted a major risk. SA Water indicated that the consequence score of 'major' was assigned if the failure of an M&E asset would result in the inadequate treatment of wastewater resulting in an incident

correlating to the environmental risk category of “Medium term environmental damage or wide scale public health impact”.

As discussed under the generic asset management section, it is not clear that the scale of the problems indicated is reflected in the historic performance. That is, the scope for mitigation is not being fully reflected. SA Water is adamant that actual failure rate history of the M&E assets would support the risk model’s inferred failure rate, failure rate data was considered at a high level for the compilation of the program and this data can be made available from Maximo. We accept that there is a recorded history of asset failure, but do not see such direct correlation between asset failure and Business KPI failure. It is unclear whether the risk profile is corroborated by reality. The absence of a history of failures implies that operational solutions are identified when problems arise and that mitigation is (at least partially) in place. Asset renewals program choices are “based upon what is financially optimum” rather than driven by customer preference or the impact upon the customer.

The relevant Business KPIs are: the financial impact on the owner, insofar as the costs of emergency repairs are considerably higher than a well-managed rehabilitation program; compliant with WHS legislation; and environmental compliance. The only Infrastructure KPI targets assets with intolerable (high or extreme) risk of asset failure. Performance against both Business and Infrastructure KPIs has been good, but with most of the WWTP assets installed since 2000, it is acknowledged that future performance will be more challenging.

The RBP2013 program included a major project at Bolivar WWTP, with further key schemes at Christies Beach WWTP and Glenelg WWTP. The average annual spend (CAPEX) during RBP2013 was $[redacted], compared to the proposed RBP2016 figure of $[redacted] (pre-efficiency). A similar level is forecast for 2017-20 and considerably higher levels thereafter. The expenditure profile for the RBP 2016 submission is based upon “Nessie” curves.

There is a slow start with activity levels increasing to reflect the historical rate on asset installation. This is a very coarse approach, which provided a scale of expenditure rather than a prioritized list of specific schemes. Implicit to this is the lack of direct connection between the scale of expenditure and the level of service achieved. However, this is an improvement on the previously applied aged based approach to WWTP M&E expenditure.

The program has associated Major Project Expenditure: Bolivar DAFF Plant Controls Upgrade ([redacted] in RBP2016) and Hahndorf WWTP Inlet Screen Upgrade ($[redacted] pre-RBP2016 and $[redacted] in RBP2016).

KEY DOCUMENTS REVIEWED

- SC0019: M_E - Treatment Plants (WW) – Asset Program Summary
- RD16036.1: Response to the following query – *‘Can further detail be provided on what constitutes a “major” failure (refer p. 5 of 29 of business case). i.e. is the differentiator: cost, customer impact’*
- RD16036.2: Response to the following query – *‘Can the failure rate inferred by the model be corroborated by actual failure rate history for various M&E assets? (Please provide data on the asset component level failure analysis from Maximo for sewerage M&E assets.)’*

PROJECT SUMMARY: WHS IMPROVEMENT WW SFL

PROJECT DETAILS

Project Name	WHS Improvement WW SFL
Project C Number	N/A
Project ID Number	9126
Program Name	Occupational Health and Safety Improvement
SLIBS	Wastewater Safety Worker
High Level Category	External Obligation

SCHEME CONCEPT

This program addresses legacy safety issues on infrastructure that was built to the standards of the day, which would not be acceptable today. This includes facilities to support higher order of controls.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project ID Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
9126	0.000	0.000	0.000	0.000	0.000	8.792	9.447	9.350	9.409

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

This program is focused on bringing safety standards on wastewater operational sites up to current standards, whether required as the result of asset deterioration or infrastructure that was built to the standards of the day, which would not be acceptable today. SA Water wants to carry out construction works to move from reliance on safe working practices (which will remain) to creating a safe working environment. The number of individual construction assets that could be worked on means that a risk-based approach will be taken and priority given to assets where the risk is most significant. The approach being adopted is that expenditure is split evenly between water and wastewater services. The asset stock for both water and wastewater are considered as a whole.

The funding required to achieve the SA Water goal of 'Zero Harm' is unclear because the size of the problem is not fully quantified. SA Water's Senior Leadership Team has deemed that it is prudent to increase the investment in this program in conjunction with targeted initiatives that will make effective use of the funds. These funds will be allocated across a range of infrastructure hazards to reduce the risk of injury to SA Water workers and align with the industry standard hierarchy of controls used to manage risks and mirroring the requirements of the WHS Act and Regulations.

SA Water acknowledges the fluidity of the program. Although built of on a bottom-up basis, the actual work carried out will be prioritised based upon a hierarchy of reacting to legislation and incidents, then proactively addressing recurring serious incidents and unacceptable hazards.

The Business KPI associated with this project is a measure of the reduction of serious incidents across the whole business. The Infrastructure KPIs are the reduction of serious incidents associated with infrastructure and the reduction of risk associated with particular assets. SA Water has persistently exceeded its Business KPI target in recent years.

At the time of the preparation of the RBP 2013, SA Water was falling well short of the necessary standards for WHS. The plan therefore included process development, training, leadership initiatives and asset upgrades. Progress has been made, but there remains a concern within SA Water about “having too many potentially life changing incidents”. During the RBP2013 period, SA Water underspent against the allowance by some 15%. The lower than planned average expenditure for RBP2013 resulted from a deliberate strategy to constrain safety related expenditure on infrastructure until the expenditure can be better aligned to the serious incidents and potential high consequence hazards.

We note that the overall (water and waste) WHS program for RBP2013 includes major project expenditure at Hope Valley, which is categorized as a major hazard facility. There is an ongoing project at Hope Valley EL170 tank and it is not clear whether the WHS costs are already implicit in the Hope Valley costs, insofar as any current design would have to be in accordance with the WHS requirements at this time. However, this project summary is considering the WW aspects of the WHS program.

Expenditure levels have been broadly at half of the proposed level since 2008/09. Without very detailed analysis of the whole SA Water operational asset stock, it is impossible to challenge the scale of expenditure proposed. A risk-based approach is being taken to identifying the activities to be carried out in RBP2016, and implicit in that is the fact that not everything is being done during the period. The scale of expenditure and the appetite for risk is a matter of policy and it would be difficult to argue the level of reasonableness of the program, insofar as it is inevitable that accidents will continue to occur, albeit at a lower level than may have otherwise been the case.

The cocktail of activities needed appears to be known in detail, ranging across safe access, ladder/work platforms, tanks, WWPS located in major roads, elimination of asbestos from all sites where practicable etc. Detailed risk assessments have been carried out across the asset stock and a Risk register Dashboard drawn up to assist in the prioritization of effort.

It was explained that costs were derived from historical costs, but that there was not a formal unit cost database to source costing data.

KEY DOCUMENTS REVIEWED

- WC0063: WHS Improvement – Asset Program Summary
- WC0063a: Work-related traumatic injury fatalities report (Australia 2013) by Safe Work Australia
- WC0063b: Interim data from Safe Work Australia
- WO0012: Safety, Health & Wellbeing Risk Reduction Program – Business Case
- WO0012A: SA Water WHS Corporate Risks
- WO0012B: Code of Practice for Crown Self-insured Employers
- WO0012C: WHS Risk Profile
- WO0012D: RBP2016 WHS Risk Programs – Estimated Cost

PROJECT SUMMARY: STRUCTURES MGT - TREATMENT PLANTS SFL

PROJECT DETAILS

Project Name	Structures Mgt - Treatment Plants SFL
Project C Number	CF269
Project ID Number	9107
Program Name	Structures Management - Wastewater Treat Plants
SLIBS	Wastewater Financial Owner
High Level Category	Asset Renewal

SCHEME CONCEPT

This program aims to ensure assets are repaired, rehabilitated and replaced at the lowest whole of life cost, whilst achieving existing levels of service and maintaining risk at the accepted level. Undertaking works at the optimum level of lifecycle costing ensures that wastewater treatment structural assets enable compliance with EPA and Department of Health licence requirements.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project C Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
CF269	0.000	0.000	0.000	0.000	1.648	8.312	11.662	11.541	11.615

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

This program is aimed at ensuring that wastewater treatment structural assets are maintained and able to support the waste treatment plants achieving compliance with EPA and Department of Health license requirements. The approach to program development is based upon seeking the best whole life solutions to achieve this and takes a risk-based approach in part based upon asset condition. SA Water assesses that 8% of wastewater treatment structures assets are in Condition Grade 4 or 5 and is concerned that there is a risk that SA Water could invest in rehabilitation of these assets too late, resulting in significant additional costs to its owner the government, and eventually its customers.

SA Water owns six Metropolitan and 18 Country wastewater treatment plants (WWTPs) as well as 4 recycled water treatment plants. The Structures Management - Wastewater Treat Plants project includes: concrete structures, digesters and tanks; wastewater storages and lagoons; buildings; pipework located internally within wastewater treatment plant structures; roadways, footpaths & drainage; and other structures. Condition assessments have been performed for 55% of the WWTP structural asset base. The main issue is in the area near and above the water level, where the combination of moist air or condensation and gases creates a corrosive environment which attacks metal, concrete and membranes.

The relevant Business KPIs are: the financial impact on the owner, insofar as the costs of emergency repairs are considerably higher than a well-managed rehabilitation program; compliance with WHS legislation; and environmental compliance. The only Infrastructure KPI is Maintain Structural Integrity.

The RBP2013 program included a major project at Bolivar WWTP, with further key schemes at Christies Beach WWTP and Glenelg WWTP. The average annual spend (CAPEX) during RBP2013 was $26.6M, compared to the proposed RBP2016 figure of $12.3M (pre-efficiency). The Structures Management - Wastewater Treat Plants program does not include a specific major project.

We note that SA Water has prepared a detailed breakdown of the cost for the remedial works identified from the condition survey of 51% (by replacement value) of the asset stock. This cost has been extrapolated across the remaining (un-surveyed asset stock) to derive the RBP2016 CAPEX. This is a reasonable approach assuming that the survey was statistically random. However, it seems likely that treatment works with known problems were given priority in the survey. Further, the criticality of the assets does not appear to be specifically considered and whether an individual tank could be taken out of service and therefore categorized for fix on fail is unclear. The absence of a defined major project also implies that the work at Bolivar WWTP will have resolved some the condition led issues in the overall asset stock.

The RBP2016 expenditure presented by SA Water of $12.3M/year (pre-efficiency) compares to RBP2013 expenditure of $11.5M/year, if the $[redacted] Bolivar WWTP expenditure is excluded. The costs associated with the remedial process are well known from historical costs and the scheme breakdown is built from the bottom up.

The asset stock is well known, although the condition remains uncertain until the tanks are drained down and fuller inspection can be carried out. There is an asymmetry between the upper and lower bound cost of an individual project. That is, if the condition is better than anticipated, the cost of cleaning the receiving surface and the application of surface covering will be marginally less than anticipated, whereas a significantly greater expense could be incurred should extra remedial work or even replacement required. However, we believe the program is large enough for costs to balance out, insofar as the costs align with historical outturn experience.

