WS Atkins International Ltd

in association with

Cardno

Final Report

Detailed Review of Sydney Water Corporation's Operating and Capital Expenditure

November 2011

ATKINS

Plan Design Enable

Detailed Review of Sydney Water Corporation's Operating and Capital Expenditure

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Notice

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Glossary

Term	Definition
ACCC	Australian Competition and Consumer Commission
ADWG	Australian Drinking Water Guidelines (2004), National Health and Medical Research Council and Agriculture and Resource Management Council
AIR	Annual Information Return
ANZECC	Australia and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ARP	Access Replacement Program (billing system replacement)
Balancing Item	All capital works under $10 million have not be listed in the 2008-12 and 2012-16 SIR reports and are categorised as a 'balancing item as agreed by IPART and Sydney Water.
BASIX	Building Sustainability Index
BIC	Business Improvements Committee
BMIS	Business Management Information System
BOO	Build, Own, Operate
CEO	Chief Executive Officer
CMP	Conservation Management Plan
CMS	Customer Management System
CRC	Current Replacement Cost
CRM	Customer Relationship Management
CSC	Customer Service Committee
DBOM	Design, Build, Operate and Maintain
DMS	Demand Management System
DPI	Department of Primary Industries
DSP	Developer Service Plans
ELL	Economic Level of leakage
EMS	Environmental Management System
ERP	Enterprise Resource Platform

Term	Definition
ESD	Ecologically Sustainable Development
EWON	Energy and Water Ombudsman NSW
FRM	Field Resource Management
FTE	Full Time Equivalent
GIS	Geographical Information System
HACCP	Hazard Analysis and Critical Control Points
IICATS	Integrated Instrumentation Control and Telemetry System
ILI	Infrastructure Leakage Index
IPART	Independent Pricing and Regulatory Tribunal
IS	Information Services
ISO	International Organisation for Standardisation
IWA	International Water Association
LCD	Litres per capita per day water consumption
KPI	Key Performance Indicator
MCA	Multi-Criteria Analysis
MEERA	Modern Engineering Equivalent Replacement Asset
MLD	Megalitres per Day
MOU	Memorandum of Understanding
NATA	National Analytical Testing Authority
NHMRC	National Health and Medical Research Council
NOW	NSW Office of Water
NSW	New South Wales
NSW Health	NSW Department of Health
NWI	National Water Initiative
OEH	Office of Environment and Heritage
OH&S	Occupational Health & Safety
PAMS	Product and Asset Management System
P_{50}	50th Percentile
P_{80}	90th Percentile
PCG	Project Control Group
PSP	Priority Sewerage Program
RAB	Regulated Asset Base

Term	Definition
R&D	Research & Development
RCM	Regulatory Cost Model
RWQMP	Recycled Water Quality Management Plan
SCA	Sydney Catchment Authority
SCADA	System Control and Data Acquisition
SCA	Sydney Catchment Authority
SCI	Statement of Corporate Intent
SDP	Sydney Desalination Plant
SIR	Special Information Return
SOP	Standing Operating Procedure
STP	Sewage Treatment Plant
SWC	Sydney Water Corporation
SWIMS	Sydney Water Information Management System
UKWIR	United Kingdom Water Industry Research
WAMC	Water Administration Ministerial Corporation
WAS	Water Accounting System
WELS	Water Efficiency Labelling Standards
WES	Water Efficiency Standards
WERF	Water Environment Research Foundation
WFP	Water Filtration Plant
WSAA	Water Services Association of Australia
WWTP	Wastewater Treatment Plant

Executive Summary

This report presents the findings of our review of the capital and operating expenditure for the regulated services of Sydney Water Corporation. It addresses the prudent and efficient expenditure in the current period from 2008 to 2012 and for the future price path period 2012 to 2016.

We have based our findings on submission, the annual and special information returns presented to IPART by Sydney Water Corporation, four days of structured interviews with the agency General Managers and staff, information provided by the Corporation and responses to subsequent written questions. Our findings are also informed by our audit of the Operating Licence Asset Management processes. We reviewed functional activities and a representative number of capital projects in the current and future price paths. This final report takes into account the comments made by Sydney Water Corporation on our draft report.

Our view of efficiency is based on the concept of a Frontier Company competing in an open market where it has strong internal cost controls. The Frontier Company will continue to seek efficiencies from technological development and innovation. Other companies or agencies will seek greater efficiencies to catch up with the frontier company. This concept has been applied in previous efficiency reviews of Sydney Water in 2004 and 2008 and for Hunter Water in 2008 and State Water in 2009. The concept is also used by Ofwat, the economic regulator in England and Wales, for water utilities.

Operating Environment

Sydney Water's supplies potable water to over 1.7m households and businesses. It purchases bulk water from the Sydney Catchment Authority and the Sydney Desalination Plant. A greater part of its bulk water is treated at a privately owned water treatment plant under BOO arrangements. It is directly responsible for the operation and maintenance of 258 service reservoirs, 182 pumping stations and 21,000km of trunk and distribution mains.

Sydney Water collects and treats wastewater from a similar number of customers through a network of 24,000km of sewers, 674 pumping stations, 13 recycling plants, 16 wastewater treatment plants and three stormflow plants. Effluent is subject to a range of treatment processes depending on the disposal route; for example primary treatment for ocean discharge at the North Head treatment works, secondary treatment to a high effluent discharge standards (biological nutrient reduction) to inland rivers and tertiary treatment where effluent is recycled. All sewage sludge from treatment is disposed to agriculture, composting or landfill.

Strategic Management Overview

We noted a marked improvement in planning systems and processes since we undertook the efficiency review in 2005. A comprehensive asset management framework is in place and confirmed from our Asset Management Audit. The development of an asset management framework and the new processes and systems for planned maintenance provide the opportunity for a comprehensive risk-based approach to asset management and the potential to drive further efficiencies. This enables a debate on the level of risk, performance and charges to customers.

Water demand has been successfully reduced during the drought which has given headroom in the network to meet future growth in demand. This has enabled significant current-period expenditure to promote water efficiency to be scaled back.

Performance against the Operating Licence measures has been good and there have been reducing trends in non-compliance against environmental standards. This is good for customers in terms of service levels, although we question whether a low risk and higher cost approach has been taken which results in bills being greater than may be necessary. Asset performance in terms of water quality, mains bursts and sewer chokes suggests that the serviceability of assets is stable or improving. To us, this is a sign that the level of proactive capital and operating expenditure to maintain assets may be greater than it needs to be. This influences our view of capital expenditure.

Sydney Water presented a detailed submission for the price review. This included estimates of operating and capital expenditure required to meet its obligations. Sydney Water has used its asset management and investment planning processes to develop a detailed capital program. Operating expenditure is based on the influence of external factors, proposed efficiencies and changes in the balance of maintenance work. While this is consistent with good practice, we saw limited evidence of a structured business plan approach. Our experience with other utilities shows that our Frontier Company would follow a rigorous business process and, for example, test the sensitivities of alternative scenarios, including 'level prices' and the impact on asset serviceability, customer performance and level of risk.

This provision of a long term investment strategy is considered by IPART as an essential element of the efficiency review, so that the medium term can be seen in relation to long term plans. There was some evidence of a long term investment strategy although was not comprehensive. Indicative long-term plans and the reasoning behind them would have helped us better appreciate the context of Sydney Water's immediate capex plans.

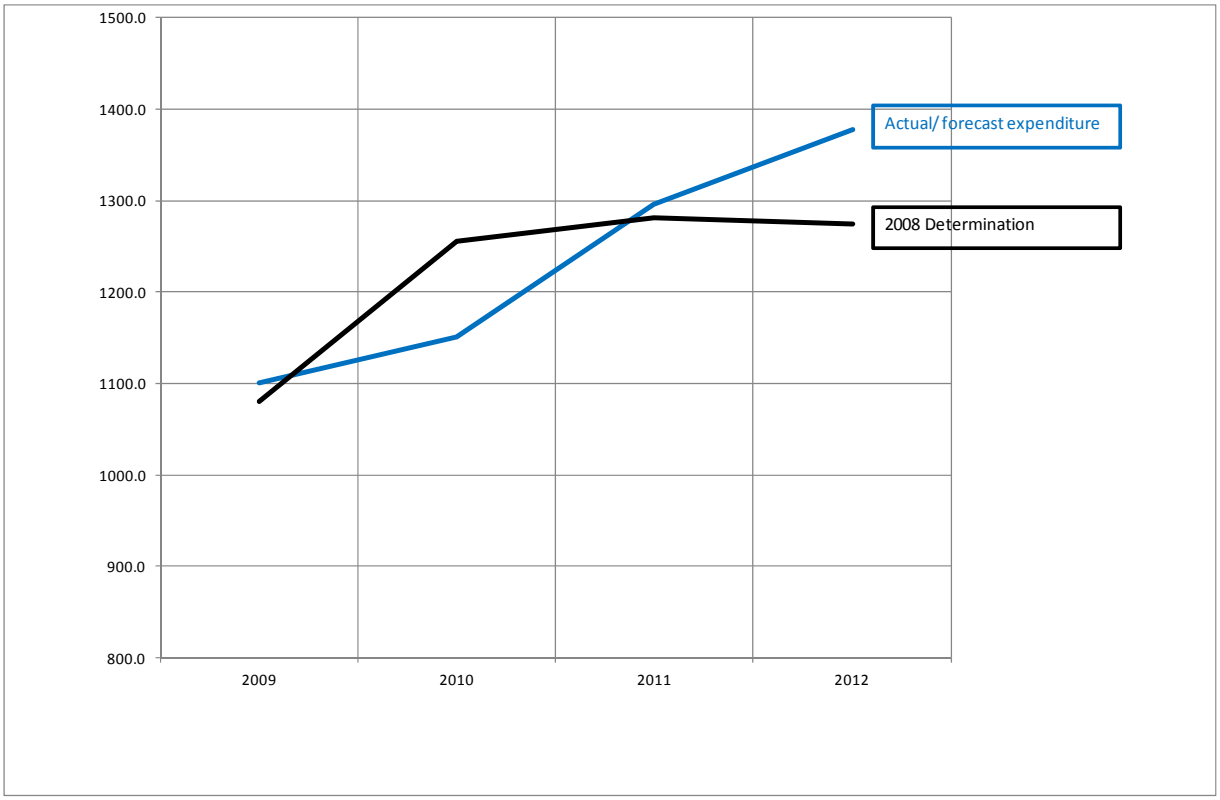
We consider effective long term investment plans and a more rigorous business plan process would deliver efficiencies both in capital and operating expenditure in the medium and long term. These findings influence our views on operating and capital and expenditure which we discuss in Sections 6 and 7.

Asset Management

This efficiency study is carried out in parallel with the audit of the asset management obligation under Sydney Water's Operating Licence. We have reported separately on this audit. We have used the findings from this audit to inform our views on the effectiveness of the asset management processes and systems used by Sydney Water. We found that Sydney Water achieved full compliance with the obligations. This provides a sound basis for capital planning and implementation, but is not necessarily confirmation of efficiency. In this efficiency study we have also been informed by the review of a representative sample of projects completed or under implementation as part of the expenditure reported in the SIR

Operating Expenditure

Sydney Water's performance over the current price path has been generally consistent with the 2008 Determination. Figure 1 compares actual expenditure over the years 2008 to 2012 with the Determination, including bulk water and desalination water which are pass-through costs. Forecast expenditure for 2012 is an increase above the Determination, although after taking into account adjustments for the Rosehill recycling scheme revenue and desalination water supplied, there is no material difference between actual expenditure and the 2008 Determination. There is, however, a material increase in expenditure for 2012 related to increased energy, chemical and contractor costs.

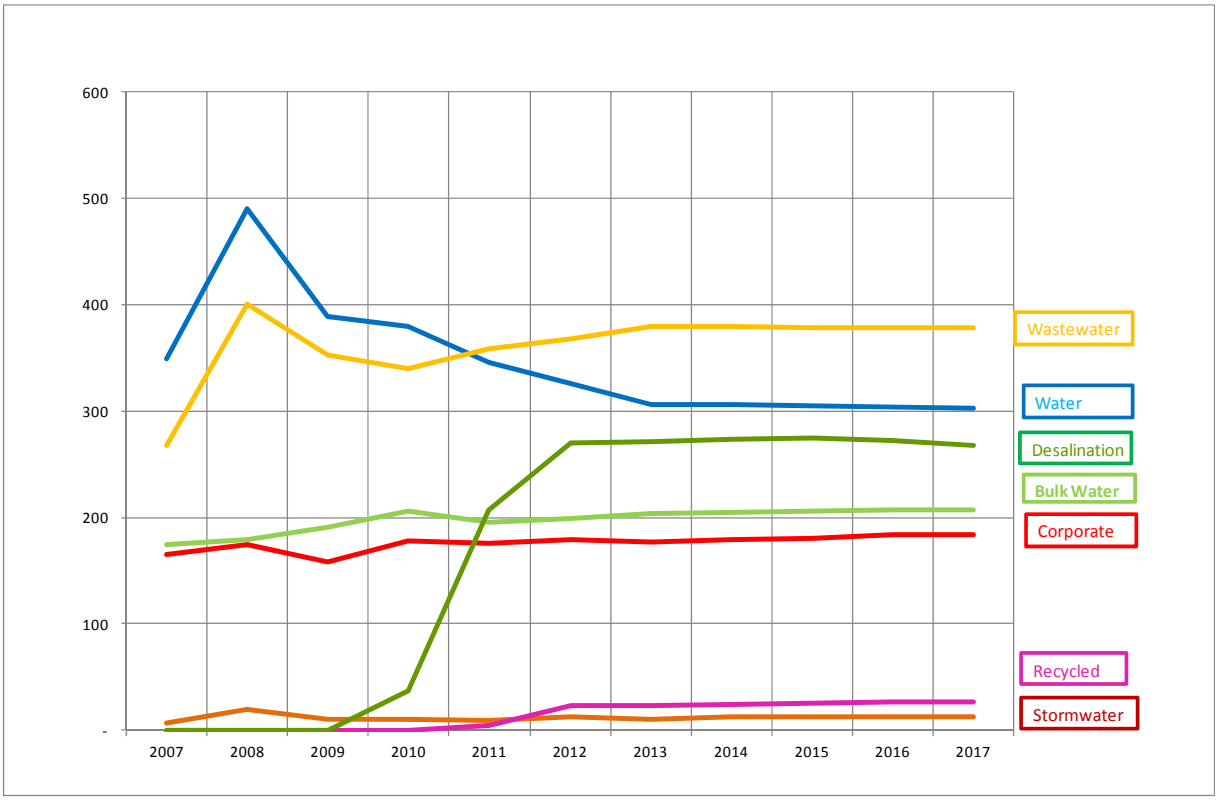


Source: SWC AIR/SIR and Atkins/Cardno analysis

Figure 1 Operating Expenditure 2008 to 2012 Comparison with Determination

Sydney Water has proposed a level of operating expenditure for 2012 to 2016 up to 2.4% above the actual 2012 base year. Expenditure is also shown by service in Figure 2 below and includes year 2017. Additional expenditure is driven by external factors such as electricity and carbon tax, although offset by savings such as the Climate Change Fund and divesting of the Wastesafe service. The net impact of these external factors is to increase operating expenditure by $11.5m/a by 2016. Sydney Water has identified a range of efficiencies on controllable costs including a significant reduction of labour costs. These efficiencies are partly offset by increases in maintenance and IT costs. These changes give rise to a 4% rise in corporate costs and marginal increases in water and wastewater service expenditure.