KEY DOCUMENTS REVIEWED

- SC0028: Structures - Treatment Plants (WW) – Asset Program Summary

PROJECT SUMMARY: TRUNK MAINS REHABILITATE SFL

PROJECT DETAILS

Project Name	Trunk Mains Rehabilitate SFL
Project C Number	CF176
Project ID Number	7841
Program Name	Wastewater Network Management - Trunk Mains
SLIBS	Wastewater Reliability Customer
High Level Category	Asset Renewal

SCHEME CONCEPT

This program invests in the wastewater trunk main assets to ensure it adequately removes sewage safely to ensure public health and the protection of the environment; thus, complying with legislative obligations.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project C Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
CF176	0.000	0.000	0.000	0.000	0.000	2.361	2.472	2.496	2.591

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

SA Water has over 667km of wastewater trunk mains across the metropolitan and country regions. This program covers the wastewater trunk mains, which have a high or extreme risk under the corporate heat map. Typical issues of reliability include assets that deteriorate with age leading to structural failure leading to sewage overflows to the environment, public exposure to untreated sewage and collapsing infrastructure and high reactive repair costs. This program covers wastewater gravity mains ≥300mm diameter.

The main period of installation of the asset stock was 1950 to 1985, when construction materials were vitrified clay and reinforced concrete. Sewers installed since then have increasingly been made of PVC. Older stock is predominantly vitrified clay, with some as old as 135 years (installed in 1880). SA Water has concerns about the condition of its reinforced concrete sewers, which are the focus of the program.

SA Water reports six trunk main collapses and one near collapse over the period 2006-2013. One of these incidents led to an overflow. From outturn costs, SA Water was able to cite an example where pre-emptive rehabilitation would have been 2.25 times less costly than the emergency repair. This disproportionate cost of emergency repairs compared to programmed rehabilitation aligns with wider industry experience.

SA Water is meeting its performance targets against the Business KPIs: “Number of type 1 and type 2 wastewater environmental notifications”; and “% increase Sewage $Bill for average valued residential property above CPI”. However, it is falling short of the Infrastructure KPI targets: “No intolerable risks greater that the corporate risk appetite”; and “Maintain Structural Integrity”. As at June 2014, there are approximately 38km of trunk mains (6% of asset stock) graded as Condition 4 or 5. It is the rehabilitation of these mains that makes up the Wastewater Network Management - Trunk Mains project.

The SA Water knowledge of its assets and their condition makes the selected program content prudent and at a much lower cost than the likely outturn of a “do nothing” option. The rehabilitation techniques are known and readily available. We believe the work needs to be done, although the categorizing of the risk levels sounds alarmist when compared to the outturn in recent years.

We requested a build-up of the lengths and unit costs in order to benchmark the reasonableness of the expenditure proposed, and the costs proposed by SA Water closely align with those we built up.

KEY DOCUMENTS REVIEWED

- SC0022: Wastewater Network - Trunk Mains – Asset Program Summary
- RD16036.3: Unit cost per mains type (i.e. various diameter) and the length of each main type used for the cost build up included in the business plan by year

PROJECT SUMMARY: PRESSURE MANAGEMENT INITIATIVES – SFL

PROJECT DETAILS

Project Name	Pressure Management Initiatives - SFL
Project C Number	CF088
Project ID Number	7709
Program Name	Pressure Management Initiatives
SLIBS	Water Reliability Customer
High Level Category	Asset Renewal

SCHEME CONCEPT

The purpose of this program is to optimise water pressure within the water network whilst meeting customer service levels, public safety and government regulations. Through identifying and implementing network improvements in pressure, the outcome of this program is to meet the customer satisfaction requirements of service delivery and reliability.

The program covers all assets in the water distribution network, including reticulation mains (diameter <375 mm), trunk mains (diameter ≥375 mm) and ancillaries.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project C Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
CF088	0.000	0.000	0.000	0.000	0.082	2.648	6.009	3.497	0.452

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

Three pressure zones in the east of metropolitan Adelaide have been selected for pressure modulation, a more flexible and adaptive approach than the typical pressure management strategy of pressure reduction. Each is to be rolled out sequentially, with the first acting as a pilot for the other two. Only zones where the payback on investment is <10 years were selected. The three proposed pressure management areas are currently responsible for c16% of the total Metro bursts figure. Of these, 60-70% are pressure related.

Pressures are to be reduced to 20-25metres (more depending upon topography), and the proposal is to have open systems rather than breaking down into DMAs with single feeds. We made the observation that multiple PRVs on feeds to a single area can lead to instability (hunting) and difficulties when operating the zone and responding to bursts or sudden demand changes. SA Water indicated that expert advice was being provided by international water operators with wide and relevant experience. This is appropriate.

We observed that (if successfully implemented) the pressure management would eliminate (defer) the need for a proportion of the renewals and there should, therefore, be a commensurate reduction

in the proposed level of expenditure on reticulation mains renewals across the city as a whole. (i.e. there is effectively a double count).

We requested that the impact on the renewals program be quantified by SA Water. We were informed that for deferred renewals and extension of asset life, WSAA has predicted that every metre of reduction in pressure increases the life of assets by 0.13 years. For example if maximum pressure at the average zone point is reduced from 70mH to 30mH (40mH reduction), the predicted extension in asset life would be 40mH x 0.13 years/metre reduction = 5 years.

We challenged whether there would be a real impact on burst performance. SA Water explained that analysis had been carried out to differentiate between bursts that were attributable to pressure and those that were not. Using WSAA modelling software, SA Water estimate a net benefit saving of $1.5m per year for reduced OPEX costs (burst attendances and reduced water loss) for the three zones. Additional benefits include the reduced CAPEX expenditure due to delayed renewals. This has not been modelled in the NPV at this stage, as it would be difficult to determine accurately. However, it is forecast to defer between 4 and 6 renewals each year and provide an additional benefit saving of between $600k and $1.2m per year for the three zones. This will not impact significantly in the RBP2016 period due the time needed for the pressure management areas to be set up.

The program assumes that 75 PRVs will be installed in 2016/7; 140 designed in 2017/8 and installed in 2018/9. However, the full benefits will not be achieved until after the RBP2016 period, with commissioning in the 3 years from 2019/20.

We note that the ratio of low to high pressure complaints in Metro is 9:1, and for Country is 14:1. The potential exists for considerable customer resistance to change in large pressure management projects of this kind. It is possible that the performance improvements to the network could be substantially offset by the rise in complaints and loss of customer satisfaction. However, at the meetings with the people responsible for the projects we were comforted by their grasp of the technical detail, the issues that could arise and the need for adequate customer buy-in.

We noted that the asset life of the PRVs needs to be part of the economic consideration and requested information concerning the asset life of PRVs (including major refurbishment). SA Water indicated that the estimated life of a PRV is 25 years and that the estimated maintenance costs $50k/year per site for the PRVs is included in the costings.

The positive NPV for the project considers the benefits of reduced annual burst rates and reduced leakage rates, and does not take into account the predicted benefits from the deferral of asset renewals. In its project report, SA Water estimate that including the benefits from deferred asset renewals would cause the program's RBP2016 NPV to increase by another $14,812k to $20,389k. It is our understanding that the deferral of renewals resulting from the Pressure Management Initiatives project was not factored into the Water Network Management – Reticulation Mains project. The benefits will not be accrued until beyond the RBP2016 period and no adjustment would be justified. However, in implementing the Reticulation renewals, the prioritization between individual renewals should reflect the future change in operating conditions. That is, if two renewals jobs are dealing with the same level of failures and interruptions, the one outside of the pressure managed zones being set up should be given priority.

The estimated simple payback period for each project and the total program is presented in Table 22. Note this includes the EL75M Zone which is to have capital expenditure primarily in RBP2013 but is not expected to be completed until early in RBP2016. As the EL140M Zone will be so large it is proposed to be delivered as two projects, creating two sub-zones. If deferred capital expenditure to replace failing assets is included in the calculation, the simple payback for the program is

expected to be -3.9 years. This is a negative value as the asset deferral saving is greater than the capital cost. [redacted]

KEY DOCUMENTS REVIEWED

- WC0080: Pressure Management Initiatives – Asset Program Summary
- RD16036.4: List of underlying assumptions in deriving estimated asset life for a Pressure Reducing Valve (PRV)
- RD16036.5: List of assumptions on the estimated timing/asset life before major refurbishment of the PRV is required
- RD16036.6: Response to the following query – *'Does the analysis on the page 44 of the business case take into account the estimated maintenance costs for the PRV?'*
- RD16036.7: Response to the following query – *'Do the asset renewal assumptions used in the water mains replacement program assume the PRVs are not installed in the RBP2016 period? Please provide details on the estimated reduction in the water renewals program expenditure if the planned PRVs are installed.'*
- RD16036.8: Provision of details on the planned timing for implementation of the three separate PRV programs and the movement in pressure (i.e. not just static head)

PROJECT SUMMARY: STRUCTURES WN RENEWAL SFL

PROJECT DETAILS

Project Name	Structures WN Renewal SFL
Project C Number	CF147
Project ID Number	7785
Program Name	Structures Water - Networks
SLIBS	Water Reliability Customer
High Level Category	Asset Renewal

SCHEME CONCEPT

This program aims to provide a financially optimum program of maintaining water networks structural assets so that SA Water can continues to deliver secure, safe, healthy and reliable water to their customers.

By definition, a water network structure is any civil/structural asset located downstream of a SA Water treatment plant. This includes tanks, earth bank storages (EBS), bores, buildings, tunnels and culverts.

Service level impact concerns water supply reliability, water supply quality and safety.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project C Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
CF147	0.000	0.000	0.000	0.000	1.648	12.298	30.868	30.549	24.595

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

SA Water has focused its Water Networks Structures Renewal effort on its larger storage facilities during the RBP2013 period: Happy Valley #1 (100ML); Happy Valley #2 (100ML); Paskerville (62ML); and Upper Paskerville (100ML). The RBP2016 program is 51% by value focused on the smaller (≤10ML) storage facilities: Metro Storages (35 No.) and Country Storages (24No.) at $53.3M. These have been identified as having intolerable risk of failure and condition grades 4 and 5. The Metro Storages (16 No.) and Country Storages (44 No.) that have been inspected and found to have tolerable risks of failure and condition grades 4 and 5 at ($33.4M of potential work) have not been included in the program. We believe that this is a prudent approach.

The included storage facilities were selected for sampling, based upon an initial Level 1 visual inspection. That is, the Level 2 inspections were aimed at the known problem sites. We are therefore minded to conclude that future Level 2 inspections of the remainder of the asset stock will not identify significant numbers of sites with intolerable risk of failure during the RBP2016 period.

We note that the SA Water assign a likelihood of failure of “will occur once a year” to assets in condition grade 5 and ”may occur at least once in a 5 year period” to condition grade 4. Considering inspection has indicated the >100 of the small storage assets are in condition grades 4 or 5, it would have been expected that a significant number of failures would have occurred each year recently, rather than the 3 reported. The reality does not corroborate likelihood assessment. This does not mean the condition grading is wrong. It is likely that operational solutions were identified when full or partial failures occurred, such as provision of alternative supplies (tankering, rezoning etc.) or local chlorination. We believe that the renewal program should reflect the reality of available mitigation and contingency planning.