When we analyse variance by function, both Operations and Maintenance show reducing trends of 4% over the period 2008 to 2016 offset by an increase of 16% in Administration costs.



Source: SWC AIR/SIR and Atkins/Cardno analysis

Figure 2 Operating Expenditure 2008 to 2017

Operating Expenditure in the Current Price Path

Sydney Water entered the 2008 Determination period with an expectation to maintain service standards of water pressure, continuity, leakage and sewage overflows. A good performance against these measures has been achieved with no failure of the Operational Licence Measures. The business has been able to reduce demand significantly over the period and expenditure on demand management has been similarly reduced.

There is a 4.2% reduction of Water Service expenditure over the period attributed mainly due to a reduction in contractor and labour components which suggest that the level of maintenance has reduced over the period. Conversely there is an increase of 8% in the Wastewater Service mainly for contractor and labour costs, which is indicative of a greater level of maintenance than envisaged in the 2008 plans, including a backlog of maintenance activities. Corporate expenditure has increased by 7% over the period.

Increasing cost pressures of energy and materials are mainly outside the control of the business, although actions have been taken to mitigate these increases through for example on-site generation and smarter energy procurement. We also noted that a review of chemical use had resulted in better optimisation of treatment processes.

We applied the efficiency and prudence tests to expenditure. We found that a proportion of maintenance expenditure was not prudent. We noted a significant increase in maintenance expenditure in the Wastewater Service which was not identified in the 2008 Submission. We questioned why, with the

significant improvements made in Asset Management and maintenance planning processes, this tranche of work was not identified earlier and whether this could have displaced, in part, other work considered to have a lower priority in the maintenance program.

Operating Expenditure in the Future Price Path

Our analysis of the information provided by Sydney Water at meetings and through subsequent questions and documentation has identified several areas where we believe there is scope for making efficiencies across the business. These areas include:

i. Business Structure: The current structure of ten Divisions is unwieldy and not conducive to effective and efficient management.

ii. Strategic Planning: The provision of a comprehensive investment plan and strategy would help to place Sydney Water's immediate capex plans in the long-term context.

iii. Labour efficiencies: We note the significant reduction in labour planned over the period to 2016. A reduction in activities and operating expenditure should be reflected through the organisation.

iv. Corporate structure: The level of Corporate costs to operational and maintenance costs appears marginally high when compared with a Frontier Company.

v. Activities: The review of the Asset Management and Sustainability Divisions provided a good example of how the internal review process has identified some duplication of activities across the Divisions.

vi. Operations Division: We formed the view that there was potential for further efficiencies through the approach applied to asset management.

vii. Maintenance and the Level of Risk: New risk management tools have been developed and systems are in place to provide a more informed risk-based approach to maintenance. With asset management processes, these should allow a more informed view of risk to be taken and further efficiencies can be levered.

viii. Information Systems: there is an opportunity to improve the way that the business is planning its Information Systems and there should be a clear, rational and comprehensive strategy for the whole business. The justification for significant additional operating expenditure and its timing is not well founded.

We have tested our assumptions of efficiencies and made some estimates of how this could be achieved, although it is for the management to decide the balance of efficiencies and how the business can best be structured to meet its commitments.

Our methodology is to assess catch-up efficiency compared with the performance of a Frontier Company, and the continuing efficiency that a Frontier Company would make over the future price path period. We have assumed a continuing efficiency of 0.25% per annum and an average catch-up efficiency of 2.0% per annum. We found from our quantitative assessment that the catch-up efficiency is likely to be greater than this value but have recognised the possible limitations of Sydney Water to achieve these efficiencies over a single four year price path. We have taken account of efficiencies proposed by Sydney Water and the extent of controlled costs within the cost base. The net impact is to apply greater efficiencies in the last three years of the future period. Table 1 below shows how the level of efficiency has been derived.

These efficiencies are challenging but the Corporation has highly experienced professionals who are motivated to deliver.

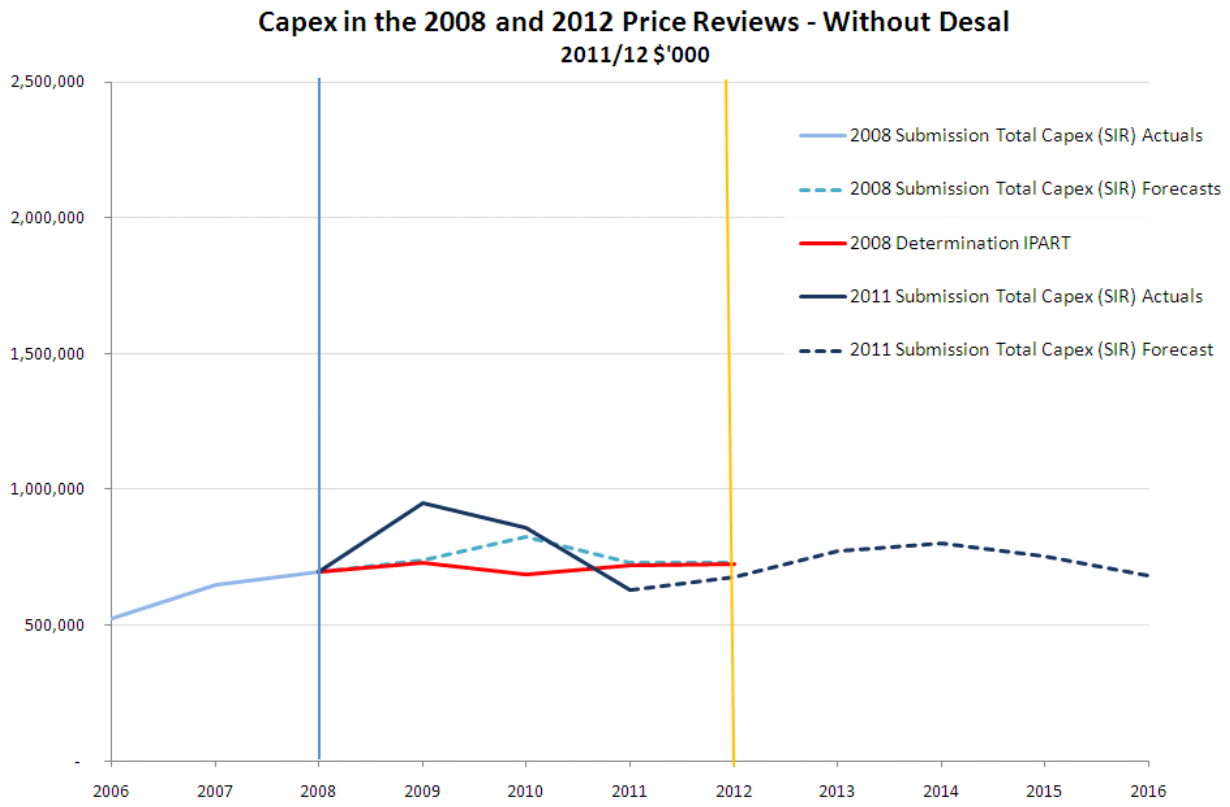
SYDNEY WATER CORPORATION PROPOSAL - OPEX - ADJUSTMENTS BY SERVICE							Notes
($M 2012)	2012	2013	2014	2015	2016	Total 2013 - 2106	
Water	326.0	306.2	306.5	305.0	303.4	**1,221.0**	
Wastewater	368.1	378.8	379.5	378.7	378.1	**1,515.1**	
Stormwater	13.1	10.7	13.0	12.8	12.9	**49.5**	
Corporate	178.6	176.5	179.6	180.3	183.7	**720.1**	
Recycled Water	23.0	23.5	23.7	25.5	26.2	**98.9**	
Bulk water	198.8	203.3	204.6	205.6	206.5	**820.1**	
Desalination Water	270.4	270.8	273.4	274.9	272.0	**1,091.1**	
Total SWC Proposed Operating Expenditure	**1,378.1**	**1,369.9**	**1,380.4**	**1,382.7**	**1,382.8**	**5,515.8**	
Adjustments and inconsistencies							
Less Rosehill scheme revenue	-8.1	-8.2	-8.3	-8.4	-8.5	**-33.4**	
Less Bulk Water	-198.8	-203.3	-204.6	-205.6	-206.5	**-820.1**	
Less Desalination water	-270.4	-270.8	-273.4	-274.9	-272.0	**-1,091.1**	
Net Opex subject to the efficiency review	**900.7**	**887.5**	**894.1**	**893.8**	**895.7**	**3,571.2**	
Application of operating efficiency targets							
Cumulative efficiencies (%)		0.00	0.68	1.18	1.80		1
Efficiency adjustment ($M)		0.0	-6.1	-10.6	-16.1		1
EFFICIENT OPERATING EXPENDITURE							
($M 2012)	2012	2013	2014	2015	2016	Total 2013 - 2106	
Water	326.0	306.2	304.4	301.4	297.9	**1,209.9**	
Wastewater	368.1	378.8	376.9	374.2	371.3	**1,501.2**	
Stormwater	13.1	10.7	12.9	12.7	12.7	**49.0**	
Recycled water	23.0	23.5	23.6	25.2	25.7	**98.0**	
Corporate	178.6	176.5	178.4	178.2	180.4	**713.5**	
Less Rosehill scheme revenue	-8.1	-8.2	-8.3	-8.4	-8.5	**-33.4**	2
Total Efficient Operating Expenditure	**900.7**	**887.5**	**887.9**	**883.2**	**879.5**	**3,538.1**	
1. Efficiencies applied pro-prata to proposed expenditure							
2. Bulk water and desalination water are excluded from the efficiency process							

Source: SWC AIR/SIR and Atkins/Cardno Analysis

Table 1 Efficient Level of Operating Expenditure

Capital Expenditure

Sydney Water's actual and planned capital expenditure over the period 2008 to 2016 is shown in Figure 3. For the current period 2008 to 2012, actual and forecast expenditure is compared with the IPART 2008 Determination. The forecast expenditure for the period 2013 to 2016 is also shown. 2012 submitted capex forecast is also shown. We have excluded any desalination plant expenditure as it has a material impact on the profile and does not form part of this efficiency study. Expenditure peaked in the first two years of the Determination then reduced to 2012. Future expenditure shows another peak in 2014.



Source: SWC SIR and Atkins/Cardno Analysis

Figure 3 Capital Expenditure 2008 to 2016

Capital Expenditure in the Current Price Path

Sydney Water's total expenditure was marginally above the Determination when expressed in real terms, with all expenditure to a 2012 base. Figure 4 shows expenditure by service over the period 2008 to 2012 and compared actual expenditure against Determination.

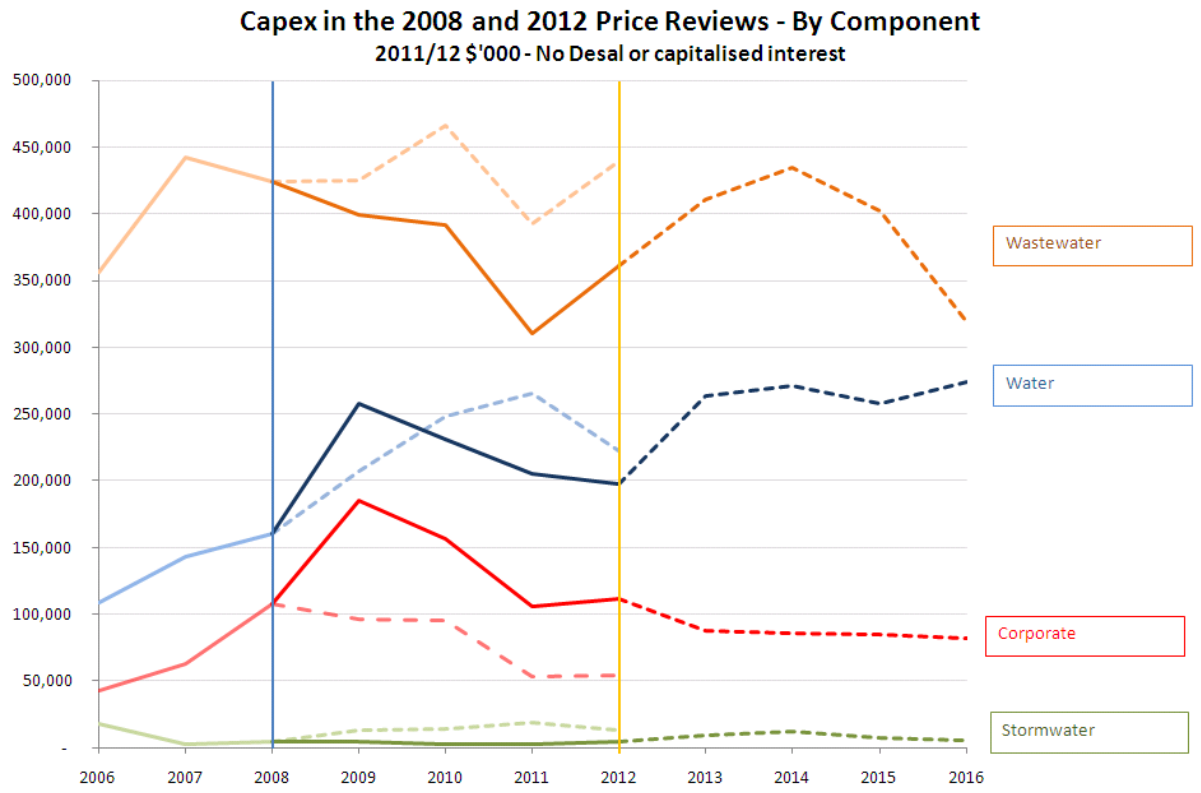


Figure 4 Expenditure in the Current Price Path by Service

Solid lines are actual figures, while dashed lines are forecast figures for the SIR/AIR submissions in 2007 and 2011. The chart shows forecasts made for the 2008-12 price path and also for the 2012-16 price path. We found that:

i. Water service expenditure is similar to the 2008 Determination in the current price path. We noted an increasing trend in water expenditure from 2006 with forecast expenditure in 2016 over twice the value in 2006. There is a marked increasing trend in future expenditure from 2012;

ii. Wastewater service expenditure was lower than the 2008 Determination and while there is a peak in 2014, the average expenditure is steady;

iii. Corporate expenditure shows a significant increase on the 2008 Determination mainly due to IT expenditure which was not shown in the submission at that time;

iv. Stormwater expenditure is relatively small and continues at a relatively even profile.

Expenditure by purpose showed that maintaining and new standards expenditure and business efficiency were above the Determination mainly because of the additional IT spend. There was a significant reduction in growth expenditure where the anticipated new developments have slipped because of lower demand.

We applied the efficiency and prudence tests to expenditure. We found that expenditure to maintain existing and new standards was prudent in that it was based on well prepared asset plans and processes

and procurement was appropriate. However, we found evidence of inadequate decision making for Corporate property and the PSP program where we concluded that a small proportion of expenditure was not prudent. We also found elements of the Corporate IT program were not prudent, because of how decisions were made and the investment was executed. Also a proportion of meter expenditure was not prudent because of procurement. We summarise our findings on prudent expenditure in Table 2. Prudence adjustments mainly relate to expenditure over and above the 2008 Determination where projects were not included in the earlier Submission and had not progressed through the price review process.