We were taken through the example of work identified for Paringa Earth Bank, a 3Ml tank with a split liner. The split looked remarkably straight implying a materials or jointing fault. The cost of repairing such a fault would be $0.5-1m.

The small storage structures program is addressing a backlog of work resulting from previous under-investment and poor design or construction. The presented program was supported with photograph examples and projects were individually costed. There can be little doubt that the work needs doing at some stage and there is an existing risk of quality or even total failure of some of the small storage assets.

Failure of small storage assets is likely to be particularly relevant in the case of the Country assets, where the local system is isolated and distant from alternative supplies. The Metro assets may have greater scope for optioneering. This has been reflected in the deeming of risk as acceptable or unacceptable, but the scheme selection did not appear to include options for rationalization or reduction of storage, rezoning or system reinforcements.

We challenged whether the water structures program would include WHS activities. It was indicated by SA Water that these were given separately costed consideration, though any renewal work would be built to current WHS standards.

The program includes refurbishment of around 6 bores per year. As part of our assessment of RBP2013 expenditure, we considered project C7166 Robe Bore No 1 Renewal (and additional bore). Robe is supplied from local bore holes which are demonstrating vulnerability to increased demand with increased salinity being noted. The area has increased holiday season demand which stresses the existing system. The original project was for the replacement of Bore 1 with Bore 8. Bore 5 is impacted by salinity and will be taken out of service when Bore 8 is commissioned and Bore 6 and Bore 7 are operated concurrently to reduce the stress on Bore 6. There is therefore need for a further bore to be brought into service, Bore 9. This was the subject of a Change Request. We noted that the only options considered to resolve the water quality issues at Robe were, do nothing and the construction of Bore 9. There is no apparent consideration of treatment or demand management options and the location and engineering detail of Bore 9 appears to have been fixed previously. As part of the improved asset management in RBP2016, would expect to see a significant improvement in the demonstration that the potential for all options had been exhausted before committing to a solution.

Hope Valley EL170 Tank is a major project included in the Structures WN Renewal SFL project. SA Water has considered the available redundancy in the local network and identified that 23,000 customers would be affected by a failure. The roof of the structure has recently failed and there is a real risk of a major quality failure. 3 distinct options have been considered and the lowest NPV solution chosen after a detailed structural assessment.

The use of a risk matrix approach to scheme prioritization was explained and demonstrated. The level of sophistication applied to the development of the Structures WN Renewal SFL project is adequate for the RBP2016 period when the focus will be on resolving the backlog. The build-up of a backlog puts into question the earlier asset management practices, and it is comforting to see the effort that has been put into inspecting these key assets in order to identify and prioritize expenditure.

Within the work identified, there needs to be urgent consideration of the criticality of the assets, as potentially offset by mitigation measures. Where network vulnerability is confirmed, operational response plans should be developed to be used in the event of failure before the backlog has been resolved. For the development of future programs, the risk matrix needs to consider mitigation and a full range of options.

The process to determine cost of repairs is set out in an Estimating Document. Of the $104.6M (pre-efficiency) total for the RBP2016 Structures WN Renewal SFL project, we note the inclusion of "Undefined – Based on condition assessments planned e.g. remaining 66% of Tank assets" of $12.0M. As discussed above the condition assessment exercise was focused on problem sites identified in the Level 1 assessment and the RBP2016 would sensibly be used to complete the survey and identify and justify the scale of future renewal program. We believe that the "Contingency / Emerging Issues" allowance of $10.0M is adequate allowance to cover uncertainty. That is the RBP2016 Structures WN Renewal SFL project should be reduced by $12.0M (pre-efficiency).

KEY DOCUMENTS REVIEWED

- WC0083: Structures - Networks (Water) – Asset Program Summary
- WC0107: Hope Valley EL170 Tank Structure Renewal – Major Project Justification (MPJ) Report
- WC0107a: Hope Valley EL170 Tank Structure Renewal – Initial Cost Estimate
- WC0178: Hope Valley EL170 Tank Structure Renewal – Project Management Plan
- WC0196: Hope Valley EL170 Tank Structure Renewal – Project Brief
- RD16036.9: Clarification behind definition of "failure" of an Earth Bank Storage
- RD16036.10: Costs breakdown to repair the Paringa Earth Bank Storage site
- RD16036.11: Schedule containing capacity information of tanks [relevant to distribution structures]

PROJECT SUMMARY: WATER RETIC SFL

PROJECT DETAILS

Project Name	Water Retic SFL
Project C Number	N/A
Project ID Number	9134
Program Name	Water Network Management – Reticulation Mains
SLIBS	Water Reliability Customer
High Level Category	Asset Renewal

SCHEME CONCEPT

The purpose/expected outcome of this program is to ensure that the water reticulation assets deliver the required level of service for an optimised life cycle cost at an acceptable level of risk. This program covers the 24,000km of water mains with a diameter <375mm that are owned by SA Water.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project ID Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
9134	0.000	0.000	0.000	0.000	0.000	17.651	19.328	19.964	20.914

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

This work item includes potable systems only and no headworks. The activity is primarily on the renewal of reticulation mains that are 50+ years old and mainly cast iron.

We note that the program is aimed at maintaining a performance standard that is worse than the level that appears to be comfortably achieved at present in the Metro area. The preference of customers to keep performance as it is must implicitly be referring to what they are feeling, i.e. the current performance level, rather than the less onerous SA Water standard. We believe the current performance should be reflected in revised and more challenging targets for the Metro area. We note that SA Water is currently achieving performance levels well below target in Metro and has since 2011.

We are comforted that SA Water appears to have good and detailed knowledge of the materials used throughout the reticulation system and the responsible managers we met appeared to have a good grasp of what needed to be done.

The program would benefit from the performance standard being reduced to a level reflective of recent outturn for the current years and a capital challenge introduced over the coming period to reflect the anticipated improvement in asset knowledge and targeting of resources. This should reasonably reflect the failure rates (#/100km) seen in both the Country and Metro areas.

The scheme is driven by the intention to deliver the current performance levels of ≤1900 properties experiencing '3 or more' unplanned interruptions per year; and <21 failures/100km/year in Metro and <8 failures/100km/year in Country. The program works in collaboration with the associated Ancillaries and Pressure Management Initiatives programs.

The Country performance for failures has been relatively steady in recent years and current activity levels would appear to be appropriate. However, the rising trend and target exceedance on interruptions needs to be addressed. The disparity between the Country trends in failures and interruptions may imply that there is work to do in the prioritization of activities so that improved interruption benefits can be achieved through renewals. It may be appropriate to relax the Country target to 10 failures/100km/year and tighten the Metro target to say 18 failures/100km/year.

Based upon the graphical representation of historical trends and standards in Figure 3 (WC0077), we note that the '3 or more' standard became incrementally tighter in 2012 and 2014 to reflect improving performance and SA Water is now indicating that it is confident that its reported performance level is below 2000. The graph would indicate an underlying performance of around 1700 over the last year.

Leakage performance appears well managed and does not seem to be either inadequate or over-targeted. It is our experience that renewals have limited short term effect on leakage levels, with pressure management and good operational practice having the main influence. SA Water is not suggesting that renewals are driven by leakage considerations in its RBP2016. We believe this to be appropriate.

The age of the reticulation system is a concern to SA Water with more than half the system being over 50 years old. It is prudent for SA Water to remain aware of the long term impacts of asset deterioration, as it will impact on leakage, interruptions and breakage rates. However, there is little to indicate that the performance of the levels are deteriorating rapidly.

SA Water indicates that it is anticipating a decline in performance due to the reduced Metro program in 2014. This correlation between pipe renewed and failure rate was not reflected through 2011 and 2012 activity fluctuations. The targeting of known problem areas as a priority dampens the effect of fluctuations in renewal activity level and improved technology and asset knowledge should allow renewals programs to be increasingly focused.

There is need for the linkage between renewal activity and performance to be better demonstrated. This is more possible for failure rates than losses of supply. Where there is accurate and granular knowledge of the cohorts within the system, and the effects of atypical circumstances like pressure transients are understood, it is possible to reasonably accurately predict the impact of renewals upon performance over the coming regulatory period. Where longer term predictions are called for, the rates of asset deterioration become more significant.

The reticulation operations practices, valve frequency, mitigation measures (over pumping, tankering etc.) and robustness of contingency planning have a compound effect with the condition of the pipes in influencing the interruptions performance of the system. The implementation of the SA Water proposed IT strategy should facilitate improved targeting of activities.

In its question to customers: "I'd be prepared to pay more on my SA Water bill to reduce the number of bursts and leaks", SA Water is not asking for a response to a performance that impacts directly upon the customer. The customer impact comes from interruptions to supply, pressure, supply restrictions or water quality. In order to demonstrate a sustainable asset management strategy for the reticulation system it is reasonable that SA Water should maintain failure rates at or

around the current levels. However, the focus of expenditure should be on the impact on the customers.

Over the RBP2016 period, SA Water should develop the ability to model the system performance and its response to different activity (and expenditure) levels. Ideally this model should be calibrated by populating the model from a historical base year and actual performance checked against known activity. Such an approach gives greater confidence to any forecasts and allows the sensitivity of the forecast to assumptions and variables to be assessed.

The capital expenditure on mains reticulation shows a rising trend. The proposed annual expenditure level for RBP2016 (years 1-4) is 20% higher than RBP2013 and 75% higher than 2008/09-2012/13 and 317% higher than 2003/04. SA Water is proposing a further 60% increase for years 5-24.

We believe that the 20% increase above current levels is questionable and the further increase in year 5 and beyond should be deferred until the evidence of performance deterioration is more robust.

In our review of the pressure management project, it was explained that the reason for the selection of the areas chosen was on the basis of existing pressures and existing performance in terms of breakages. It is implicit to the pressure management project that pipe renewals are obviated. This should be reflected in the renewals program and effort should be focused away from the area that it is planned will benefit from the pressure management benefits. We believe this should effectively extend the assets useful life and the year 5 increase in expenditure should be deferred and the longer term expenditure taken as a “draft” for further consideration after the potential benefits of the pressure managements have been quantified.

The proposed activity level has been achieved in the past and should, therefore, present no difficulties in mobilization; the activity level proposed is broadly in line with the most recent levels of replacement.

Costs are derived from historical costs. We note that the assumed unit cost applied equates to c150mm dia. in both Metro and Country. It seems likely that this indicates a focus on resolving failure rates in preference to interruptions, particularly in Metro. The SA Water rates applied compare well with our own cost modelling.

It is our understanding that the deferral of renewals resulting from the Pressure Management Initiatives project was not factored into the Water Network Management – Reticulation Mains project. The benefits will not be accrued until beyond the RBP2016 period and no adjustment would be justified. However, in implementing the Reticulation renewals, the prioritization between individual renewals should reflect the future change in operating conditions. That is, if two renewals jobs are dealing with the same level of failures and interruptions, the one outside of the pressure managed zones should be given priority.

Overall we believe the program should be reduced by the overall capital efficiency challenge. The performance standard should be made more challenging and reflect recent performance. The extra onus on the interruptions measure will shift the renewals to larger diameter mains which could justify the increase in expenditure levels above the RBP2013 levels.

KEY DOCUMENTS REVIEWED

- WC0077: Water Network - Reticulation Mains – Asset Program Summary

PROJECT SUMMARY: ORROROO WQ IMPROVEMENT

PROJECT DETAILS

Project Name	Orroroo WQ Improvement
Project C Number	C3497
Project ID Number	991
Program Name	Water Quality - Network
SLIBS	Water Quality Customer
High Level Category	External Obligation

SCHEME CONCEPT

The town of Orroroo has a population of around 540 and 340 customers. Water is currently supplied from two local groundwater bores. The water meets the ADWG health guidelines but fails for aesthetic parameters. The measured water quality at the boreholes compared with the ADWG guidelines values for aesthetics for relevant parameters is set out in the following table. The measured water quality is based on monitoring results since 2011. Note that for most of the relevant parameters the measurements are reasonably consistent from sample to sample.

Parameter	Measured water quality Bore 6	Measured water quality Bore 7	SA Water treated water quality targets	ADWG guideline value for aesthetics
Chloride (mg/L)	716 – 807	618 - 654	<250	250
Sulphate (mg/L)	405 - 441	384 - 414	< 250	250
Total hardness (mg/L as $CaCO_3$)	694 - 725	680 - 742	< 200	
Total dissolved solids (mg/L)	1200 – 2100 (1200 is an outlier, typically 1900 – 2100)	1700 -2100	< 600 – full quality <800 – mid-range	600. Based on taste: <600 mg/L is regarded as good quality drinking water. 600-900 mg/L is regarded as fair quality 900-1200 mg/L is regarded as poor quality >1200 mg/L is regarded as unacceptable.

Water from the bores is disinfected with chlorine before being provided to customers. This table shows that the water currently supplied to customers, while not a health concern, has unacceptable (or unpalatable) levels of total dissolved solids.

This proposal is to provide an alternative supply of acceptable quality water to the town of Orroroo via a pipeline from Peterborough.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project C Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

SA Water's Justification

The business case for this project states that (underlining is from the original):

> SA Water has a legislated responsibility, as defined by the Safe Drinking Water Act (2011), to ensure the water supplied to customers is safe to drink and its taste and odour is acceptable to customers.

The Safe Drinking Water Act requires that SA Water must not provide water to customers that is unsafe (knowingly or unknowingly). There is no obligation in the Act for SA Water to provide water that has an acceptable taste and odour. The Safe Drinking Water Regulations 2012 made under the Act place on SA Water a "general obligation to observe Australian Drinking Water Guidelines" as follows:

> *The Australian Drinking Water Guidelines 2011 prepared by the National Health and Medical Research Council and the Natural Resources Management Ministerial Council, as in force from time to time, must be observed in relation to the quality and supply of drinking water by a drinking water provider.*

The implication is that SA Water must observe the Guidelines, it does not have an obligation to comply with the Guidelines. We consider the statement in the business case that can be reasonably interpreted as reading that SA Water has a "legislated responsibility….to ensure that water supplied (has) taste and odour (that) is acceptable to customers" is misleading. It is important to make this distinction as SA Water is not obliged to undertake this project; it has chosen to do so.

The fact that Orroroo's water is routinely of an "unacceptable" or "unpalatable" quality due to salinity raises an important question: why was this project not carried out earlier? Or, similarly, how have customers put up with such poor quality water until now? These questions are not addressed in the business case or supporting documentation that we have witnessed.

A probable explanation that can be inferred from the questionnaire referred to below is that customers rely mostly on rainwater for drinking and use mains water for non-drinking purposes. This places the proposed expenditure in a different light: SA Water is proposing to provide water for drinking to a population that appears to not use it widely for drinking. This represents an improvement in the level of service provided to the town.

We consider that there is justification for SA Water to provide this improved level of service to the town but as we will discuss following, we consider that the options development should better account for the existing uses and expectations of customers.

Customer engagement

The business case includes the results of a customer survey that was undertaken by SA Water in collaboration with the District Council of Orroroo Carrieton. There was 107 residential responses to the survey and 15 commercial responses. Given that there are around 340 customers in town, around one third of customers responded which is likely to provide reasonably representative results.

The survey includes the following results with our comments following in italics:

- For Question 3: what do you use as an alternative supply if your rain water runs out?" The responses received were:
  - 38% replied mains supply
  - 36% replied water carting
  - The remaining 26% replied that they use bore water, borrow water, use bottled water or obtain water from council

Comment: carting is more expensive than mains supply suggesting that customers who cart either do not have access to mains supply or would rather pay the higher price for what is presumably higher quality water. Where customers do not have mains supply then this proposed new pipeline is not going to be of benefit to them.

- 85% of respondents identified "corrosion" as the reason for having to replace internal water fittings

Comment: it would be useful to investigate this in more detail. Hard water is often associated with scaling rather than corrosion suggesting that the survey may be better targeted.

- Only 33% of respondents stated that they would use mains water supply as their primary water supply if the water quality was improved
- When questioned as to in what areas they would change their patterns of consumption if the quality of mains water was improved, the following responses were received:
  - 50% of respondents said that would not use more mains water for drinking, 33% said they would.
  - 74% of respondents said they would increase their consumption for outdoor/garden use.

Comment: these results suggest that customers have a preference for rainwater for drinking and that the water proposed to be piped in from Peterborough is not seen as being of benefit by 50% of respondents to meet the objective for which SA Water is promoting this project.

We note that there is a disconnect between SA Water's stated aim for this project – addressing the aesthetic guideline values in the ADWG and the benefits as seen by the community – where half of respondents do not wish to use the water for drinking but most want to use the water for outdoor use. SA Water needs to consider whether it is justifiable to incur this expenditure on a service that is primarily seen as providing an opportunity for improved gardens. We consider that if it can be demonstrated that improved quality water will be used by the community for drinking then it is justified. We have not seen sufficient evidence to conclude that the proposed new pipeline will provide water that will be used for drinking purposes.

Consumption patterns

We requested SA Water to provide data on annual consumption over previous years. The pattern of annual consumption is shown in the following table.

	2014-15	2013-14	2012-13	2011-12	2010-11	2009-10	2008-09	2007-08
Total annual supply (kL)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

This analysis shows that water consumption has decreased markedly beginning in 2008/09. The 2013/14 total was half that seen in 2007/08. The step change is likely due to behavioural changes / reduced outdoor use in residences, as supported by the figure below which shows annual total consumption by land use type. As noted in the customer survey, many residences use rainwater for drinking water.

This figure also shows that consumption for 'common supply' has decreased significantly since 2008/09. [redacted]

In the light of the above analysis of consumption, we question why SA Water has advised Jacobs to use the following assumptions in its analysis:

- [redacted]
- [redacted]

Based on the trends in consumption, we consider that lower figures could have been used with confidence. Further, we consider that it should be investigated whether the [redacted] would need to be supplied by a desalination plant given the end use. We acknowledge that these changes may not make desalination more favourable than a pipeline, but we consider that they are worth exploring and will provide more rigour to the conclusions.

Options assessment

The business case identifies the following options that were considered:

Option Reference	Title	Description
Base Case	Do nothing	An assessment of the future costs and benefits associated with continuing to provide the current asset level of service with the existing infrastructure.
Option 1	Full supply desalination	Treatment in a [redacted] reverse osmosis desalination plant designed to treat the entire Orroroo water supply with improved quality water meeting the ADWG aesthetic values and a 100% capacity redundancy.

Option 2	Reduced quality desalination	Treatment in a [redacted] desalination plant to meet peak day demand at a reduced quality of 1000mg/l TDS, but better than the existing 1950mg/L TDS.
Option 3	Partial desalination	Treatment in an 85Kl /day desalination plant to supply domestic potable consumption only with improved water quality meeting the aesthetic quality of the ADWG.
Option 4	Pipeline from Peterborough to Orroroo	Supply treated water from the Morgan WTP via a pipeline and small pumping station from Peterborough to Orroroo to supply peak day demand at Orroroo.

However, Options 2 and 3, which are for desalination at lower production volumes than for Option 1, are not discussed further in the business case. Option 4, the pipeline, is termed Option 2 for the remainder of the business case. Therefore, three options have been considered in the business case: do nothing, desalination (full supply with 100% redundancy) and a pipeline from Peterborough.

The options assessment include a financial (net present cost) assessment and residual risk assessment. Option 2, the pipeline, was found to have a higher but still acceptable residual risk but a much lower net present cost [redacted] and is therefore the preferred option.

We requested from SA Water the consultant report (undertaken by Jacobs) that supported the business case. This report includes assessment of all options. The assessment methodology was a multi-criteria analysis against 21 financial and non-financial criterion. The scoring was undertaken at a workshop attended by SA Water and Jacobs staff. The workshop agreed weighting for all criteria. The assessment found that the highest scoring option was 'Do nothing' (score 4.31) followed by the pipeline (Score 3.72). Because the 'Do nothing' option did not meet SA Water's objectives the pipeline option is preferred. The pipeline option was not considered in Jacobs' original scope, this was requested to be added by SA Water and SA Water provided the capital cost estimate for this option.

We consider that the broad approach to the options assessment in the Jacobs report using a comprehensive multi-criteria approach is sound. However, we consider that a separate financial assessment should have been included alongside the multi-criteria analysis. Financial metrics are included in the multi-criteria analysis, and are given the highest weighting, but there is no specific assessment as to which option represents the lowest whole of life cycle cost. We note that the SA Water business case does include a net present cost assessment and residual risk assessment but only for the three options considered, not the full suite of options. Therefore, while we consider that the options assessment is broadly sound, we believe that a separate financial assessment should be undertaken and that this should cover all (or all highest scoring) options for completeness. We note following our concerns over the financial data on which the options assessment has been based.

Cost estimates

We note in Section 7.2 that we consider that the capital cost estimate for the Peterborough – Orroroo pipeline is low compared with industry benchmarks. The benchmarking shows that the outturn costs may be double that estimated by SA Water. We therefore recommend that SA Water revisit this capital cost estimate and the options analysis noting that the high operating costs of desalination mean that a pipeline is likely to still be preferred but this should be confirmed.

[redacted] While under statewide pricing there will inevitably varying levels of historic and proposed investment between regions, the purpose of this comparison is to highlight the magnitude of the investment proposed; on its own the project is a small component of SA Water's overall capital expenditure program but on a per customer basis, it is very high compared to the average historic level of capital expenditure per customer noting that the town is already served by existing water supply infrastructure.

Conclusions

SA Water is proposing to construct a pipeline to provide high quality water to the town of Orroroo which is currently supplied by water from two local bores that have high levels of salinity. SA Water is not obliged to do this under the Safe Drinking Water Act; it proposes to do this to improve the quality of service provided to customers in the town. However, evidence, including a customer survey, suggest that residents do not use the local water supply to meet drinking needs, instead relying on rainwater tanks. Customers observed that they were more likely to use higher quality water on their gardens than for drinking.