2012 $M	2009	2010	2011	2012	Total
Total Capex	1084.6	1053.8	710.3	759.1	3607.8
Adjustments related to the prudency test					
IT imprudent expenditure	-4.5	-3.5	-6.5	-3.5	-18.0
Meters imprudent expenditure	0.0	0.0	-1.2	-1.2	-2.4
PSP projects	-2.7	-5.1	-3.3	-3.0	-14.1
Property	-2.4	-1.5	-0.9	-1.2	-6.0
Prudent expenditure	**1075.0**	**1043.7**	**698.4**	**750.2**	**3567.3**

Table 2 Prudent Expenditure in Current Price Path (2008 to 2012)

Capital Expenditure in the Future Price Path

Our view on the level of efficient expenditure is based on the review of the Information Return, the review of sample projects and the assessment of asset management and capital expenditure processes.

We have compared the Operational Licence outputs with the level and profile of expenditure proposed. We found for the water sector that the continuing increase in expenditure and replacement of some assets was not consistent with the high performance being achieved against the operational licence requirements. We consider that Sydney Water is taking a low risk approach which results in a material increase in expenditure. We formed the view that there could be a phased increase in some of these activities rather than a step increase in 2013. The impact has been to maintain a similar level of total capital maintenance expenditure compared with the current price path. The extent of rephasing of wastewater outputs was not material as the level of 'maintain standards' expenditure is similar to the current price path.

Our assessment of the level of capital efficiency able to be achieved by Sydney Water in the future price path is a progression of the methodology which we applied to our 2004 review, Hunter Water in 2008 and State Water in 2009. This methodology applies the concepts of continuing and catch-up efficiency. Continuing efficiency is that which a Frontier Company would seek to achieve through new technology and innovation. We have assumed a continuing efficiency of 0.4% per annum which is consistent with these earlier studies and currently assumed by Ofwat in the UK in its 2009 Determination for water companies in England and Wales.

Catch-up efficiency relates to the improvements in systems and processes to achieve the performance of a frontier company over time. Our review of sample projects identified three business processes where there is an opportunity to lever efficiency savings on the expenditure proposals in the SIR. These relate to Investment Planning, Cost Estimates and Procurement. We have made an assessment of the extent of efficiencies that can be made to catch up with the frontier company. The efficiencies that we have applied

are summarised in Table 3 below. These efficiencies differ for the wastewater program as contracts are small. Similarly the diversity of the Corporate program is likely to reduce the scope for efficiencies.

PROPOSED CAPITAL EFFICIENCIES	2013	2014	2015	2016
Efficiencies for the main program	1.3%	4.4%	9.6%	12.0%
Stormwater service efficiencies	1.3%	1.8%	2.7%	3.6%
Corporate efficiencies	1.3%	2.8%	4.8%	6.8%

Table 3 Proposed Capital Efficiencies (Source: Atkins/Cardno analysis)

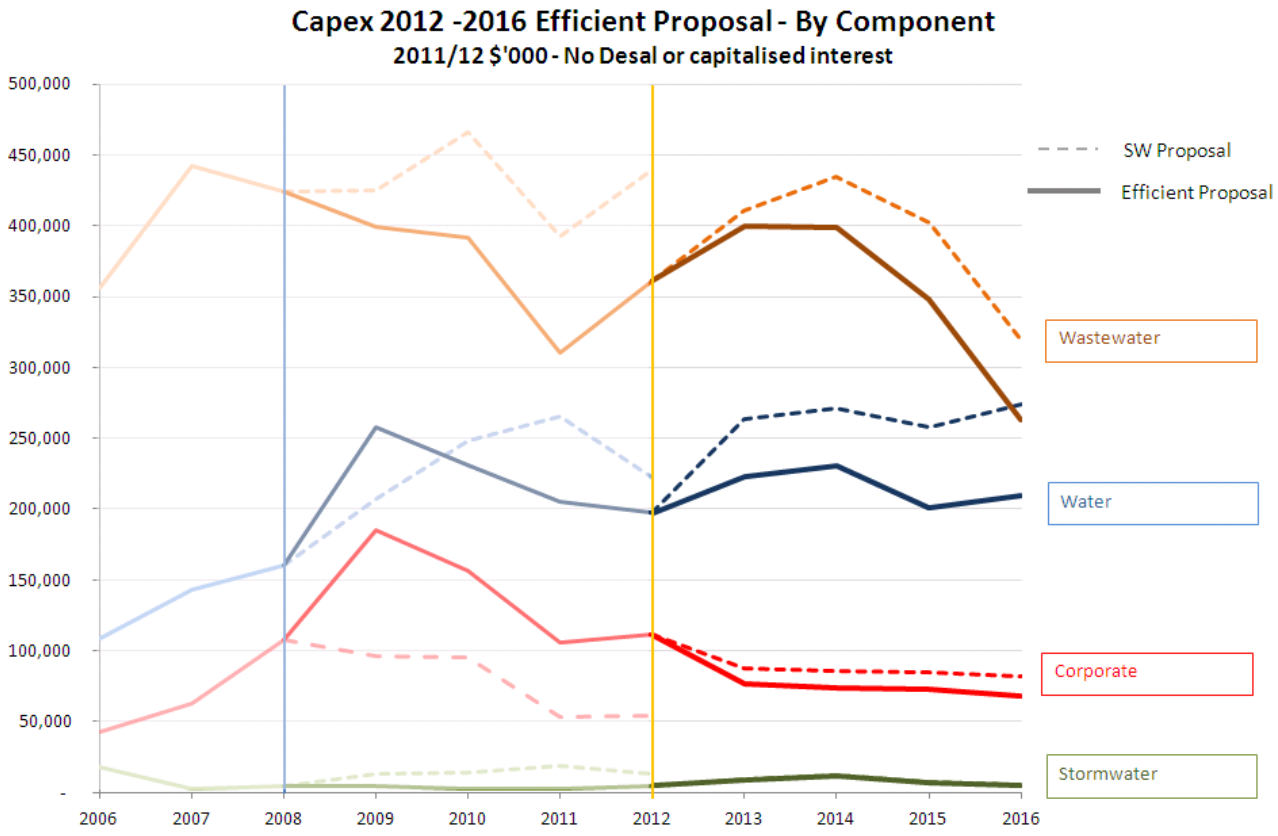
We have then applied these efficiencies to derive an efficient level of capital expenditure as summarised in Table 4.

PROPOSED CAPITAL EXPENDITURE						Notes
($m 2011/12) year ending June	2013	2014	2015	2016	Total	
Water	263.9	271.4	258.2	274.3	1067.7	
Wastewater	410.8	434.7	402.3	318.9	1566.7	
Stormwater	10.3	10.8	6.2	4.6	31.9	
Recycled Water	0.0	0.0	0.0	0.0	0.0	
Corporate	88.1	85.6	84.8	81.7	340.1	1
Total requested	773.0	802.5	751.4	679.6	3006.5	
ADJUSTMENTS						
Timing of Outputs	-38.3	-41.9	-67.7	-36.1	-184.0	
Growth reprofiling	-33.9	-22.4	-22.7	-29.9	-108.9	
Corporate	-7.3	-9.8	-9.0	-12.3	-38.3	
Efficiency	-7.5	-27.0	-36.0	-72.7	-143.2	2
EFFICIENT EXPENDITURE						
($m 2011/12) year ending June	2013	2014	2015	2016	Total	
Water	212.9	225.4	203.8	196.6	838.7	
Wastewater	382.8	390.7	332.2	259.6	1365.3	
Stormwater	10.1	10.6	6.0	4.4	31.2	
Recycled Water	0.0	0.0	0.0	0.0	0.0	
Corporate	80.2	74.8	74.1	68.0	297.0	
Total	686.0	701.5	616.0	528.6	2532.1	
1. Capital borrowing costs are excluded						
2 Catchup efficiency varies across services						

Table 4 Efficient Level of Capital Expenditure (Source: Atkins/Cardno analysis)

The tables in Section 7 detail the derivation of these adjustments and the level of efficient expenditure by service and purpose. Note that about 40% of the adjustments relate to the timing of outputs and 50% on efficiency savings in the way projects are identified, designed and delivered.

We have compared the efficient expenditure proposals with the Sydney Water submission in Figure 5.



Source: SIR and Atkins/Cardno analysis

Figure 5 Sydney Water Proposals and Proposed Efficient Level of Capital Expenditure

Wastewater expenditure shows a reducing trend on the submission profile mainly because of catch-up efficiencies. The efficiency water service expenditure shows a slightly rising trend from 2012. There are marginal reductions on Corporate expenditure following benchmarking of IT expenditure with other water agencies.

We have re-profiled growth expenditure to recognise the uncertainties in timing of new development. A probabilistic approach has been applied to derive a rational profile of growth expenditure. While the current period and growth rate assumptions are consistent with Government plans, growth expenditure is uncertain and it is likely that there will be further slippage in new development programs. Any over-expenditure can be considered in the subsequent price review; conversely any under-expenditure net of efficiencies should be ring-fenced for the subsequent period. Slippage should not be considered an opportunity for major new expenditure that has not gone through this review process.

Output Measures

Output measures are important in assessing the efficiency of investment programs when viewed in subsequent price reviews. In the current price path all the outputs were delivered generally to target. The main shortfall was in growth where the number of new connections was 50,000 below target. This is no reflection on Sydney Water's performance as the timing of new development is determined by others.

We are proposing a small number of output measures so that the progress in delivery of the programs set out in the Sydney Water submission can be confirmed in the future and efficiencies assessed. These proposals for asset maintenance, delivery of projects and environmental drivers take into account comments from Sydney Water. Definitions may need further development before implementation in the future price path. We are also suggesting an additional serviceability measure which could be developed as a high level measure.

1. Introduction

1.1 Terms of Reference

In July 2011 the Independent Pricing Tribunal of New South Wales (IPART) appointed the Atkins/Cardno consortium to carry out a detailed review of the Sydney Water Corporation's operating expenditure and capital expenditure and, under separate cover, an audit of the Corporation's performance against the asset management obligation in its 2010-2015 Operating Licence. The purpose of this review is to inform the Tribunal's Determination on prices for the upcoming price control period which applies from 1st July 2012 to 30th June 2016.

This report has been prepared in accordance with the Terms of Reference set out in the contract between Atkins/Cardno and IPART dated 9th June 2011. These are reproduced in the Appendix E.

The findings of this report form an important component of the overall price review process as set out in the IPART Issues Paper. The conclusions relating to prudence of expenditure in the current price path inform what IPART includes in Sydney Water Corporation's opening Regulated Asset Base value. The conclusions relating to efficient operating and capital expenditure in the future price path assist the Tribunal's assessment of what are justified requirements to be included in the 'building block' model for determining future prices.

The Terms of Reference state that the price control period is for a period of up to four years, 2012 to 2016.

1.2 Sydney Water Corporation submission to IPART

IPART required Sydney Water Corporation to provide a submission outlining and substantiating its proposed prices for the period 2012-2016 and historic costs for the current price path from 2008 to 2012. The following versions of this information have been used in the preparation of this final report:

Submission to IPART dated 16th September 2011;

Special Information Return (SIR) dated 16th September 2011; and

Annual Information Return dated 16th September 2011.

Whilst we have endeavoured to satisfy ourselves as to the provenance and robustness of the data provided, a detailed audit of the completeness and accuracy of the information lies outside the scope of this project.

1.3 Review Process

We, the Atkins/Cardno team, commenced our review on 19th September 2011 following receipt of the Sydney Water Submission, AIR and SIR. Following initial review and planning the team arrived in Sydney from 29th September. We presented and discussed our methodology with the Secretariat on 28th September and 3rd October.

We held interviews between 4th and 11th October 2011 with key Sydney Water staff. Appendix E includes a summary of staff involved and meetings held over the review period. A detailed agenda for each of these interviews was prepared and provided to the organisation in advance.

Over the week long interview period we requested additional supporting documentation relating to a range of issues. We believe that the Corporation provided us with this information promptly and to the

best of its ability. We then requested further information over the subsequent two weeks which Sydney Water was able to respond to in a timely manner.

We presented our draft findings to the IPART Secretariat and Sydney Water on 14th October 2011 and discussed the key issues with both parties at the same meeting. We also agreed the next steps with both parties.

Atkins/Cardno would like to take the opportunity to thank Sydney Water Corporation for making its staff available for the interview days and for the professional manner in which the organisation responded to our challenges and requests for further detail.

We submitted a draft report to IPART on 3rd November. Sydney Water and IPART were given the opportunity to comment on the draft.

This final report is the outcome of our review of the strategic management processes and other processes of the Sydney Water. It is based on the background information provided to us by IPART, the submissions made and supplementary information provided by the Corporation, the findings of our interviews and the outcome of the presentations and associated dialogue. This report also addressed the comments made by Sydney Water on the draft (see Appendix E). Where appropriate we refer to the Company's comments within the text.

1.4 Methodology

Strategic Management Overview

Our review and assessment of capital and operating efficiency is based on the hypothesis of a Frontier Company competing in an open market to deliver services to customers. We use this approach to compare the business processes and systems with current best practice and to identify the extent of catch-up that may be required over time to reach an efficient level of operation. We review the decision making processes for both operating and capital expenditure to test whether there is sufficient challenge and rigour to deliver total least cost solutions. We comment in Section 3 on Sydney Water's management systems and processes and identify areas with the potential to drive further efficiencies over the price path period.

Within this overview we have reviewed the asset management practices and capital investment appraisal and procurement processes insofar as they are used to identify investment needs and timing, appraise solutions, prioritise projects within defined budgets and procure and manage timely delivery. In parallel with this efficiency study, we undertook an audit of Sydney Water's compliance with the licence requirements for asset management. From this audit, we were able to compare asset management frameworks with best practice. Our analysis is focussed on the ability of the asset management systems and processes to deliver efficient expenditure. Our review is consistent with the IPART paper 'Regulatory Tests of past and forecast Capital Expenditure', December 2010.

Operating Expenditure

IPART requires us to assess:

- the efficiency of operating expenditure for the period from 1 July 2008 to 30 June 2012, to the extent necessary to assess the efficiency of the proposed operating expenditure; and
- the efficiency of proposed operating expenditure for the period from 1 July 2012 to 30 June 2016.

Our assessment is based on the actual operating expenditure in the Submission, the robustness and confidence of these estimates taking into account the basis of the estimates and confidence in the need, timing and scope of the requirements. We also take into account whether additional expenditure proposals have been through the internal approval and challenge processes.

We have interviewed the functional managers, reviewed supporting reports and documents and assessed the current position on the development and implementation of corporate systems used to set budgets, control and monitor costs and allocate expenditure to the IPART expense types.

We have taken into account the future efficiencies proposed by the Corporation at both functional and corporate levels.

We present our analysis of the future expenditure proposals contained and comment on each activity in terms of the potential for efficiencies to be achieved through the robustness of estimates, the need and timing of expenditure and absorbing of some activities within base opex as a surrogate for the application of internal challenge and budget control.

Our views on future operating expenditure efficiencies are based on the hypothesis of a Frontier Company, the continuing efficiencies that a Frontier Company makes through innovation and technological development, and the catch up efficiency required of Sydney Water to achieve the performance of a Frontier Company over time.

We present our review of operating expenditure and our present proposals for an efficient level of future expenditure in Section 6.

Capital Expenditure

IPART requires us to assess:

- the efficiency and prudence of capital expenditure for the period from 1 July 2008 to 30 June 2011; and
- the efficiency and prudence of proposed capital expenditure for the period from 1 July 2011 to 30 June 2016 – in order to ensure that planned capital expenditure is directed to the most appropriate projects at an efficient cost.

Our assessment of the prudence of schemes in the current price path is based on a review of a representative sample of projects. We reviewed the need for each project, its timing and the difference between actual costs and outputs against planned. We considered the basis of costs and the procurement route for implementation of sample projects. For the year 2012, we took a view of the most likely outturn expenditure based on the current status of schemes in the program.

Our approach to the assessment of allowable future expenditure is based on a review of the asset management and capital expenditure processes, project appraisal and decision processes and a review of a representative sample of schemes in the program. Our methodology involves the following steps which we apply to all expenditure at a real 2011/12 price base:

- Any inconsistencies in inclusions and allocation of capital expenditure by driver recorded in the SIR;
- Adjustments to the timing of projects due to uncertainties in the implementation programs;
- Adjustments for specific scheme cost estimates; and

- The scope to gain efficiencies through the implementation of the appraisal and cost estimating process, the approach to procurement and the program management process discussed in Section 4.

Our views on future capital expenditure efficiencies are based on the hypothesis of a Frontier Company, the continuing capital efficiencies that a Frontier Company makes through innovation and technological development and the catch up efficiency required of Sydney Water to achieve the performance of a Frontier Company over time.

We present our review of capital expenditure and present proposals for an efficient level of future expenditure in Section 7.

Output Measures

IPART requires us to assess Sydney Water's past performance against its current output measures and review and recommend output measures for the next determination period, taking into account:

- any proposals made by Sydney Water in its submission to IPART; and
- the outcomes of the consultancy to review performance indicators and output measures.

We present our findings in Section 5.

2. Business Environment

2.1 Legislation

Sydney Water is a state-owned corporation, wholly owned by the New South Wales Government, under the *State Owned Corporation Act 1989.* The Corporation operates under the enabling legislation, the *Sydney Water Act 1994.* Sydney Water's area of operations comprises the greater Sydney area, the Illawarra, and the Blue Mountains. The Corporation has three equal principal objectives, which are:

- to protect public health;
- to protect the environment; and
- to be a successful business.

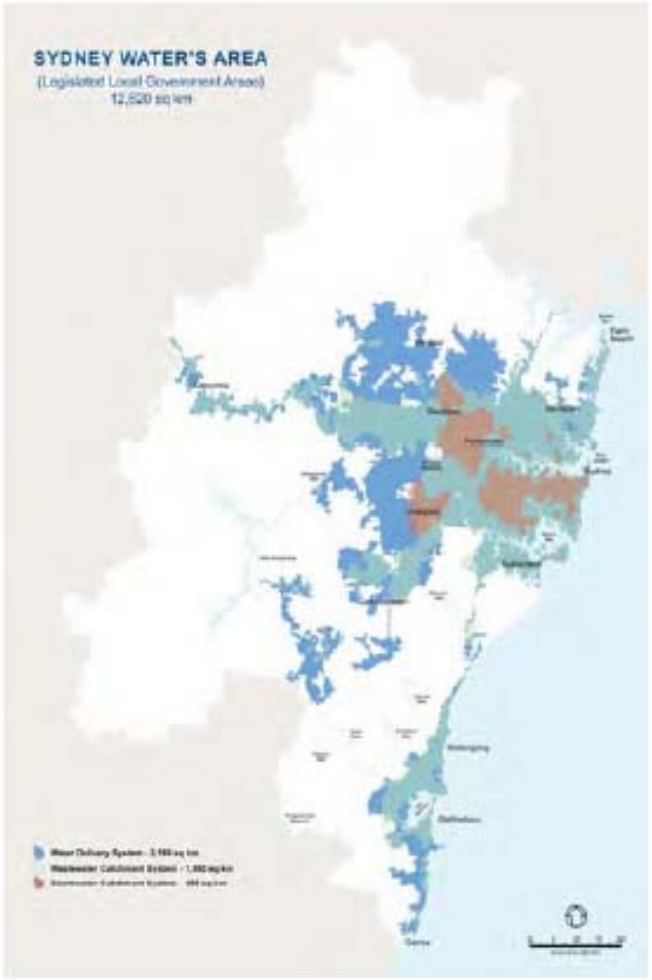


Figure 2.1 Map of the Sydney Water Corporation Area

The Sydney Water Regulation 2011 governs access to Sydney Water land around Prospect Reservoir; regulates plumbing and drainage work; and prescribes the Minister's powers to impose water restrictions. If the proposed transfer of onsite plumbing regulation to the Office of Fair Trading proceeds, the plumbing provisions in the regulation will be repealed.

Under the *IPART Act 1992,* IPART is responsible for setting prices for Sydney Water. The last price path review covers the period to June 2012. The future price path period will cover a period of four years until 2016.

Sydney Water Catchment Management Act 1998 established the Sydney Catchment Authority (SCA) to manage Sydney's storage dams and catchment areas, which had previously been managed by Sydney Water. The SCA's role is to manage and protect the catchment areas and catchment infrastructure, to be a supplier of raw water and to regulate certain activities affecting the catchment areas. Sydney Water purchases bulk water from the SCA and is the SCA's major customer. IPART is also responsible for determining the maximum charges for bulk water services to customers within the Sydney Water Corporation regulatory business.

2.2 Regulatory Requirements

Sydney Water's Operating Licence is a requirement of the Sydney Water Act. It authorises the functions that Sydney Water can undertake and sets out the terms and conditions under which it functions. The Licence is granted by the Government of NSW. IPART is responsible for administering the Operating Licence. The form of the Licence was reviewed in 2009 and updated with new requirements.

A Memorandum of Understanding is in place with NSW Health, the Office of Environment and Heritage, and the Water Administration Ministerial Corporation.

The key contents of the Licence insofar as it impacts on the efficiency review are:

i. Growth - drinking water and wastewater services must be available on request for connection to any property in the area of operations, subject to any conditions to ensure safe, reliable and financially viable supply to properties.

ii. Customer rights and complaint/dispute handling - customer contract, hardship procedures, rules on disconnection for non-payment.

iii. Asset Management and infrastructure performance: asset management requirements, system performance standards, service quality indicators, response times for water main breaks, towns to be serviced under the Priority Sewerage Program;

iv. Water Delivery Operations: water quality requirements for drinking water, recycled water, stormwater and water conservation requirements to reduce the quantity of drinking water used and the level of leaks, water efficiency programs, recycling;

v. The Environment: requirements to maintain an environmental management system certified to AS/NZS ISO 14001:2004 and report on environmental performance indicators; and

vi. Performance Indicators: these define service delivery performance for customers.

Performance against the Operational Licence is audited annually and reported by IPART.

2.3 The Regulated Business

The regulated business of Sydney Water is responsible for:

- Water treatment;
- Drinking water distribution;
- Wastewater collection;
- Wastewater treatment;
- Recycled water treatment;
- Recycled water distribution; and
- Stormwater collection and treatment.

2.4 The Non-Regulated Business

Sydney Water undertakes some activities which fall outside the regulated business, defined as those activities not within the remit of the IPART price review. These activities relate mainly to some recycled water activities and are not material when considered in relation to the regulated business. These non-regulated costs are excluded from the efficiency study.

2.5 Sydney Desalination Plant

The Sydney Desalination Plant Pty Limited a wholly owned subsidiary of Sydney Water, was granted a Network Operator's licence and a Retail Supplier's licence under the Water Industry Competition Act 2006 on 9 August 2010.

The Retail Supplier's Licence permits Sydney Desalination Plant Pty Limited to sell drinking water from the plant. Currently, its only customer is Sydney Water. Drinking water from the plant mixes with drinking water that originates in Sydney Water's other sources such as reservoirs, in the distribution system. Sydney Water sells drinking water to homes and businesses in Sydney, the Illawarra and the Blue Mountains.

The Sydney Desalination Plant is not included as part of this review.

3. Strategic Management Overview

3.1 Operating Environment

Sydney Water's business is to supply potable water to over 1.7m households and businesses. It purchases bulk water from the Sydney Catchment Authority and the Sydney Desalination Plant. A greater part of its bulk water is treated at a privately owned water treatment plant under BOO arrangements; it owns and operates a small number of water treatment works. It is directly responsible for the operation and maintenance of 258 service reservoirs, 182 pumping stations and 21,000km of trunk and distribution mains.

Sydney Water collects and treats wastewater from a similar number of customers through a network of 24,000km of sewers, 674 pumping stations, 13 recycling plants, 16 wastewater treatment plants and three stormflow plants. Effluent is subject to a range of treatment processes depending on the disposal route; for example primary treatment for ocean discharge at the North Head treatment works, secondary treatment to a high effluent discharge standards (biological nutrient reduction) to inland rivers and tertiary treatment where effluent is recycled. All sewage sludge from treatment is disposed to agriculture, composting or landfill.

Sydney Water also manages 447km of stormwater channels mainly in the Eastern Suburbs and south and south west of Sydney and trunk drainage land in Rouse Hill.

Asset Management

A key challenge to Sydney Water is to maintain assets in the long term to achieve a stable serviceability to meet Operational licence requirements. The Asset Management Operational Audit shows that the methods, processes and systems are in place to manage the assets. The challenge is to achieve a balance of risk and cost to the benefit of customers.

Water Demand

In the current price path, Sydney Water has been successful in reducing demand from 550 Gl/a in 2004 to 500 Gl/a in 2011 over a period of population growth. This is equivalent of per capita demand reducing from 369 l/c/d in 2004 to 303 l/c/day in 2011. This lower figure was influenced by a reassessment of population. The Operating Licence sets a target reduction to 329 l//c/d by 2011. The high expenditure on water efficiency measures has been significantly reduced over this period. It is expected that there will be little elasticity of demand and per capita consumption will remain at a similar level through to 2016.

Water Supply

The construction and commissioning of the Desalination Plant (SDP) as part of the Metropolitan Water Plan provides additional resources should reservoir storage fall below prescribed limits. The plant is currently operating at full output over two years as part of contractual requirements. From 2012 the plant will be subject to operating rules which depend on reservoir storage. The SDP is separate from Sydney Water and does not form a part of this efficiency review.

Growth

Growth in the current price path has been lower than forecast. Higher growth rates driving major developments to the North West and South West of Sydney are expected in the period to 2016 although this is dependent on economic factors. Developer Service charges were discontinued in the current price

path and all growth funding is met from all customers. A challenge to Sydney Water is to stage the provision of services in an innovative way to reduce the risk of stranded assets.

Wet Weather Overflows

A program to reduce the number of wet weather overflows has been progressed since 2005 and the current program of projects will be complete within the 2012-16 price path.

Discharges to the Environment

The high standards for effluent discharge to inland waterways are driving the need for tertiary treatment and alternative discharges or water use. One project is to provide replacement flows in compensation for upstream abstraction. The St Mary's Water Recycling Plant treats up to 50ML/d through reverse osmosis and discharges the recycled water to the river above Penrith Weir. This concept of "Replacement flows" allows less water to be released from Warragamba Dam thus conserving the stored dam water for drinking water.

Government Programs

There are requirements to provide first time sewerage in defined rural areas. Investment is only made under a Direction from the NSW Government. The design of the project is a matter for Sydney Water to determine.

3.1.1 Customer Services & Environment Outcomes

Operating Licence performance

Sydney Water reports annually on its performance against the Operating Licence[1]. Water service performance is measured through incidents of pressure below the 15 minute standard, water continuity in terms of properties experiencing interruptions exceeding five hours and repeat events, response times to mains breaks, per capita consumption and leakage.

The business performs well against all these indicators: water pressure is 76% under the reference level and continuity 35% under the reference level. This gives significant headroom in performance. The increase from the previous year was attributed to a natural variation and '*the number of properties affected is well below the current performance standard*'. Continuity performance over the last five years is at a similar average 35% under the reference level.

Sydney Water achieved 100% compliance against the drinking water guidelines.

The good performance against the water outputs reflects in part the low risk taken by Sydney Water in managing its water assets. We understand that the Operating Licence performance measures will be unchanged over the period to 2016.

The *Response time for water mains breaks* is a measure of operational effectiveness and not related to asset performance.

The leakage target continues to be achieved. The SDP water is likely to have an impact on the short run economic level of leakage and we understand this is to be reviewed. This is because the unit cost of SDP water is greater than the dam supply.

[1] Operating licence 2010-2015 System performance Standards Report, Sydney Water 2011

The number of mains bursts shows a reducing trend from 42 to 28 per 100km over the period 2006 to 2010. This is indicative of improving serviceability. Comparative performance is shown graphically in Section 4.12.

Sewerage service outputs relate to the number of properties that experience a sewage overflow in dry weather. A further measure is the number of properties with three or more dry weather overflows. In 2011 Sydney Water performance was 35% below target. The trend over the last five years is shown in Figure 3.2 which reduces below target from 2007 to a generally stable level some 35% below target. Repeat sewage overflows are 84% below target.

A further measure is the number of sewer chokes mainly due to tree roots. Sewer breaks and chokes have reduced from a high of 90/100km/yr in 2006-07 to 56/100km/yr in 2009/10.

Comparative performance is shown graphically in Section 4.12. This data suggests that performance has been stable over the past four years.

Environmental Compliance

Wastewater network performance is measured by chokes and odour complaints, dry weather overflows, pumping station overflows and uncontrolled overflows. Current year performance shows 150 non-compliances which were nearly all related to uncontrolled overflows. This is an increasing trend on the 100 in 2008 although lower than previous years.

Wastewater treatment works non-compliance shows a reducing trend from 38 in 2006 to 20 in 2011. The main cause for failure is 'treatment by pass and flow'.

Customer Consultation

Sydney Water has carried out customer surveys to measure attitudes to quality of service and reliability which it presents in Section 2 of the Submission. The quality of service measure shows continuing improvement over the last five years. Ratings of value for money show no material change over the five years. Customer attitudes to the price of water shows that customers who perceive the cost of water to be high priced or very high priced has increased from 29% in 2008 to 38% in 2011.

There has been no evident consultation with customers on the willingness to pay for improvements included in the Submission. While IPART follows a customer consultation on the price review, the Frontier Company would normally undertake customer willingness to pay surveys to inform the assessment of options and scenarios within the business plan process.

3.2 Business Planning

Capital Investment Strategy

One of the outcomes from the IPART review 'Regulatory tests of past and forecast capital expenditure[2]' was that businesses would be required to submit a long term investment strategy covering at least ten years. Some water utilities prepare longer term plans to include asset replacement, demand forecasts and growth assessments. These plans set out a broad strategic direction, where key assumptions are considered and tested.

The requirement for a longer term capital investment strategy was to require a business to submit the reasoning and rationale underlying the plans. IPART considered that the indicative long term plans and

[2] Regulatory tests of past and forecast capital expenditure, IPART 2010

the reasoning behind them would help them to appreciate better the place of the immediate capex plans within a long term concept. The Plan would also help IPART to understand the impact of strategies and plans which extend beyond a four year price path period into the long-term plan. Sydney Water commented that:

> *Sydney Water does have long term asset investment plans. IPART conducted a review of all agencies (Price Waterhouse Coopers report Oct 2010) that identified the need for regulated agencies to move towards 10 – 15 year plans. No specific requirements following this report have been stipulated by IPART and did not form part of the AIR/SIR process for this efficiency review. However, Sydney Water did provide a longer term capital investment plan to Atkins for their consideration. All asset plans take a 30 year investment view. Just because we presented a four year view in accordance with IPART's requirements does not mean these longer term plans do not exist.*

A well managed water utility could be expected to have a long term strategic plan in which the medium term investment program can be considered. Such a plan would address operating as well as capital expenditure and provide a long-term strategic review.