SA Water considers that a pipeline from the town of Peterborough for a capital cost of [redacted] is a better option than a local desalination plant. We consider that the options assessment methodology used by SA Water and its consultant is sound. However, we have concerns that:

- SA Water has not properly defined the problem: it is not clear that the population want or need high quality water for drinking; it is possible that customers would be satisfied with a non-potable supply
- The input data to the options assessment for the pipeline is low and that the actual outturn cost may be twice as high as the estimate provided.

Given these concerns, we consider that this project does not pass the prudence test on the information available.

KEY DOCUMENTS REVIEWED

- WC0115: Orroroo WQ Improvement – Major Project Justification (MPJ) Report
- WC0115a: Orroroo WQ Improvement – Initial Cost Estimate
- RD16030.10.1, RD16030.10.2 : Treated water quality data for Orroroo for the last 5 years
- RD16030.11: Annual water sales / metered customer usage 2006/07 to 2014/15
- RD16032.1: Orroroo WQ Improvement Project – Options Report by Jacobs SKM

PROJECT SUMMARY: MURRAY BRIDGE WWTP RELOCATION

PROJECT DETAILS

Project Name	Murray Bridge WWTP Relocation
Project C Number	C3001
Project ID Number	9218
Program Name	Growth – Wastewater Treatment Plants
SLIBS	Wastewater Quality Environment
High Level Category	Growth

SCHEME CONCEPT

At RBP2013 SA Water proposed to relocate the Murray Bridge WWTP for a total project cost (at the time) of $188M. Cardno/Atkins reviewed this proposal and we did not consider it to be prudent because we considered that there was no clear justification for it. Since this time, the Environment Protection Authority (EPA) has submitted an Annexure to the treatment plant licence which requires that SA Water must:

1. Develop and submit to the EPA by 31 March 2014, an Environmental Improvement Program to the satisfaction of the EPA
2. Ensure that the Environmental Improvement Program includes, but not be limited to, details of the actions to be undertaken by the licensee to:

    2.1 - Prevent pond failure and transfer pipe failure at the site

    2.2 - Ensure that odour from the site does not exceed 2 odour units at the nearest sensitive receiver

    2.3 - Indicate clear timeframes for actions to be taken by the Licensee as set out in the Environmental Improvement Program

    2.4 – Establish a reporting method to the EPA, including frequency, that demonstrates progress and completion of compliance actions

3. Implement the Environmental Improvement Program or any revised Environmental Improvement Program approved in writing by the EPA upon approval in writing by the EPA.

SA Water submitted to the EPA its Environmental Improvement Program on 27 April 2015. This Environmental Improvement Program includes a compliance action that SA Water will cease operating the Murray Bridge WWTP and relocate to an alternative location by 2021. This project is to meet this action under the Environmental Improvement Program.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project C Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20

C3001	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

Options assessment

SA Water commissioned Jacobs to prepare a Business Case based on further studies that have been completed since the RBP2013 review. This comprehensive Business Case identifies that there is a need for upgrade to the plant to be undertaken based on a combination of drivers, namely:

- The EPA's requirement in the Environmental Improvement Program in relation to odour
- Asset condition
- Plant performance (effluent quality)
- Other factors including plant resilience.

The Business Case includes an assessment of numerous options to meet the short, medium and long term requirements of the treatment plant. The options considered include:

- Upgrades and repairs to infrastructure at the existing site and operational strategies
- Constructing new treatment capacity at the site, e.g. a package plant
- Constructing a new MBR treatment plant at the existing site
- Constructing a new conventional activated sludge treatment plant at a new site.

The options assessment found that only two options could address the project drivers and in particular, the requirements for odour mitigation:

- Constructing a new MBR treatment plant at the existing site
- Constructing a new conventional activated sludge treatment plant at a new site.

Financial and non-financial consideration led to the construction of a new conventional activated sludge treatment plant at a new site being the preferred option.

We consider that the assessment in the Business Case is rigorous, supported by evidence and addresses most of the shortcomings identified at the RBP2013 review. We, therefore, consider this proposal is prudent.

Cost estimate

SA Water estimates a total project cost of $[redacted] (before the 5% capital efficiency). Expenditure in the upcoming regulatory period is proposed as $66.477M. We have reviewed the cost estimate developed by SA Water and undertaken benchmakring of the proposed capital costs. For this project, there are two main elements: network upgrades to transfer sewage to the new treatment plant site and the new treatment plant.

Our benchmarking found (see Section 7.2) good agreement between the cost estimate for the network upgrades put forward by SA Water and the cost estimate derived from our cost models. However, we identified a substantial difference in the direct costs estimated for the treatment plant. The proposed treatment plant is proposed to service a population of 24,200 EP. SA Water has estimated a direct cost for the treatment plant of $[redacted], exclusive of owner's costs.

[redacted]

- [redacted]
- [redacted]

[redacted]

[redacted]

	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]			[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

<u>Conclusion</u>

SA Water has undertaken considerable work since RBP2013 to confirm the need to relocate the Murray Bridge WWTP from its current location. The Environment Protection Authority has issued an Annexure to the Environmental Authority for the site which imposes conditions for odour that will only be able to be met by moving off the site or upgrading to a different treatment process. SA Water has completed an options analysis that determined that the most appropriate option was to relocate to a new site and construct a new conventional activated sludge treatment plant. We have reviewed this options assessment and consider it to be robust. We have benchmarked the estimated capital cost and found that the cost for the treatment plant works was significantly higher than two benchmark data sets. We recommend that the capital expenditure forecast be reduced by $7.00M in the RBP2016 period and $7.18M in the following regulatory period to allow for efficient costs.

KEY DOCUMENTS REVIEWED

- SC0045: Murray Bridge WWTP Upgrade Business Case – Major Project Justification (MPJ) Report
- SC0046: Murray Bridge WWTP Business Case Development by Jacobs
- SC0047: Murray Bridge WWTP Upgrade – Initial Cost Estimate
- SC0048: Environment Improvement Program (EIP) Report
- SC0049: Murray Bridge WWTP Odour Study Report by Pacific Environment Limited
- SC0050: Murray Bridge WWTP Upgrade – NPV Analysis

PROJECT SUMMARY: BOLIVAR WWTP CAPACITY GROWTH UPGRADE

PROJECT DETAILS

Project Name	Bolivar WWTP Capacity Growth Upgrade
Project C Number	C1928
Project ID Number	9291
Program Name	Growth - Wastewater Treatment Plants
SLIBS	Wastewater Quality Environment
High Level Category	Growth

SCHEME CONCEPT

This project will address issues relating to insufficient infrastructure capacity at the Bolivar WWTP. Previous investigations have concluded that the main areas with insufficient capacity area: (i) Inlet Screens; (ii) Clarifiers.

The proposed work scope in RBP2016 includes:

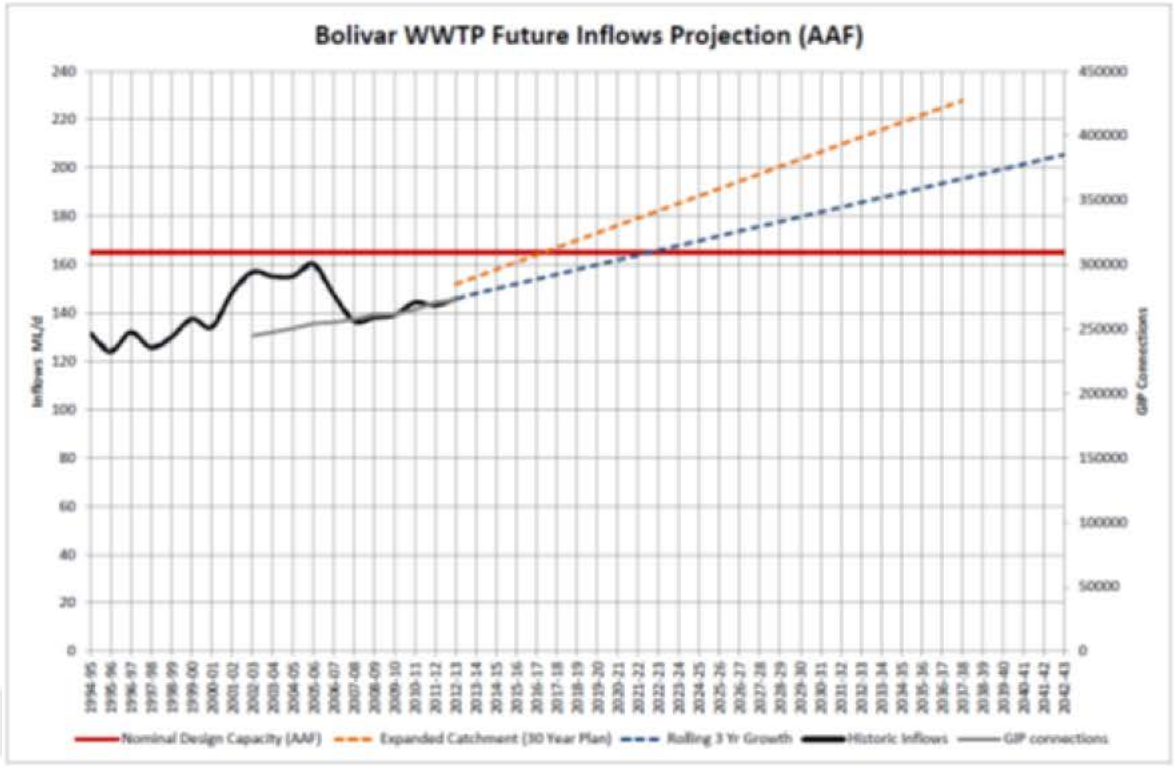
- Staged inlet screen upgrade: Civil (inlet channels) works to accommodate 2038 (RBP2036) flows; M&E (new screens) works to accommodate 2024 (RBP2020) flows;
- Refurbishment of seven clarifiers.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project C Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
C1928	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