A capital investment plan was subsequently supplied which was helpful in providing longer term trends in capital expenditure from its asset management plans. There is an opportunity for Sydney Water to develop a comprehensive plan which will cover the medium term to 2016 and provide greater clarity to its strategic view of the long-term including external pressures, customer requirements, environment impacts and the investment scenarios to address these.

Business Planning

The Submission to IPART dated 16 September 2011 presented Sydney Water's proposals for setting maximum prices for the period 2012 to 2016. It included estimates of operating and capital expenditure required to meet its operational obligations of providing water supplies, wastewater disposal and other services under the terms of its Licence.

We reviewed actual and forecast expenditure in the current price path to assess efficiency and prudence. We also reviewed proposed expenditure over the period 2012 to 2016 to assess efficiency and prudence. We formed the view that the Submission had been prepared by the Divisions to represent their view of expenditure needs over the next four years. We note from Section 4 that asset management processes including project appraisal, capital prioritisation management of the investment program have been applied in preparing the program. However, the Sydney Water submission showed insufficient evidence of a structured and comprehensive business planning approach, for example using a scenario approach.

As part of the business planning process we would expect that scenario testing would be carried out to test the robustness of the program. We saw no evidence of a rational testing of scenarios including 'level pricing' and the impact on service to customers, level of risk and asset serviceability. There is no evidence of any willingness to pay surveys by Sydney Water although in its Submission, Sydney Water stated that:

> *[it] recognises that customer willingness to pay is an important consideration in setting performance requirements.*

Our Frontier Company would normally undertake willingness to pay surveys to justify areas of expenditure, elements of discretionary expenditure and the phasing of improvements.

Unconstrained Capital Expenditure

From our review of projects in the SIR Submission, we formed the view that while there are processes to manage the development and implementation of projects, there appeared to be a view that capital expenditure was not constrained. Sydney Water commented that:

> *Capital constraints are applied to develop the annual program and five year capital program, constraints are consistent with the allowed spend set by IPART and approved by Sydney Water Board and its shareholders.*

We formed our view from the way that expenditure was managed in the current price path. While outturn expenditure is forecast to be at or near the Determination, there is a significant shortfall in growth outputs of about 50,000 properties. Customers are now being asked to fund growth for the second time. A prudent frontier company would have recognised the need to make provision for this, would be logged down on this output or voluntarily reduced charges to customers. While it is reasonable for efficiencies gained from capital expenditure to be applied to business enhancements, using the expenditure from slippage and under-delivery of outputs is not a prudent way to manage expenditure.

We understand the nature of economic regulation for Sydney Water is such that capital expenditure is not strictly linked to outputs and that efficiencies from capital projects can be redeployed at Sydney Water's discretion. We note, however, that in 2008-12 Sydney Water ensured that overall, the total capex envelope was spent despite very significant underspend in a number of areas, due to much slower growth than forecast, as well as considerable efficiencies on a number of projects. In practice, these efficiencies were all subsequently spent on projects unrelated to the original capital allocation.

We have a concern that the approach of redeploying capital saved from efficiencies or lower than expected growth, is that instead of this capital being returned to customers, it is considered available for investment in other, presumably lower priority projects, which were not foreseen at the time of the price review. If this business model is followed, Sydney Water customers will not actually reap the benefits of any project capital efficiencies in terms of reduced bills - only in terms of additional assets (in the 2008-12 period, these were I.T. and property assets).

This creates a situation driving capital expenditure which we have referred to as an "environment of unconstrained capital" that may impose less business case discipline than in a company where capital must compete with demands to reduce prices, or pay increased dividends to shareholders.

While individual projects progress through the assessment of costs and benefits, a Frontier Company in a competitive environment would look to prioritise the program, using appropriate methods, within the capital constraints that may be set by prices or shareholder funds.

3.3 Governance Arrangements

Sydney Water has a Board of nine members including the Chairman and Managing Director. Reporting to the Board is an Executive Team comprising the Managing Director and nine General Managers of the functions defined in Section 3.4.

3.4 Organisation, Structure & Functions

Sydney Water is structured in ten divisions as shown in Figure 3.1 below. We have grouped these Divisions into Operations, Maintenance and Administration consistent with the requirements of our brief. This grouping is based on our high level assessment and there may be parts of Divisions which may be spread across these key functions.

The Operations and Support function includes Operations and Customer Community Relations. The **Operations Division** is responsible for the operation of the water treatment plants, distribution networks, sewage treatment works and wastewater systems. It comprises six functional areas including monitoring services, networks, treatment, hydraulic services, operational services and business management. The Division is responsible for managing bulk water supplies and disposal of biosolids. The Division is responsible for the Control Room and SCADA systems and promotes energy management through the business.

The **Customer and Community Relations Division** is responsible for managing Sydney Water's interaction with customers including meter reading and customer accounts, the customer contact centre, on-line services and looking after business customers. It also manages communications and marketing for the whole of the business. The Division had managed the water efficiency program which now has a lower priority.

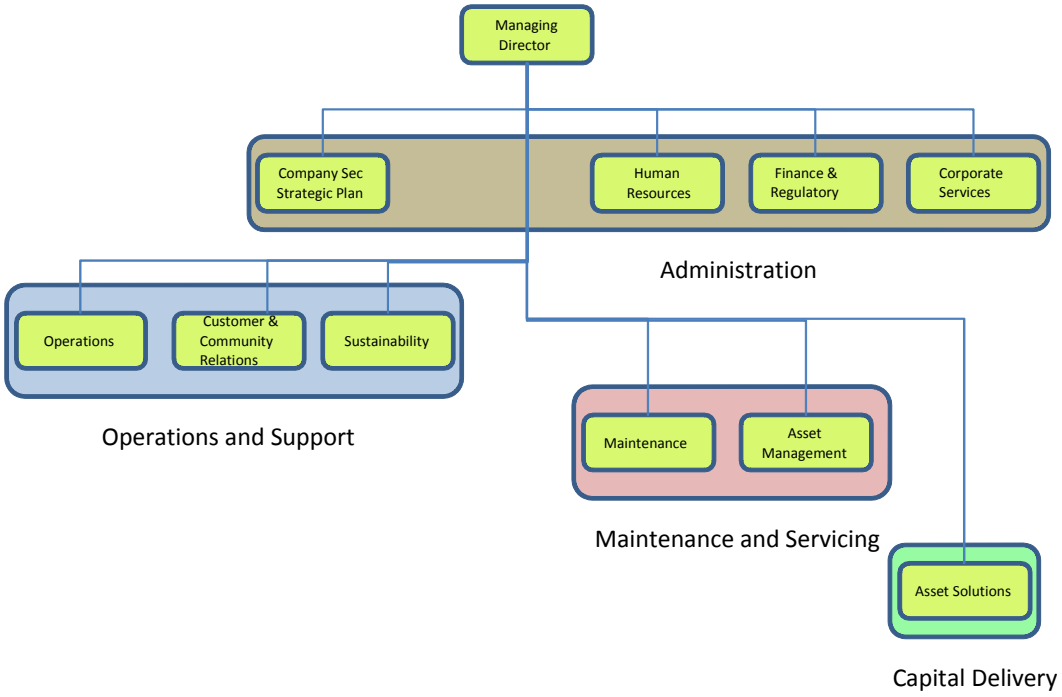


Figure 3.1 Sydney Water Organisational Structure (Source: Sydney Water)

We have included **Sustainability** within Operations although its several functions span across to Maintenance and Capital Delivery. The Sustainability Division comprises four functions including Science and Technology in support of operations and research and development, Strategic Direction, environmental Strategy where over half the team work with capital delivery and Business Services Manager.

The Maintenance and Servicing function includes the Maintenance and Asset Management Divisions. The **Maintenance Division** is responsible for maintenance of all Sydney Water's assets including treatment works, water mains, wastewater networks and recycled water facilities. It is organised into six

functional areas including maintenance engineering, electrical and mechanical delivery, civil delivery, logistic and support, business improvements, health and safety and supporting HR and accounting staff.

The **Asset Management Division** comprises seven functions including Strategic Asset Management, Investment Program Management and Asset Planning. Urban Growth function supports new developments in Sydney Water's area of operations. There are separate functions covering Property management, Stormwater and Recycled Water. The structure and functions are under review by Sydney Water.

The Administration and Support functions are carried out in four Divisions titled **Human Resources**, **Finance and Regulatory**, **Corporate Services** and the Office of the **Managing Director**. The latter comprises the Company Secretary, internal audit and strategic planning. The Corporate Division includes Shared Services, Information Technology, Corporate Risk, Legal Counsel and Business Improvement functions.

The **Asset Solutions Division** is responsible for procurement and implementation of the capital program and nearly all costs are capitalised. Some 30% of the Asset Management Division's labour costs are capitalised, with a lower 16% of Corporate and 14% of Maintenance.

The FTE numbers and related labour expenditure (2011/12) is shown in Figures 3.2 and 3.3.

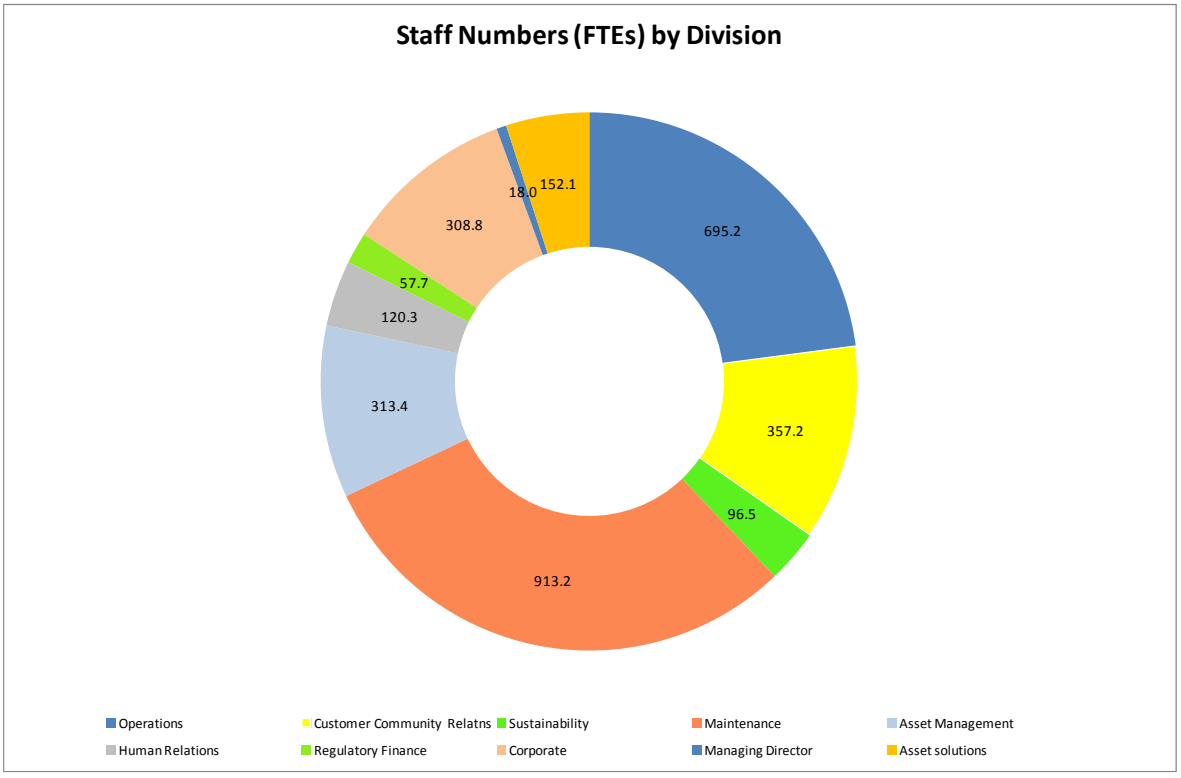


Figure 3.2: Distribution of FTEs by Operational Function (Source: Sydney Water)

These FTEs include staff which are capitalised. This represents $65m of a total $393m labour operating expenditure.

Total operating expenditure by Division, which includes labour, energy and other costs but excludes bulk water and desalination water costs are shown in Figure 3.3.

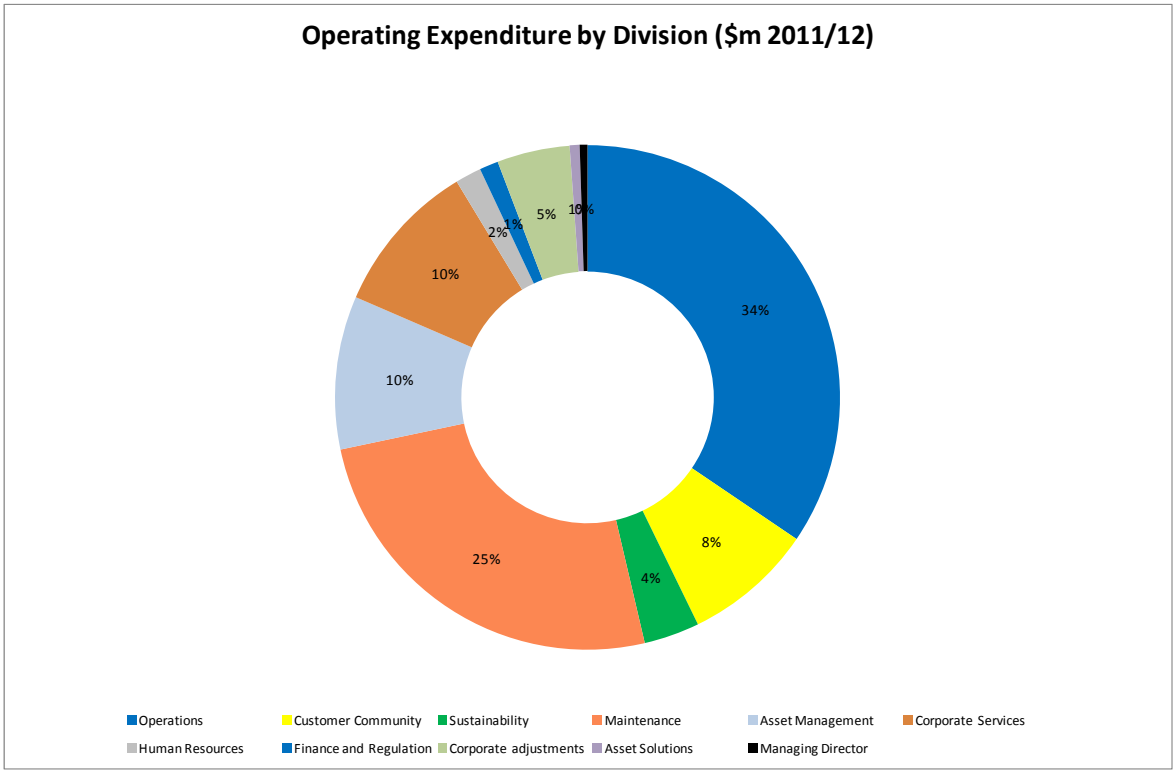


Figure 3.3 Total Operating Expenditure by Division ($2011/12) (Sources: Sydney Water)

We have analysed operating expenditure by the principal areas of Operations, Maintenance and Administration, consistent with our brief. This is shown in Figure 3.4.

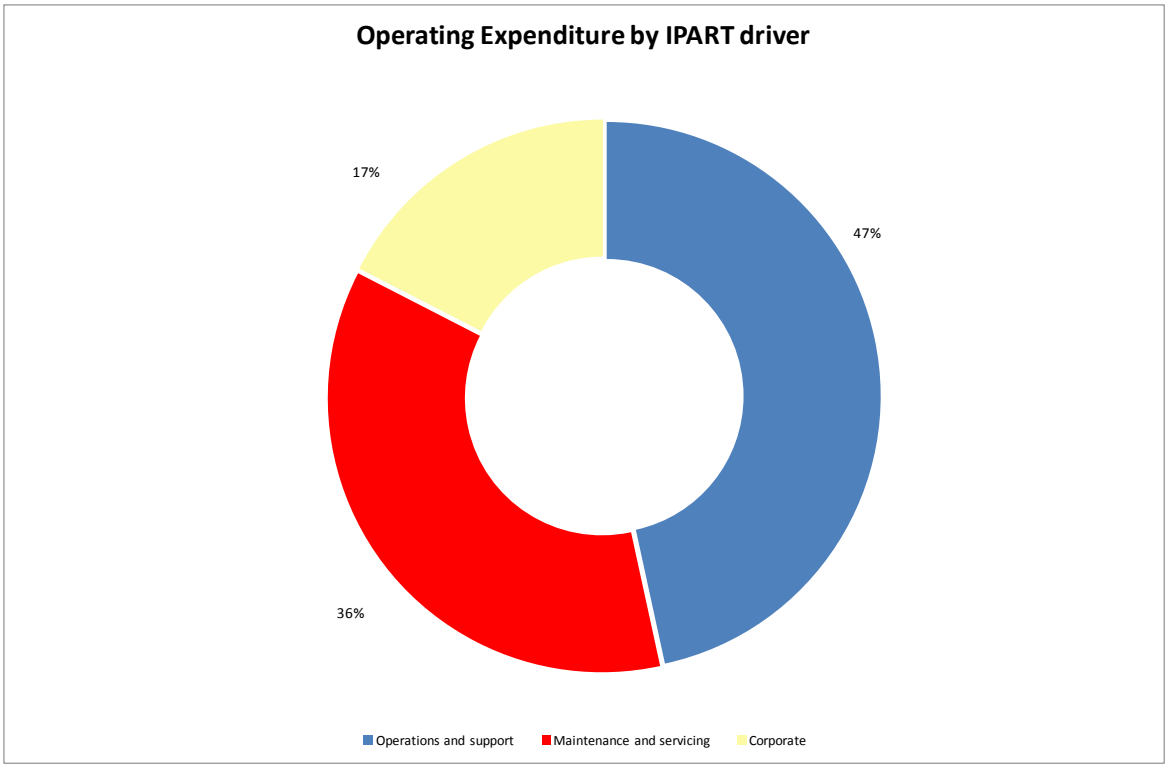


Figure 3.4 Operating Expenditure by IPART Driver

3.5 Business Systems & Processes

The quality, extent and application of the Sydney Water business systems provide an important measure of the effectiveness of the business and the potential for leverage of further efficiencies over time. We list the key business systems and their current status in Table 3.1.

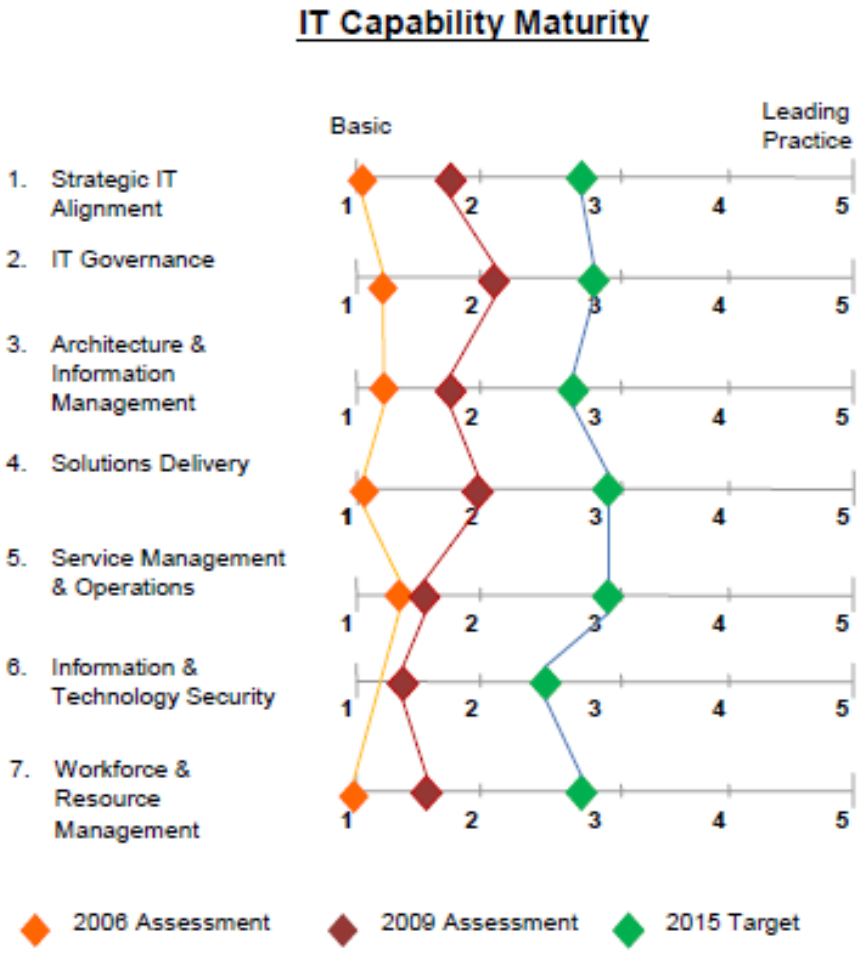
Functional Area	System	Last updated	Comments
Finance and Regulatory	Financial Management Information System (FMIS)	2012	Financial management and reporting using PeopleSoft packages: includes General Ledger, Fixed Assets, Project costing, billing, expenses
Customer and Community Relations	ACCESS provides customer billing, invoicing, payment processing and credit collection	Platform upgrade in 09/10	Custom application managed 'in house'. Minor enhancements planned.
Customer and Community Relations	Customer Management System which replaced C-View	2011	Now at Phase 1 with options for further phases. Upgrade post 2016
Maintenance Asset management	MAXIMO works management for civil, mechanical, electrical and asset management	In place 2011/12	Upgrade post 2016

Functional Area	System	Last updated	Comments
Maintenance	Field Resource Management (FRM) for job scheduling and despatch. Enables the delivery of reactive and programmed work orders to field personnel who report back on progress	2008	FRM now rolled out to all maintenance teams
Operations	LIMNOS Water quality reporting and environmental data	2009	Custom application. Further maintenance planned.
Asset Management and CCR	e-Developer for management of new developments	2003	Custom application. Further maintenance planned
Asset Management	Water Modelling System (WMS) for network modelling of water mains	2011	Upgrade planned before 2016
All	HYDRA GIS system for water mains and sewer asset records	2003	Support ended 2007 and managed in house. To upgrade 2013 to 2014.
All	Business Intelligence used for internal data collection, collation and reporting	2012	Managed in house. Minor maintenance planned
All	IConnect intranet which supports a number of applications	2011	Upgrade planned in 2013
All	BMIMS and SWIMS document control systems		
Operations	IICATS for operations resource management		

Table 3.1 Sydney Water Business Processes (Source: Atkins/Cardno analysis)

Information Technology

Sydney Water's 2010 IT Strategy highlights that its capability and maturity level would not be considered to be frontier at the present point in time. A comparison of the current capability against the frontier is shown in Figure 3.5.



Source: Sydney Water 2010 IT Strategy

Figure 3.5 Sydney Water's IT Capability Maturity[3]

Based on the evidence presented to us, we concur with some of the key observations made in Sydney Water's 2010 IT strategy about past performance and we believe that they direct impact on the prudence and efficiency of the Corporation's 2008-2012 IT program. The 2010 strategy highlights issues related to resources, decision making and procurement.

[3] Maturity level descriptions

1. Initial – Frameworks are considered but not always enforced, limited controls, reactive activities, informal processes
2. Repeatable – Processes are being formalised, standards are developed, compliance is sometimes tracked, increasing use of frameworks
3. Defined – Architecture is formalised according to standard frameworks, processes are defined and consistently applied, fundamentals are in place to allow more proactive work
4. Managed – Quantitative management of process performance, process automation in key areas
5. Optimising – predictable processes, significant levels of automation, full continuous improvement, predictable knowledge needs

Resources

The main IT resources are committed to delivering and supporting big system renewal programs and reactive maintenance work. Preventive maintenance activities are given a lower priority. Some IT areas typically targeted for outsourcing due to the commodity nature of the activities are still being carried out in-house. This is unlikely to be optimising business value. In addition, allocation of funding and support resources is not optimised based on the business value that an application provides to Sydney Water.

Sydney Water responded that:

> *The IT Strategy has identified areas including Application Support and Development and Infrastructure for consideration of outsourcing. A review of Application Support and Development is currently in progress. The IT strategy identifies reducing business operating cost by leveraging investments in IT.*

Decision Making

The current "best of breed" strategy has resulted in at least seven different technology stacks. Efficiency of approach is hindered by the complexity brought by the "cottage industry" applications. The current approach meets business requirements but at a higher cost and longer lead time compared with a holistic approach. Despite the progress made, Sydney Water's application landscape remains fragmented and complex. This hinders IT operational efficiency. The business piecemeal approach to IT initiatives has hindered efficient management of internal support.

Procurement

The sourcing strategy has not been fully executed. The resulting "body shopping" approach does not fully leverage third-party capability and capacity to Sydney Water's advantage.

Sydney Water responded to our observation that the method for costing estimates is unreliable that:

> *The previous cost estimating method was ineffective and did not consider factors such as direct operating expenses. A new methodology has been established to address these issues which will result in a more accurate and reliable cost estimation.*

Solution delivery quality has improved although time and costs are yet to be addressed. The current test environment setup prolongs delivery times and has been cited as promoting defects in production[4]. The Company disagreed, stating that:

> *The current testing model and the use of an external testing panel has been very effective in minimizing the level of defects.*

Multiple vendors are engaged across each service area, using various forms of agreement. This results in vendor management complexity due to multiple interfaces between Sydney Water IT and vendors, governance burden from managing different contract types and difficulty in measuring and comparing vendor performance.

Sydney Water responded to the observation that IT process efficiency cannot be measured effectively that:

> *IT process efficiency does contain performance measurement. Service Level agreements exist with the business and are reported on a monthly basis. These reports measure the Service delivery to the business and the process that support them. The IT Service Management processes are all ITILv3 based and were independently assessed as part of the IT Service Management (ITSM) refresh project. Annual self-assessment occurs to measure the growing maturity of the processes.*

[4] Source: Sydney Water's 2010 Strategy

The Corporation has set out a tiered service model to improve IT efficiency through focusing resources and investment on valuable assets for the future. The Corporation explained its IT Investment Planning Cycle shown in Figure 3.6 and described how it has developed a risk-based profile and carried out a prioritisation of projects for the 2012-16 submission.

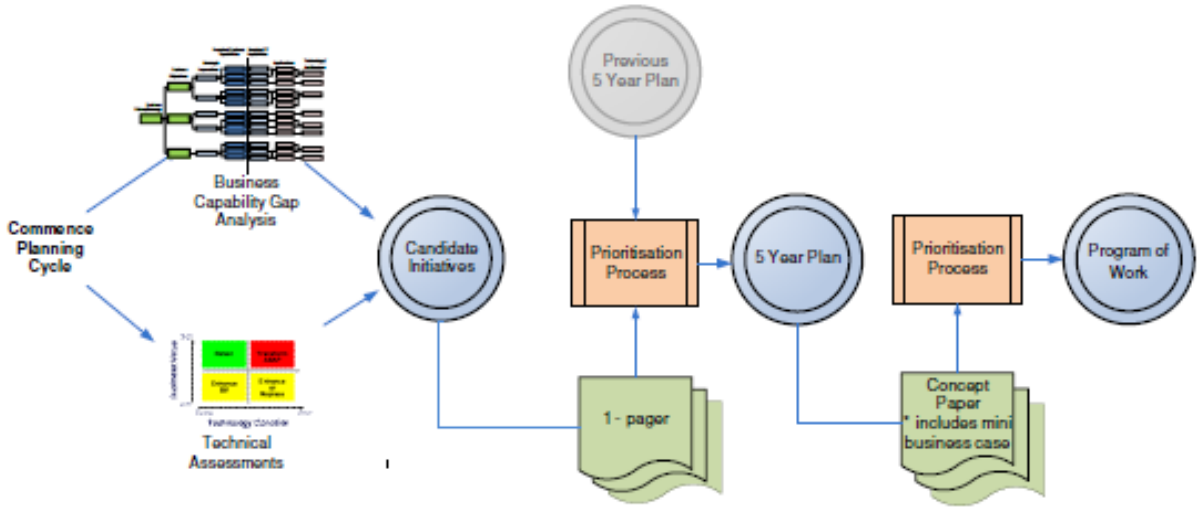


Figure 3.6 IT Investment Planning Cycle - Source: Sydney Water IT Presentation

The Corporation is currently at the Five Year Plan stage in its investment planning cycle. There was a lack of robust supporting documentation presented to us both in terms of methodology documentation, financial data and also business cases put forward for the majority of IT investment. In many cases, the Corporation is only at the stage of producing 'one pagers' with very little or no other supporting documentation and, as their name suggests, they do not address either at all or in sufficient detail the decision making process.

The Corporation responded that:

> *Sydney Water provided detailed information on the methodology. Our process does require detailed business cases for projects in the 1 year Program of Work; it does not require detailed business cases for projects in 5 year plan. The 1 year Program of Work is reviewed on a regular basis.*

While we recognise that this may be Sydney Water's process, we do not believe it is fit for purpose to justify the proposed capital expenditure in its IPART submission. In other areas of capital expenditure, e.g. the Water or Wastewater, the Corporation provides robust supporting documentation for planned activity over the 2012-16 period. We would expect the decision making process for the IT program to similarly address the need and scope of project, the planned project budget, program and outputs, the options considered in the appraisal and the appropriate prioritisation and timing for the scheme. We would also expect to see the assessment of the project outcomes and contribution to Sydney Water's capital program drivers. The decision making process should also address program, outputs, uncertainties and risks and achievability of the program. We formed the view that the IT investment planning cycle does not appear to be aligned with Sydney Water's business planning process; it is not sufficiently developed to justify all of the proposed expenditure.

3.6 Cost Allocation

Sydney Water has implemented a new methodology to apportion operating expenditure to product and activity. This Regulatory Cost Model (RCM) process was implemented from 2009/10 and superseded the previous activity based costing approach. The RCM approach uses a 'bottom up' methodology where information for cost allocation is provided by line managers. Where possible the RCM process assigns the directly-attributable costs to the designated product and service. The direct allocation of costs is dependent on the level of disaggregation and confidence within each Division. The reliability of data depends on the staff within each Division and consistency across Divisions.

The shared or common costs such as planning, administration, financial management IT, human resources and property costs, where these cannot be directly attributable to a product, are allocated to the core water, wastewater and stormwater products in proportion to the direct costs.

For ease of analysis and to be consistent with the Brief, we have grouped these activities into Operations, Maintenance and Corporate. The mapping of functions to these principal activities is shown in Table 3.2.