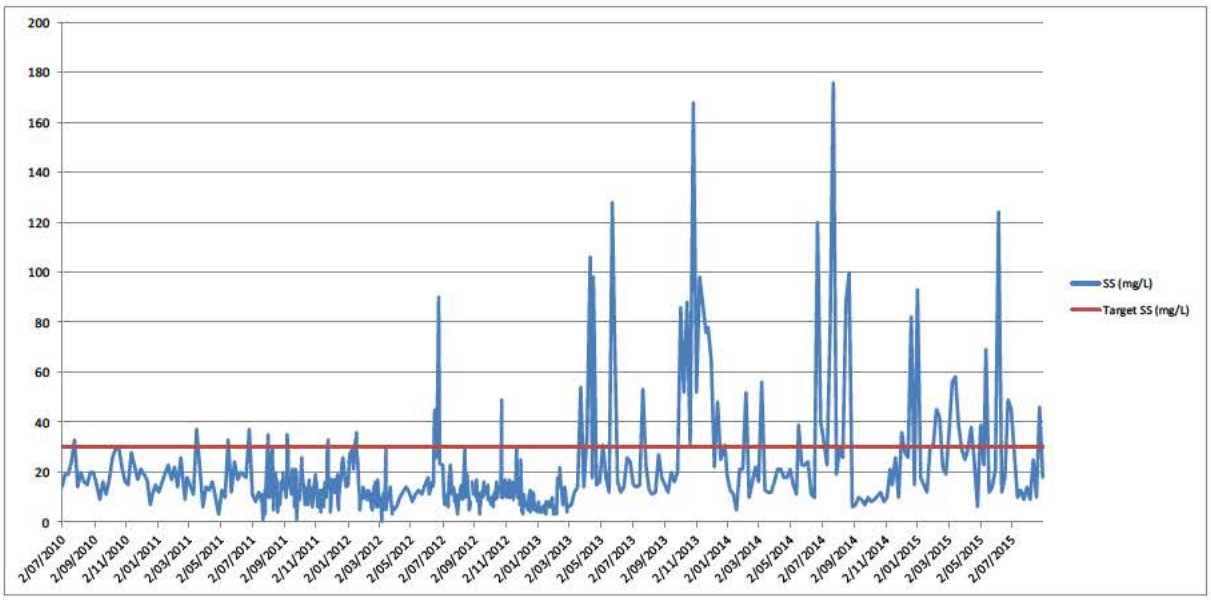
OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

Projections of future hydraulic loading on the Bolivar WWTP suggest that peak wet weather flows will reach 500 ML/d in 2022/2023, having reached 443ML/d in 2012/13. Analysis has identified that the inlet screens and clarifiers at the plant are at or near their existing hydraulic capacity which is below this projected long term figure. The existing inlet screens have capacity of 375ML/d with all screens working. The clarifiers have peak wet weather flow capacity of 446ML/d. The treatment process includes effluent lagoons which provide additional treatment and buffering to effluent quality. SA Water contends, and we accept, that overloading the lagoons will eventually lead to decreased lagoon performance and operational costs in this area.

We requested SA Water to provide its analysis of historical and projected plant inflows. This analysis is based on connections rather than population. The three year average of number of connections is used to estimate the level of future connections. A three year average of inflows per connection is also employed. This projection is much lower than alternative forecasts, such as that in the 30 year plan for Greater Adelaide. The 30 Year Plan forecast suggests that this work would be required in 2015/16, while the more conservative forecast allowing SA Water to defer the work to be completed in 2019/20. This analysis is shown in the figure below.



We also requested SA Water to provide the data underlying its analysis of the performance of its clarifiers. This is shown in the figure below and shows that clarifier performance has deteriorated since 2013 with exceedances of the target for suspended solids being regularly exceeded. It is reasonable to assume that these exceedances will continue and likely worsen as inflow to the plant increases.



SA Water has also undertaken condition assessment of the assets. The clarifiers show deterioration in the walkways and internal metalwork. SA Water has identified that the condition of the clarifiers are contributing to increased costs for breakdown maintenance.

Options analysis has been undertaken which considers different timing and levels of refurbishment. We consider that the preferred option is justified. We have reviewed the cost estimate and consider it to be reasonable noting that the outturn cost of refurbishment works can be affected by unforeseen shortcomings in the condition of the existing asset. However, by undertaking the work across multiple clarifiers, SA Water has the opportunity to mitigate this risk and realise efficiencies.

KEY DOCUMENTS REVIEWED

- SC0029: Bolivar WWTP Capacity Growth Upgrade – Major Project Justification (MPJ) Report
- FD0011: Bolivar WWTP EPA Licence
- RD16033.9: Analysis on population growth/ plant inflows referred to in the business case
- RD16033.10: Advice on the depth of the existing clarifiers at Bolivar WWTP
- RD16033.11: Raw data for SS monitoring of the clarifier effluent

PROJECT SUMMARY: MANDATED GROWTH WW NETWORK SFL

PROJECT DETAILS

Project Name	Mandated Growth WW Network SFL
Project C Number	N/A
Project ID Number	9121
Program Name	Growth - Wastewater Networks
SLIBS	Wastewater Reliability Environment
High Level Category	Growth

SCHEME CONCEPT

SA Water operates under a Water Industry Retail Licence by providing wastewater services to customers where the customers are situated in an area identified by the Minister as "mandated areas". The provision of wastewater services in mandated area is a regulatory obligation.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project ID Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
9121	0.000	0.000	0.000	0.000	0.000	12.221	12.269	12.142	12.220

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

Scope of work

The primary objective of 'Growth – Networks (WW)' Asset Program Summary (APS) is to provide wastewater services in areas of new growth. It consists of two main funding lines namely:

1. WW Extensions Regulated Component SFL
2. Mandated Growth WW Network SFL

The scope of work covered by this APS is detailed in the following table. It is noted that the APS excludes connections in mandated areas as they are unregulated and payment for 100% of the works is received upfront from the customer.

Growth type	Description	Cost recovery	Funding line in APS
Mandated growth – extensions (Direct Control)	Minor extensions required to provide a wastewater service to a new customer	▪ 95% customer contribution ▪ 5% funded by SA Water ▪ 100% of funding required in APS, although revenue will offset 95% of the costs later in the RBP	▪ WW Extensions Regulated Component SFL

Mandated growth – extensions (Capital Sub-Division Repayments)	Upsizing of extensions required by Developers to provide additional benefits to the SA Water network	▪ 100% reimbursement to Developer from SA Water (for the up-sizing component only)	▪ WW Extensions Regulated Component SFL
Augmentation growth	Wastewater network capacity upgrades to cater for future growth. Includes allocations in APS for smaller projects and separate major projects	▪ Augmentation charge collected from customers before and after capital works performed	▪ North Lefevre Peninsula WW Diversion (Major Project) ▪ Victor Harbor WWN Upgrade Stage 3 (Major Project) ▪ Mandated Growth WW Network SFL
Other growth (i.e. infill growth)	Minor capacity upgrades of an existing wastewater network usually to cater for infill growth and where allotments have been split for new customers	▪ 100% funded by SA Water	▪ Mandated Growth WW Network SFL
Recycled water growth	Extensions and/or connections to recycled water networks	▪ 95% customer contribution ▪ 5% SA Water funded ▪ 100% of funding required in APS, although revenue will offset 95% of the costs later in the RBP	▪ Mandated Growth WW Network SFL
Mitigation of odours associated with growth	Works (typically capacity upgrades) required to prevent odours associated with surcharging of sewers	▪ 100% funded by SA Water, funding included in this APS	▪ Mandated Growth WW Network SFL
Associated works	Installation of permanent flow meters, system management tools (e.g. calibrating flow models), and other works not covered by the above categories	▪ 100% funded by SA Water, funding included in this APS	▪ Mandated Growth WW Network SFL

SA Water has established the following split of funding allocations across the work categories are listed below.

Funding line in APS	**Category of works required**	**Percentage of APS allocation (based on SC0002)**
Mandated Growth WW Network SFL	Augmentation growth projects (non-major projects)	14%
	Other growth projects (infill growth)	20%
	Recycled water growth projects	7%
	Odour mitigation	14%
	Associated/ support works	14%
	Contingency	10%

WW Extensions Regulated Component SFL	Mandated growth – WW extensions	21%

It is unclear how these percentage figures were derived as it is not made clear within the supporting documentation.

Revision of capex forecast

SA Water advised in our discussions with them that the forecasts for this program of works included some overlap in costs. The advice below was provided by SA Water following our discussions to seek for further clarifications (Extracted from RD16033.3):

> *"As put forward as part of the interview process with ESCoSA, we have identified an error with the calculation of the Mandated Growth WW Networks investment that was estimated to be $12.987m per annum. The actual investment should be $4.65m per annum which is based on the following justification*
>
> - *Historically there has been $2.15m per annum invested in Wastewater Growth Projects*
> - *There is an expectation that $0.5m per annum that will be spent to extend the Recycled Water Schemes SA Water owns as recycling is promoted (as a result of consultation with our customers) and customers look for this alternative water source to support their business investments*
> - *SA Water regularly reflects upon its' approach to developer contributions and has recently committed to further encourage infill development and subsequently ensure more efficient use of existing network assets. In supporting such an approach, SA Water considers a sum of $2.0M will be required to improve its' assets where a net benefit exists to new and existing customers.*
>
> *This change ultimately means that the investment in the Growth – Networks (WW) Asset Program Summary will now total $8.095m per annum rather than $16.432M per annum."*

For clarity purposes, the information provided by SA Water above is summarised in the following table:

		Infrastructure Technical Plan without efficiency reductions ($'M Dec 2014)			
Project ID Number	**Project Name**	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Capex figures prior to revision					
9121	Mandated Growth WW Network SFL	$12.987	$12.987	$12,987	$12,987
9130	WW Extensions Regulated Component SFL	$3,445	$3,445	$3,445	$3,445
	Growth – Networks (WW) APS Total (original)	**$16,432**	**$16,432**	**$16,432**	**$16,432**
Capex figures post-revision					
9121	Mandated Growth WW Network SFL ▪ $2.15M per annum based on historical expenditure trends ▪ $0.50M per annum to extend recycled water schemes ▪ $2.00M per annum to further encourage infill development	$4,650	$4,650	$4,650	$4,650
9130	WW Extensions Regulated Component SFL	$3,445	$3,445	$3,445	$3,445
	Growth – Networks (WW) APS Total (revised)	**$8,095**	**$8,095**	**$8,095**	**$8,095**

We consider the allowance for recycled water is not significantly material and should be allowed for as SA Water seeks to develop this service area. However, we are concerned that there is limited justification for the $2M per annum to encourage infill development because:

- Based on the percentage breakdown in the business case, the adjusted figure is lower at $1.12M per annum
- Encouraging infill development will, all else being equal, lead to reduction in costs for servicing growth elsewhere
- As noted, “more efficient use of existing network assets” will lead to business savings
- There is generally excess capacity in metropolitan sewer networks due to reduction in per capita discharge over the last decade or so

Consequently, we consider that it would not be prudent to make a specific allowance for increase in these costs and recommend that the costs be maintained at the prorated level, i.e. $1.12M.

Our recommended capital expenditure profile for this program is set out in the table below.

		2016/17	2017/18	2018/19	2019/20
Recommended	▪ $2.15M per annum based on historical expenditure trends ▪ $0.50M per annum to extend recycled water schemes ▪ $1.12M per annum to further encourage infill development	$3,770	$3,770	$3,770	$3,770
SA Water proposed (revised)		$4,650	$4,650	$4,650	$4,650
Adjustment on revised figures		-$880	-$880	-$880	-$880
Adjustment to RBP submission		-$9,217	-$9,217	-$9,217	-$9,217

Impacts on operating expenditure forecast

SA Water had indicated in its APS documentation (SC0004) that there will be operating expenditures associated with this program. These forecast operating expenditure figures are expected to change due to the revisions of capex figures mentioned earlier.