Primary Function	Function	Activity
Operations	Customer Services	Customer Billing, Metering Customer Contact and Compliance.
	Operations	Operation of treatment works, distribution networks, sewerage systems, biosolids disposal
	Sustainability	Demand management, science and Technology, Research and Development, Environmental planning and management
Maintenance	Maintenance	Planned and unplanned maintenance of Renewal and Replacement
	Asset Management	Strategic Asset Management, Asset Planning, Investment Program Manager, Urban Growth, Property Services, Stormwater, Recycled Water.
	Asset Solutions	Design, Program Management, Procurement
Administration and Overheads	MD / Company Secretary	Strategy, Governance
	Finance and Regulation	Business Planning, Financial Control and Accounting, Treasury, Regulatory Strategy and Reporting
	Human Resources	Operations, Recruitment, Industrial Relations, training
	Corporate	Shared Services, Corporate Risk and Insurance , Legal, Information Technology, Business Improvement

Table 3.2 Allocation of Activity Codes to functions (Source: Atkins/Cardno analysis)

Sydney Water comments that this approach gives greater ownership of data than the previous activity based costing.

Operating expenditure analysis for years 2009 and 2010 are not available from the RCM and detailed analysis by product and activity were not available. Sydney Water provided a comparison of the RCM and ABC approaches for 2010.

Sydney Water has not allocated common or shared costs to recycled water activities, both regulated and non-regulated and only the marginal costs are allocated. With the significant increase in recycled water costs, which are greater than stormwater opex, from 2011/12 due mainly to the Camellia project there is a case to share the common costs across all products.

Transfer of Costs between the regulated and non-regulated business

The RCM process allows separation of costs between the regulated and non-regulated business. The main areas of non-regulated business are parts of the recycled water program.

Drivers of Capital Expenditure

The RCM process allows separation of costs between the regulated and non-regulated business. The main areas of non-regulated business are parts of the recycled water program.

Function	Activity
Maintain mandatory standards	Expenditure to maintain assets to deliver current Operational Licence standards
New mandatory standards	Expenditure to meet new environment or licence standards
Growth	Expenditure to meet demand from new customers
Government Programs	Projects undertaken under Government Direction
Business Efficiency	Expenditure which is shown to be deliver clear efficiencies to the business

Table 3.3 Capital Expenditure Drivers (Source: Sydney Water)

3.7 Conclusions

Our review has focussed on the business management processes and systems in place, under improvement or being developed to make the decisions on how to invest in and maintain assets. This informs us of the scope to lever efficiency savings in the future price path.

We noted a marked improvement in planning systems and processes since we undertook the efficiency review in 2005. A comprehensive asset management framework is in place and confirmed from our Asset Management Audit. The development of an asset management framework and the new processes and systems for planned maintenance provide the opportunity for a comprehensive risk-based approach to asset management and the potential to drive further efficiencies. This enables a debate on the level of risk, performance and charges to customers.

Water demand has been successfully reduced during the drought which has given headroom in the network to meet future growth in demand. This has enabled significant current-period expenditure to promote water efficiency to be scaled back.

Performance against the Operating Licence measures has been good and there have been reducing trends in non-compliance against environmental standards. This is good for customers in terms of service levels, although we question whether a low risk and higher cost approach has been taken which results in bills being greater than may be necessary. Asset performance in terms of, water quality, mains bursts and sewer chokes suggests that the serviceability of assets is stable or improving. To us, this is a sign that the level of proactive capital and operating expenditure to maintain assets may be greater than it needs to be. This influences our view of capital expenditure which we discuss in Section 7.

Sydney Water presented a detailed submission for the price review. This included estimates of operating and capital expenditure required to meet its obligations. Sydney Water has used its asset management and investment planning processes to develop a detailed capital program. Operating expenditure is based on the influence of external factors, proposed efficiencies and changes in balance of maintenance work. While this is consistent with good practice, we saw limited evidence of a structured business plan approach. Our experience with other utilities shows that our Frontier Company would follow a rigorous business process and, for example, test the sensitivities of alternative scenarios, including 'level prices' and the impact on asset serviceability, customer performance and level of risk.

There was some evidence of a long-term investment strategy although it was not comprehensive. Indicative long-term plans and the reasoning behind them would have helped us appreciate better the place of Sydney Water's immediate capex plans in the long-term context.

This provision of a long-term investment strategy is considered by IPART as an essential element of the efficiency review so that the medium term can be seen in relation to long term plans. The Submission expenditures can be set in an overall strategy to meet the external and internal pressures on the business. Without such a long term view, it is difficult to set the Submission into the long-term vision.

We consider effective long-term investment plans and a more rigorous business plan process would deliver efficiencies both in capital and operating expenditure in the medium and long-term. These findings influence our views on operating and capital and expenditure which we discuss in Sections 6 and 7.

4. Asset Management

We have taken an overview of Sydney Water's Asset Management framework and processes having regard to the condition of assets, the definition of renewal requirements and the scope for reducing or re-phasing expenditures. We also comment on the processes used to manage capital projects to minimise costs over the life of the assets. Our assessment of the effectiveness of these processes has been used to derive the likely efficiencies to be applied to the capital expenditure proposals in the Sydney Water Submission.

4.1 Audit of Framework

As part of this consultancy we undertook an audit of Asset Management Obligations in Sydney Water Corporation's 2010-2015 operation licence. The audit found that Sydney Water fully complied with the audited clauses, namely:

- Clause 3.1.1 Managing assets
- Clause 3.1.2 Asset management framework

We found that asset management practices, supporting systems and documentation within Sydney Water were well developed, robust and mature. These practices had been refined over a number of years and Sydney Water indicated that there practices would continue to be refined as the organisation sought to further improve its performance. The audit report highlighted a number of notable asset management practices and also listed some potential asset management improvements.

4.2 Asset Base

Sydney Water owns infrastructure with a current replacement cost of over $44 billion and a written down value of over $32 billion (based on a MEERA Valuation) Table 4.1 summarises the extent of this asset base.

Service	Value	Units	Current Replacement Cost ($M)	Written Down Value ($M)
Water Supply				
Water mains	21,015	km	11,588	7,048
Critical	4,800	km		
Non-critical	16,200	km		
Reservoirs	265	No.	2,135	1,222
Water pumping stations	171	No.	344	148
Water treatment plants	5	No.	357	201
Water treatment plants - finance leases	4	No.	105	103
Recycled water assets				
Recycled water mains	444	km	215	195
Critical	107	No.		
Non-critical	370	No.		
Reservoirs	5	No.	30	21
Pumping stations	8	No.	15	13

Service	Value	Units	Current Replacement Cost ($M)	Written Down Value ($M)
Treatment plants	4	No.	101	99
Wastewater				
Sewer mains	24,022	km	20,624	17,962
Avoid-fail	2,130	km		
Plan-to-repair	21,892	km		
Sewage pumping stations	670	No.	755	432
Storage units			735	650
Sewage treatment plants	29	No.	3,824	2,167
Deep ocean sewer outfalls	13	No.	602	478
Stormwater				
Stormwater drains	440	km	1,980	1,122
Other				
Other system assets			296	85
Adjustments			382	315
Easements			23	23
			44,111	**32,284**

Source: State of the Assets Report 2009-10, Sydney Water – Fixed Assets Summary 30 June 2011

Table 4.1 Asset Base

4.3 Asset Condition & Performance

A summary of asset condition is listed in Table 4.2. This table indicated that the majority of Sydney Water's assets are in a fair to very good condition.

Asset category	Very Good	Good	Fair	Poor	Very Poor
Water Supply					
Water mains	85.6%	9.9%	2.3%	1.7%	0.4%
Critical	85.5%	10.0%	2.3%	1.7%	0.4%
Non-critical	86.5%	9.3%	2.3%	1.6%	0.4%
Reservoirs					
Civil	2.0%	29.0%	54.0%	14.0%	1.0%
Mechanical	0.0%	33.0%	64.0%	3.0%	0.0%
Electrical	2.0%	56.0%	41.0%	1.0%	0.0%
Electronics	16.0%	55.0%	17.0%	2.0%	0.0%
Water pumping stations					
Civil	24.0%	63.0%	12.0%	1.0%	0.0%
Mechanical	20.0%	30.0%	45.0%	5.0%	0.0%
Electrical	21.0%	43.0%	29.0%	6.0%	1.0%
Electronics	21.0%	58.0%	14.0%	6.0%	1.0%
Water treatment plants					
Civil	0.4%	47.5%	49.2%	2.9%	0.0%
Mechanical	0.6%	33.0%	60.6%	5.0%	0.8%

Asset category	Very Good	Good	Fair	Poor	Very Poor
Electrical	2.5%	44.4%	50.6%	2.5%	0.0%
Electronics	1.4%	44.9%	50.2%	3.4%	0.0%
Wastewater					
Sewer mains					
Avoid-fail	91.0%	5.0%	3.0%	1.0%	1.0%
Plan-to-repair	45.0%	41.0%	9.0%	4.0%	1.0%
Sewage pumping stations					
Civil	15.0%	38.0%	44.0%	3.0%	0.0%
Mechanical	28.0%	28.0%	39.0%	5.0%	0.0%
Electrical	63.0%	24.0%	10.0%	3.0%	0.0%
Electronics	85.0%	14.0%	1.0%	0.0%	0.0%
Sewage treatment plants					
Civil	27.0%	37.0%	30.0%	5.0%	0.0%
Mechanical	5.0%	51.0%	34.0%	8.0%	3.0%
Electrical	5.0%	46.0%	38.0%	8.0%	3.0%
Electronics	4.0%	40.0%	41.0%	14.0%	2.0%
Stormwater					
Stormwater drains		78.4%	16.4%	5.3%	

Source: State of the Assets Report 2009-10

Table 4.2 Asset Condition

Table 4.3 lists Sydney Water's asset performance against its operating licence. This table show that Sydney Water's performance is well within these operating licence limits.

	Licence standard	Performance 2010/11
Water supply		
Number of properties experiencing a pressure of less than 15 m for a continuous period of 15 minutes	6,000	832
Properties experiencing unplanned water interruptions exceeding 5 hours	40,000	26,205
Properties exceeding 3 or more unplanned water interruptions exceeding more than 1 hour	14,000	5,305
Sewerage		
Properties experiencing an uncontrolled sewage overflow in dry weather	14,000	9,158
Properties experiencing 3 or more uncontrolled sewage overflows in dry weather	175	30

Table 4.3 Operating Licence

4.4 Data Sources and Quality

Effective asset management requires good quality knowledge of the extent, condition, performance, and lifecycle cost of the asset base in order to make informed decisions on asset investment and for optimising asset maintenance and renewals.

Sydney Water has well developed systems for recording asset attributes, location and criticality. The primary systems are Maximo (facility assets) and Hydra (GIS) for linear assets (pipes and fittings). These systems are linked. A financial asset register also exists. Processes exist to maintain the currency and reliability of the data stored.

The primary data sources include IICATS (operational data), Maximo (maintenance management) and Hydra (GIS). Asset management procedures are stored in PAMS. Controlled documents are stored in BMIS while records and uncontrolled documents are stored in SWIM. Sydney Water has invested in Business Object, a business intelligence software that allows staff to better analyse data from a range of sources within the Corporation.

4.5 Processes and Systems

Sydney Water has an integrated planning framework that incorporates corporate strategy and planning, business planning, asset planning, program and project management and financial management. There is a high level of inter dependency between the various planning documents and processes which includes both a 'top down' and 'bottom up' approach to planning. The 'top down' approach considers high-level strategic issues while a 'bottom up' approach provides a detailed understanding of asset capability, condition and performance and their ability to meet existing and future service requirements.

Sydney Water has developed a series of processes, systems, practices and plans that aim to ensure that its assets are optimally delivering the services demanded by regulators and customers. Together there form the strategic framework for asset management

Key elements of the framework include:

- Asset management policy;
- Asset management processes;
- Asset plans;
- Decision support tools;
- Risk management framework;
- Quality management system;
- Competencies; and
- Benchmarking and continuous improvement.

The asset planning process is illustrated in Figure 4.1.

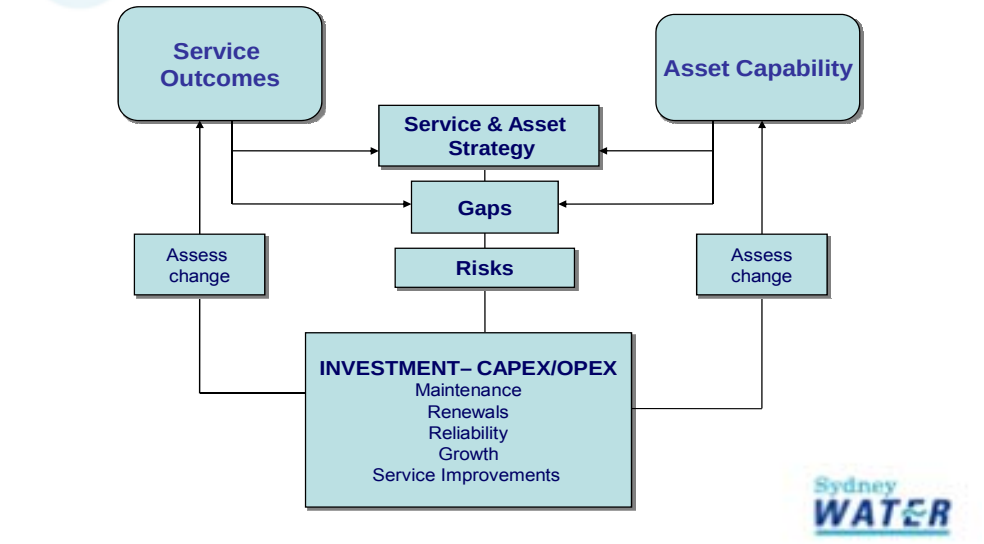


Figure 4.1 Asset Planning Process

The asset planning process and outcomes are documented in a suite of plans as outlined in Figure 4.2.

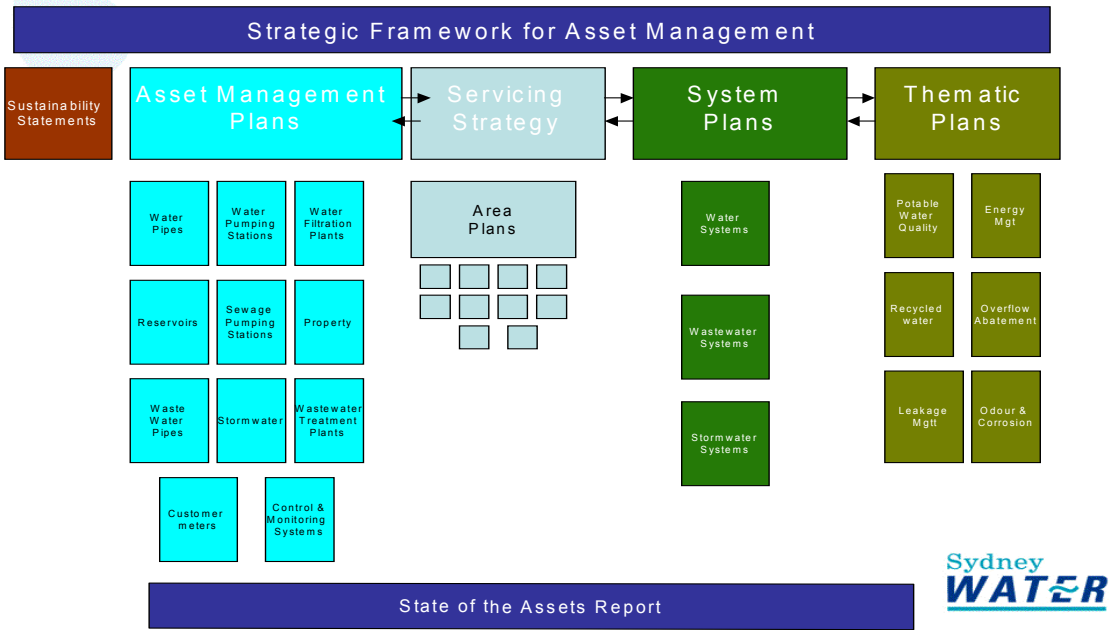


Figure 4.2 Integrated Set of Asset Plans

4.6 Risk Management

Sydney Water has a structured Risk Management Framework which is applied throughout the organisation to assess the relative importance of identified gaps and risks. Risks are prioritised to identify these that are unacceptable and require risk mitigation action including maintenance and renewals.