	Infrastructure Technical Plan without efficiency reductions ($'M Dec 2014)			
Mandated Growth WW Network SFL *(prior to revision)*	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Proposed CAPEX	12.987	12.987	12.987	12.987
Proposed operating expenditure	0.461	0.615	0.769	0.923
Percentage ratio (OPEX:CAPEX)	**3.55%**	**4.74%**	**5.92%**	**7.11%**

Assuming the operating expenditure to capex ratio remains unchanged, the following is the revised operating expenditure:

	Infrastructure Technical Plan without efficiency reductions ($'M Dec 2014)			
Mandated Growth WW Network SFL *(post-revision)*	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Revised CAPEX	3.77	3.77	3.77	3.77
Revised operating expenditure	**0.13**	**0.18**	**0.22**	**0.27**

Adjustment to operating expenditure	**-0.33**	**-0.44**	**-0.55**	**-0.65**

KEY DOCUMENTS REVIEWED

- SC0002: Growth - Networks (WW) – Asset Program Summary
- RD16033.2: Analysis supporting the capital expenditure estimate attributed to 'Mandated Growth WW Network SFL'
- RD16033.3: Response to the following query – *'It was noted that there was a potential overlap between the regulated and non-regulated estimated cost components. Could you please clarify and quantity the overlap if any?'*
- RD16033.4: Response to the following query – *'What proportion of wastewater network growth work is done by developers versus procurement by SA Water on schedule of rates contracts?'*

PROJECT SUMMARY: NORTH LEFEVRE PENINSULA WW DIVERSION

PROJECT DETAILS

Project Name	North Lefevre Peninsula WW Diversion
Project C Number	C1336
Project ID Number	2896
Program Name	Growth - Wastewater Networks
SLIBS	Wastewater Reliability Environment
High Level Category	Growth

SCHEME CONCEPT

The purpose of the North LeFevre Wastewater Diversion is to determine the best approach to manage wastewater collection from the growing residential and commercial water use on the LeFevre Peninsula.

The existing infrastructure is already operating above capacity for significant periods with surcharging (i.e. not overflow) in the system, causing sewage in the trunk system to be stagnant resulting in significant odour complaints. The existing collection infrastructure is currently geographically remote from the Bolivar WWTP which ultimately receives the collected wastewater and has a very flat topography both of which are significant factors in selecting the best option.

SA Water's preferred option is to augment the existing system to make use of spare capacity in the wider system through an upgrade to sewage pumping station WWPS013 at Dover Terrace Largs North, and the construction of a new rising main discharge at Bower Road, before gravitating to the sewage pump station SE939 at Ethelton. Ethelton has the capacity to receive the flow and treat the odours.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project C Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
C1336	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

SA Water has identified that growth in this area is leading to sewers to run at high levels but because of the topography, the sewers are surcharging but not overflowing. The end result is that the impact on service is primarily odour complaints rather than network overflows. We requested SA Water to quantify the extent to which odour complaints have been observed and the following analysis was provided for the areas within this catchment:

ClusterID	Count of Complaints within Cluster Bounds	Area (Ha)	Area (SqKm)	Odour Complaint Density (Count of Complaints within Cluster bounds divided by Sq Km of Cluster)	Suburb
97	25	66 2	0.66	37.8	PETERHEAD
108	23	77 5	0.77	29.7	ETHELTON
66	3	10.6	0.11	28.2	OSBORNE
71	3	11 8	0.12	25.4	TAPEROO
64	3	19.7	0.20	15.2	NORTH HAVEN
72	4	28 3	0.28	14.1	TAPEROO
101	3	28 2	0.28	10.6	SEMAPHORE
81	0	7 0	0.07	0.0	LARGS NORTH

This data shows that the complaints are primarily arising in Peterhead and Ethelton. SA Water also provided maps showing spatial analysis it has undertaken of the odour complaint clusters. The Major Project Justification report identifies the location of 40 odour complaints made since 2011 along the route of the existing trunk sewer.

We also requested that SA Water provide example data from the flow monitoring undertaken by it. This data shows that in the trunk sewer it is flowing full or near full for long periods. Based on the evidence provided, we are satisfied that there is a clear need for this work.

SA Water's is proposing to augment the existing system through an upgrade to sewage pumping station WWPS013 at Dover Tce Largs North, and the construction of a new rising main discharge at Bower Rd, before gravitating to the sewage pump station SE939 at Ethelton. Ethelton has the capacity to receive the flow and treat the odours. The estimated cost for this options is [redacted] (pre-efficiency).

We queried whether the preferred option was sufficient to minimise costs over the whole lifecycle as we were concerned that there may be wider problems with the condition of the assets across the catchment that may necessitate a larger program of works. SA Water responded that it had completed CCTV survey of most concrete pipes in the network and found that most were in poor condition but that this was likely due to age as these pipes are typically over 100 years old. SA Water noted that the PVC and VC pipes in the network should be resistant to corrosion caused by the observed high levels of sewage in the network.

We consider that there is a clear need for these works as evidenced by the monitoring data and analysis of odour complaints. SA Water has conducted options analysis and identified that the preferred option is to augment the existing network through upgrade of pump station WWPS013 and construction of a rising main to pump station SE939. We consider that the options analysis undertaken is robust.

KEY DOCUMENTS REVIEWED

- SC0071: North LeFevre Peninsula Sewer Upgrade – Project Brief
- SC0072: North LeFevre Peninsula Wastewater Diversion – Project Management Plan
- SC0051: North LeFevre Peninsula Wastewater Diversion – Major Project Justification (MPJ) Report
- SC0052: North LeFevre Peninsula Wastewater Diversion – Initial Cost Estimate
- RD16033.5: Raw data from a manhole level sensor for the past 12 months
- RD16033.6: Schedule of the 40 odour complaints received
- RD16033.7: Supporting information behind the increase in cost forecast for FY2019/20
- RD16033.8: Response to the following query – *'To what extent is the condition in the network known? Is the full sewers and septicity leading to more rapid degradation of the sewers? And if so, would a more comprehensive solution (e.g. vacuum network in places) have a lower whole of lifecycle costs?'*

PROJECT SUMMARY: PURCHASE ADDITIONAL MURRAY WATER LICENCE

PROJECT DETAILS

Project Name	Purchase additional Murray water licence
Project C Number	C6384
Project ID Number	2148
Program Name	No Asset Program (Water Licences)
SLIBS	Water Reliability Customer
High Level Category	External Obligation

SCHEME CONCEPT

SA Water is proposing to rebalance its portfolio of River Murray water entitlements so that it holds a greater proportion of entitlements from New South Wales and Victoria than it currently holds. This is because these entitlements have a demonstrated higher level of historical allocation and are, therefore, considered more reliable and better able to meet demand at a lower cost.

The RBP2016 expenditure is part of an ongoing program. For RBP2016, SA Water proposes to sell 11.48 GL of South Australia entitlements and purchase 12.8 GL of New South Wales / Victoria Entitlements. The forecast cost (net of proceeds from sale of existing entitlements) is $[redacted] over RBP2016.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project C Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
C6384	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

Need for portfolio rebalancing

SA Water supplies customers from surface water storages, groundwater, the Adelaide desalination plant and water abstracted from the River Murray. In times of drought, the surface water storages that supply Adelaide (in the Western Mount Loft Ranges) typically have low supply. SA Water can use the Adelaide desalination plant to supplement supplies to the Adelaide region. However, this cannot supply regional areas and it is also more expensive than water obtained from the River Murray. Therefore, water abstracted from the River Murray is an important part of SA Water's overall approach to meeting long term demand.

SA Water holds 'gifted' licences to abstract 180GL/year from the River Murray, 130GL for the metropolitan area and 50GL/year for country regions. These entitlements may not be fully allocated in a dry year. SA Water holds a portfolio of a further 25GL of entitlements to supplement its gifted licences.

SA Water proposes to rebalance its portfolio of water entitlements so that it holds more entitlements from the upstream states of New South Wales and Victoria, as these states have historically had higher reliability of allocations against entitlements compared with South Australia. The sharing of water from the River Murray between states is governed by the Murray-Darling Basin Agreement. Within the shares allocated to each state, decisions on allocation are made by State resource managers. The approach to determining annual allocations vary between states based on the water accounting policies adopted by each. The decisions affect the reliability of allocations from year to year. Another factor impacting the reliability of annual allocations is the end uses and mix of water share types within each state. It is generally recognised that Victoria has the most reliable allocations due to its approach to accounting for water from year to year.

SA Water's reasoning for rebalancing its water entitlement portfolio – that upstream states have more reliable allocations – is supported by the analysis below which shows end of year allocation levels for each state for high reliability water shares. The analysis period included the end of the millennium drought and the wetter years that followed.

	South Australian Murray Regulated - High Reliability Water Share	**Victoria Murray Regulated - High Reliability Water Share**	**NSW Murray Regulated - High Reliability Water Share**
2007/08	32%	43%	28.3%
2008/09	18%	35%	93.6%
2009/10	62%	100%	97.0%
2010/11	67%	100%	89.6%
2011/12	100%	100%	100%
2012/13	100%	100%	100%
2013/14	100%	100%	100%
2014/15	100%	100%	100%
2015/16 (YTD)	100%	85%	97%

Allocation data sourced as follows:

- South Australia: http://www.environment.sa.gov.au/files/sharedassets/public/water/river-murray-history-water-allocations-gen.pdf
- Victoria: http://waterregister.vic.gov.au/water-availability-and-use/seasonal-determinations
- New South Wales: http://www.water.nsw.gov.au/water-licensing/registers

We accept that this expenditure represents a prudent investment.

SA Water explained that it will undertake the purchase and sale of entitlements when market conditions are favourable and that this, therefore, would possibly lead to a different expenditure profile than that put forward in its RBP2016 submission. This is appropriate – the actual capital expenditure can be tested through an ex-post review if warranted.

Accounting for revenue from unused allocations

SA Water advised that it had not made allowance for sale of annual allocation water from its purchased entitlements in its operating expenditure forecasts. SA Water's business case notes that purchased entitlements have historically only been used for drought years. At current market prices for allocation water, the annual proceeds from sale of all of SA Water's available allocation would realise around $7M in revenue in the allocation year. This estimate is highly sensitive to the market price for allocation water (currently $250 - $300/ML). Prices for allocation water are currently trending upwards due to drier conditions in the Murray Darling Basin. The revenue that SA Water could reasonably receive will depend on the level of risk it is willing to take across the season, accounting for the probability that it may require some allocation water.

KEY DOCUMENTS REVIEWED

- WC0103: Purchase additional Murray River water licences – Major Project Justification (MPJ) Report
- WO0003: Draft water allocation plan for the River Murray prescribed watercourse
- RD16032.2: Board paper for approval to sell South Australia River Murray water entitlements dated 18 June 2014

PROJECT SUMMARY: IMPROVE ENVIRONMENTAL PERFORMANCE SFL

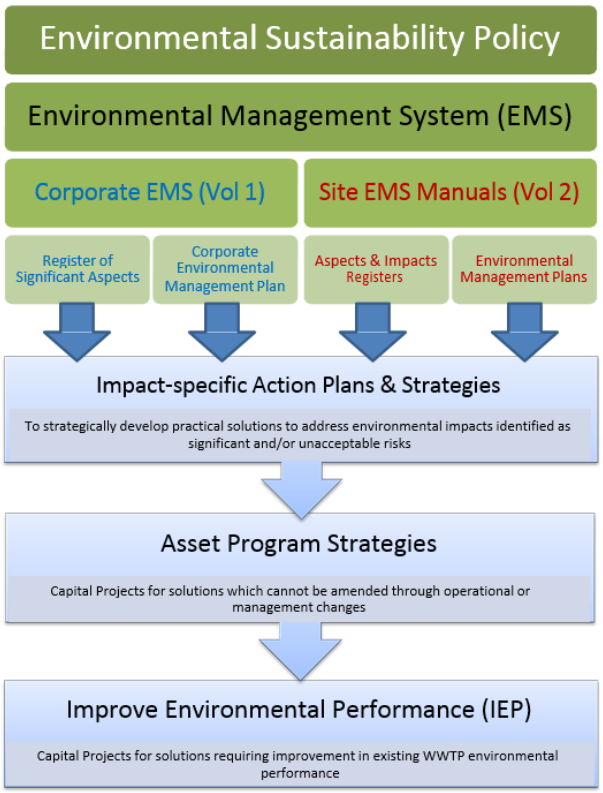
PROJECT DETAILS

Project Name	Improve Environmental Performance SFL
Project C Number	CF273
Project ID Number	9137
Program Name	Improve Environmental Performance
SLIBS	Wastewater Quality Environment
High Level Category	External Obligation

SCHEME CONCEPT

In order to align with the SA Water's strategic objectives, an Environmental Sustainability Policy (CP006) is in place to ensure SA Water's planning and actions reflect best practice environmental management in its services delivery and are in accordance with AS/NZS ISO14001:2004.

The following schematic provides an insight to the strategic alignment between SA Water's Environmental Management System (EMS) and processes and how these ultimately connect with the Improve Environmental Performance (IEP) asset program.



As illustrated above, environmental impacts which are to be addressed by the IEP asset program are those relating to improving existing environmental management and/or performance of WWTPs to meet compliance with the Environmental Protection Act 1993, EPA licence conditions and DHA approvals.

The EPA also has a prioritisation tool established which purports to identify key areas and WWTPs of concerns over current performance or expect improved environmental performance to be targeted. The areas related to improved performance are to be addressed under this program.

SA Water is proposing a total capital expenditure of $37.2M over the next four years regulatory period to carry out this program.

	Net Capital Expenditure (excl. contributions) ($'M Dec 2014)								
	Actual				Plan				
Project C Number	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
CF273	0.000	0.000	0.000	0.000	0.824	3.686	9.023	12.622	11.855

OBSERVATION ON JUSTIFICATION AND SOLUTION DEVELOPMENT

Scope of work

SA Water owns 6 Metropolitan and 18 Regional wastewater treatment plants (WWTPs) as well as four recycled water treatment plants (RWTPs). These facilities provide the vast majority of wastewater treatment services in South Australia and will be subjected to scrutiny under this program.

We have requested for a list of cost breakdown for each of the items included in this program and this is set out in the following table. Please note most of the estimated costs were initially provided as an estimated price range but these were split into lower and upper limits to get a better picture of how the program's total costs is derived.

Extracted from RD16033.12:

					Estimated Cost RBP2016			
Business KPI	Infrastructure KPI	WW System	Issue/Risk	Linked to Adelaide Coastal Waters EIP	Low	High	Average	Comments
100% compliance with EPA Licence and Environmental Legislation	100% compliance with specified timeframes and to meet EIP outcomes	Metro	ACW- EIP development	Y	[redacted]			Allocated for business case development. EPA aware of SA Water process. EIP response by 2017.
		Port Augusta East	EMP	N				Further assessment of the network infiltration will indicate the source of the salinity and may indicate need to reline or repair network mains, or redirect parts of the network to increase the amount of lower salinity water going to the reuse plant. EPA aware.
		Whyalla	Increase in salinity impacting reuse	N				Further assessment of the network infiltration will indicate the source of the salinity and may indicate need to reline or repair network mains.

		Bolivar HS	Divert HS effluent to Salt Pans	Y	[redacted]	[redacted] 0		Possible opportunity to minimise investment towards Adelaide Coastal Waters, by redirecting HS discharges to salt pans.
		Hahndorf WWTP	Need to reduce discharge to creek (by creating a reuse network and purchasing some farming land) (options assessment) as per EIP	N	[redacted]	[redacted]		EPA have flagged the need for reuse to occur at this WWTP. EPA aware of SA Water's processes.
		Victor Harbor WWTP	Increase reuse to minimise discharge	Y	[redacted]	[redacted]		Joint project with Trility to utilise the SA Water land for reuse to minimise discharge and to provide a commercial return for the land. EPA just beginning engagement process and raising of issue with SA Water. EPA and SA Water currently negotiating and considering best approach.
100% compliance with EPA Licence and Environmental Legislation	No unacceptable levels of risk for environmental impacts identified under the EMS relating to compliance with the Environment Protection Act	Angaston	Creek Bank Erosion	N	[redacted]	[redacted]		This is not currently captured in the Aspects and Impacts Register but has been raised through the EM team.
		Bolivar WWTP	Midge flies stage 4	Y	[redacted]	[redacted]		EPA involved over time due to nuisance complaints and aware of SA Water process
		Hahndorf WWTP	Poly and Sugar Dosing - chemical spill risk	N	[redacted]	[redacted]		Due to the lack of bunding or means to control spills from the poly and sugar dosing systems, there is a risk that there could be a chemical spill that will result in an environmental incident.
		Gumeracha WWTP	Bio filter Arms or alarms	N	[redacted]	[redacted]		From Aspects and Impacts register. May involve installing infrastructure to provide early warning response.
		Mt Burr/Nangwarry	Investigate reuse options/understand impact on the environment	N	[redacted]	[redacted]		EPA have indicated that there is potential impact on the ground water, investigation by monitoring bores is required to provide a response to the EPA. EPA aware.

		Mannum WWTP	Over irrigation of non SA Water land	N	[redacted]	[redacted]		Must address issue of over irrigating the "emergency" irrigation area at Mannum, irrigation rate is 4 times the sustainable rate, need to increase the irrigation system to cover more land and expand the spread of the irrigation water.
		Fingerpoint	Lagoon leakage?	N	[redacted]	[redacted]		
		Pt Augusta East	Sludge Mgmt.	N	[redacted]	[redacted]		Follow up works resultant from the Biosolids strategy as well as an increased risk due to the Alinta Power Station announcing their closure. SA Water
		Whyalla	Sludge Mgmt.	N	[redacted]	[redacted]		Follow up works resultant from the Biosolids strategy
			Technical Assistance Programs missions	N	[redacted]	[redacted]		Improve and optimise treatment processes, by tapping into Allwater's global knowledge
		Christies Beach WWTP	Underground Fuel tanks removal	N	[redacted]	[redacted]		Contaminated site risks
		Glenelg WWTP	Underground Fuel tanks removal	N	[redacted]	[redacted]		Contaminated site risks
100% compliance with SA Water targets for WWTP Water Quality Performance	SS target	Glenelg WWTP	Scum Removal	Y	[redacted]	[redacted]		Reviewing performance of RBP2013 scum removal project. Adelaide Coastal Waters impact and recycled water impact.
		Victor Harbor WWTP	Algae in Hindmarsh reservoir	N	[redacted]	[redacted]		
		Mannum WWTP	algae Mgmt.	N	[redacted]	[redacted]		
		Angaston	algae Mgmt.	N	[redacted]	[redacted]		
		Millicent	algae Mgmt.	N	[redacted]	[redacted]		
		Pt Augusta	algae Mgmt.	N	[redacted]	[redacted]		
N/A	N/A	Regional	SBR plant investment	N	[redacted]	[redacted]		After a technical review of the operation of SA Water's regional plants, a number of recommendations were made. These recommendations need to be reviewed against risks which have been identified at the SBR plants or against whether plants are not meeting their required levels of service (SA Water effluent quality targets). Unclear what specific projects will go ahead? Further

								business case development required.
N/A	N/A	All systems	energy efficiency opportunity	N	[redacted]	[redacted]		Renewable or energy reduction targets to be included

Assuming upper price limits of proposed works from the table above are adopted, the total capex of this program is derived as follows:

Business KPI	Infrastructure KPI	Estimated Cost RBP2016	% of Total	Comments
100% compliance with EPA Licence and Environmental Legislation	100% compliance with specified timeframes and to meet EIP outcomes	[redacted]	[redacted]	
100% compliance with EPA Licence and Environmental Legislation	No unacceptable levels of risk for environmental impacts identified under the EMS relating to compliance with the Environment Protection Act	[redacted]	[redacted]	
100% compliance with SA Water targets for WWTP Water Quality Performance	SS target	[redacted]	[redacted]	
N/A	N/A	[redacted]	[redacted]	SBR plant investment
N/A	N/A	[redacted]	[redacted]	Energy efficiency opportunity
Asset Program Total (derived based on RD16033.12)		**$29.34M**		
Proposed CAPEX (based on SC0004)		**$37.20M**		
Variance ($)		**$7.86M**		

We have noted the capex forecasts derived based on information in RD16033.12 is $7.86M lower than the SA Water's proposed capex for RBP2016. It is not immediately clear as to why such difference exists.

Also, we noted SA Water had allowed $4M worth of capital expenditure under this program citing 'energy efficiency opportunity' as its main driver. We are concerned that there is limited justification for this expenditure because:

- The efficiency gains from such work will lead to business savings and should occur where there is a cost beneficial business case
- The proposed work will presumably replace existing assets that might not be near its end of useful life and therefore might not be the optimal life cycle costing option
- The driver for this proposed work seems to be lacking links to any of the Business and/or Infrastructure KPIs under this program

Consequently, we consider that it would not be prudent to undertake the proposed $4M work during RBP2016 and recommend that such work to be deferred to later date once proper business case analysis is undertaken.

Our recommended capital expenditure profile for this program is set out in the table below.

		2016/17	2017/18	2018/19	2019/20

Recommended	▪ Asset program total derived based on RD16033.12 (less $4M attributable to proposed energy efficiency works) ▪ Costs are distributed across RBP2016 in a prorata manner based on SA Water's proposed capex	$2.512M	$6.149M	$8.601M	$8.078M
SA Water proposed		$3.686M (9.9%)	$9.023M (24.3%)	$12.622M (12.62%)	$11.855M (31.9%)
Adjustment on proposed figures		-$1.174M	-$2.874M	-$4.021M	-$3.777M

KEY DOCUMENTS REVIEWED

- SC0004: Improve Environmental Performance – Asset Program Summary
- SC0006: SA Water's Environmental Sustainability Policy
- SC0009: SA Water's Determination of Significant Environmental Aspects and Wastewater Overflow Risks (EMS-00)
- SC0014: SA Water's Corporate Environmental Management Plan
- RD16033.12: Cost breakdown for each of the items included in this program
- RD16033.13: Demonstration on how risk assessment and the EPA has been engaged to justify and prioritise the expenditure