Risk assessments are carried out at strategic, divisional and operational levels:

- Strategic risks are higher order risks, tend to be long term in nature and impact on the future direction of Sydney Water;
- Divisional risks are lower order risks, then to be short-term in nature and focus on the business and operating environment; and
- Operational risks are identified in day to day business operations, capital investment planning and managing projects and contracts.

For most asset categories an assessment is made on the criticality of the asset based on the consequences of failure. High criticality risks such as large diameter water main sewers are managed on an 'avoid-fail' basis while less critical assets such as reticulation mains are managed on a run-to-fail basis. We observed that capital investment decisions were prioritised based on risk.

4.7 Investment Appraisal

Sydney Water has a well developed capital investment process, which includes the following stages:

- Needs identification. Capital investment needs are identified by Business Units using forward plans. These forward plans include:
    - Area servicing strategies, layout and staging plans;
    - Precinct and local service plan;
    - Growth servicing plan;
    - Asset management plans;
    - System plans which assess existing asset condition, performance, capabilities and needs in existing area; and
    - Service improvement strategies (e.g. leakage, pressure)
- Assessment of Capital Project/Program Value and Risk. Proponents wishing to include their projects on the capital program complete a scoring template. This template scores the project value against Sydney Water's corporate objectives and assesses the risk of deferring the project by 12 months;
- Capital Program Prioritisation. Key steps in prioritising the capital program includes:
    - Using the Optimiser Tool to prioritise projects based on value and risk;
    - Modelling a range of scenarios (e.g. capital budget limits);
    - Reviewing the ability to deliver the proposed program; and
    - Review and approval of the prioritised program by the Executive Team and the Sydney Water Board.

- Sydney Water has a 5-year rolling Capital Investment Program (CIP) with an approved projects/programs for year 1 and indicative program/projects for years 2 to 5.
- Business Case. A business case is required at key decision points (gateways) in the project, with progressively more information required as the project progresses. Independent (pink slip) reviews of business cases carried out.

  The development of robust and rigorous business cases is facilitated through having appropriate templates. A consistent approach to cost-benefit analysis is achieved through use of Econ 8 and Excel spreadsheet that allows staff to analyse and compare costs and benefits of up to 8 project options. The selection of the optimal solution is based on NPV and multi-criteria analyses

We found that Sydney Water has well developed processes to identify investment needs for growth and service level improvements, identify and assess options and assess the timing of investment options.

4.8 Control and Approvals Processes

Sydney Water's control and approvals processes are documented in its Capital Project Delivery Management System Quality Manual and supporting procedures.

The Sydney Water project lifecycle includes a number of key decision points including:

- Agreeing on the capital investment strategy;
- Approving funds for project development (initial Business Case);
- Agreeing on the preferred option;
- Approving the Project Procurement Strategy; and
- Approving funds for design, construction and commissioning (full Business Case).

All projects require a business case which is independently reviewed for robustness (known as the 'pink slip'), prior to being submitted for approval.

Business cases for all projects are written using one of the standard templates available, or a template associated with an approved Decision Framework. Delegation for approving project funding is set out in Sydney Water's Delegations Manual. However, the following types of projects require endorsement for the Financial Performance and Review Committee (FPRC) or Information Technology Steering Committee (ITSC) prior to approval:

- Any project to be approved by the Managing Director or Board;
- IT capital projects costing $2,000,000 or more (ITSC);
- Operating projects costing $250,000 or more;
- Variations to business cases originally endorsed by the FPRC or ITSC.

The FPRC assists the Managing Director and General Managers assure that the investment expenditure is prudent and efficient as defined in the FPRC Charter.

4.9 Cost Estimating Process

Sydney Water uses a range of cost estimating techniques depending on the overall assessment of the project's risk and the gateway Approval stage. The techniques are summarised in Table 4.4.

Gateway Approval Stage	Cost Estimating Technique
Project initiation	Methods range from the use of unit rates through to first principle
Preferred option	Ranges from unit rates and first principles through to risk-based cost estimating

Table 4.4 Extent of Outsourcing 2010-11

Cost estimates at the project initiation and options analysis (low/medium risk projects) are estimated using Sydney water's in-house estimating system. This system is an MS Excel based system containing standard construction/ asset items and unit rates prepared by the Asset Solutions Group. Where rates are not available they are separately sourced or derived from industry sources. The contingencies applied range from 40% at the pre-initiation phase to 25% at the options analysis stage.

First principles cost estimating is undertaken by external consultants. The contingency applied may be the same as applied for the unit rates for the appropriate phase of the project or could be risk-based.

For higher risk projects risk based costs estimating is undertaken by external consultants with the estimates expressed as the percentage chance of the project cost not exceeding a prescribed acceptable level (e.g. a P_{80} estimate is an estimate which has 80% confidence that the cost will not be exceeded). Sydney Water's Business Case Template for Large Projects indicates that the estimate should be presented as a P_{80} with a P_{50} estimate included for noting.

Table 4.5 summarises Sydney Water's approach to contingencies in comparison to the NSW Government Procurement Guidelines *Draft* Capital Project Estimating (for Construction, 2006):

NSW Guideline Phase	Equivalent Sydney Water Phase	NSW Guideline Contingency Range	Sydney Water Contingency Applied
Indicative estimate	Project initiation	15 – 50%	40%
Preliminary estimate	Preferred option	15 – 25%	25%
Budget	Business case	10 – 15%	25% (initial Business Case)

Table 4.5 Application of Contingencies

Sydney Water has applied an appropriate level of contingencies or risk-based estimates at the project planning phase although it would be expected that the level of contingencies are reduced in later iterations of the business case. However, when these estimates are applied at the program level we consider that the overall program cost may be over-stated, particularly if the project estimate is a P_{80}. Sydney Water advised that the 2012-16 capital program incorporates contracted and un-contracted estimates using P_{80} and P_{50} estimates. Our review suggested that the estimates used at the planning/business case stage may over-state actual costs and cost savings can be achieved during the

project development stage. For instance the presentation on critical water mains renewal provided the following figures for a program of works:

Budget	$133.7m
Target out-turn cost	$109.9m
Actual out-turn cost	$95.0m

These savings were achieved through value management ($23.8m) and procurement ($14.9m).

4.10 Procurement

Sydney Water outsources a significant amount of its activities. Table 4.6 lists the extent of outsourcing.

Activity	Total Expenditure ($M)	% Outsourced
Infrastructure planning	94.6	47.5%
Asset delivery	474.7	95.2%
Operations	504.9	75.4%
Maintenance	278.8	54.8%
Customer management	82.7	38.6%
Corporate services	13.5	25.5%
Finance	7.6	1.3%
IT	130.5	78.5%

Table 4.6 Extent of Outsourcing 2010-11

Sydney Water has undertaken the bundling of contracts to gain efficiencies. Since 2000/01 the number of CAPEX projects awarded has reduced from over 120 to less than 20.

The delivery model selected is based on risk and opportunities. The most suitable delivery models are shortlisted using a suitability matrix and the most suitable method selected using multi-criteria analysis.

Table 4.7 lists the types of delivery models used by value of contracts (Note: Much of the design and construct asset delivery was associated with the desalination plant).

Delivery Model	%
Alliance	50%
Design and construct (D&C)	33%
Design, build, operate, maintain	16%
Engineering, procurement, construct and maintain (EPCM)	1%

Table 4.7 Delivery Models

As part of the audit of Asset Management Obligations we were required to consider whether the use of Alliance procurement methods leads to the lowest life cycle in comparison with other procurement methodologies. We concluded that the practices adopted by Sydney Water for the selection and management of Alliances included many features of good practice widely used in industry including consideration of alternative procurement methodologies, documentation of procurement advisors to advise on the set up and management of Alliance and use of independent estimators to validate Target Out Turn Costs. However, when compared to best practice there is scope for improvement. During the audit we identified improvements which Sydney Water should consider adopting. We noted that Sydney Water was already seeking to investigate a number of these improvement opportunities.

During the audit we identified improvements which Sydney Water should consider adopting. We noted that Sydney Water was already seeking to investigate a number of these improvement opportunities. Potential improvement opportunities include:

i. Undertaking the planned review of best practice Alliance procurement practices in the United Kingdom and determine the extent to which those practices may be applied for procurement at Sydney;

ii. Undertaking further reviews to determine the reason for apparent cost differences between the NetWorks Alliance, Sydney Water Civil Projects Group and delivery of similar projects elsewhere;

iii. Continuing to seek other opportunities to benchmark the costs of different procurement models and strategies to validate procurement model and strategy selection decisions. Sydney Water advised that a benchmarking project is being conducted with four water utilities and two electrical and gas utilities;

iv. Considering of the findings of benchmarking studies / cost investigations when reviewing the NetWorks Alliance and making decisions about major procurement strategies and the amount of work delivered via the Sydney Water Civil Projects Group;

v. Considering undertaking trials of more extensive use of Design and Construct methodologies and / or other methodologies which have possible cost advantages relative to Alliances for routine work currently undertaken by Program Alliances;

vi. Including price or expected cost as an explicit criteria in all procurement model, strategy selection and major procurement contract approval decisions (with the possible exception of Alliances with substantial complexity or difficult to define risks);

vii. Where non-cost criteria are used for procurement model and major contractor selection decisions, seeking objective data to validate the weighting and scoring of those criteria. Sydney Water have advised that they now have a planned project to review price and non-price criteria and weighting model;

viii. Implementing reviews of cost and performance of procurement strategies and models against initial cost and performance expectations and use of the results of the reviews to strengthen the validation of procurement model decisions. A project has commenced to compare actual vs predicted cost estimates for a number of past projects and project types;

ix. Developing consistent definitions for cost categories such as direct costs, indirect costs and program management costs; and

x. Ensuring that Project Management Office and other overheads are appropriately allocated for Alliances, work undertaken by the Sydney Water Civil Projects Group and any other delivery mechanisms to facilitate cost comparisons.

4.11 Program Management

Effective management of the capital program is an essential element for efficient and timely delivery. We have previously discussed investment appraisal, project estimating and procurement. The program management function complements these processes by monitoring, reporting and managing variances in cost and time.

Sydney Water's program management processes are documented in its Capital Project Delivery Management System Quality Manual and supporting procedures.

Through our scheme reviews we formed the opinion that Sydney Water had well developed processes for managing its capital investment program and has successfully delivered capital investment programs averaging $750M pa and reaching a peak of $1.8 billion in 2008/09.

4.12 Benchmarking

We have carried out some broad comparisons of the performance and costs associated with Sydney Water's service delivery from 2004/05 to 2009/10. *The National Performance Report 2009-10 – Urban Water Utilities*, *National Water Commission, 2011* has been used as the basis for the comparisons. In the case of sewerage breaks and chokes, data from the 2008-09 report was accessed. The comparison has been made with other Australian water utilities classified as major utilities (large). We understand that there are limitations to such comparisons and there are local factors which influence performance (e.g. asset age or ground conditions – the water mains in Perth are in stable sandy conditions which contributes to the low main break rate)

Sydney is by far the largest Australian water utility serving a population of 4.5 million. The median population served by the utilities classified as major utilities (large) is around one million.

The comparisons are illustrated in Figures 4.3 to 4.5 (water supply) and Figures 4.6 to 4.8 (sewerage). Trends for Sydney Water are illustrated in a thick dark line.

Water Supply

Sydney Water's performance in relation to main breaks has improved over the period and is now about mid-range for the comparable utilities. Figure 4.4 indicates that Sydney Water's rate of water loss has reduced significantly and has gone from being one of the highest water loss utilities to being mid-range. There has been an increase in operating expenditure in most utilities over the period with Sydney Water remaining at mid-range at the start and end of the 2004 to10 period.

Sewerage

Sydney Water's rate of sewerage breaks and chokes as declined significantly whereas the performance of most of the other utilities has been at similar levels throughout the period. The data on sewer overflows reported to the Environmental regulator is limited. From the available data it appears that Sydney Water's performance in relation to this indicator is very good. Overall, Sydney Water's operating costs have increased slightly over the period and appear to be lower than many of the other utilities.

General

The limited benchmarking suggests that Sydney Water's asset performance has improved over the 2004-2010 period. The comparisons do not indicate any areas of particular concern.

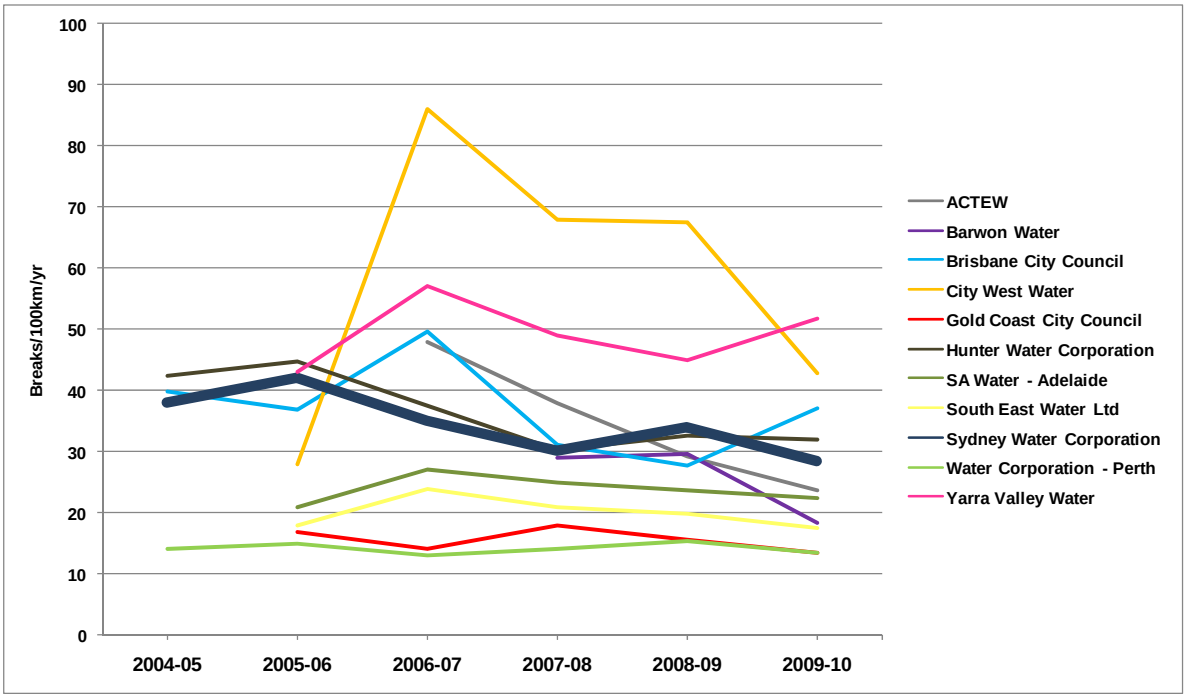


Figure 4.3 Water Main Breaks

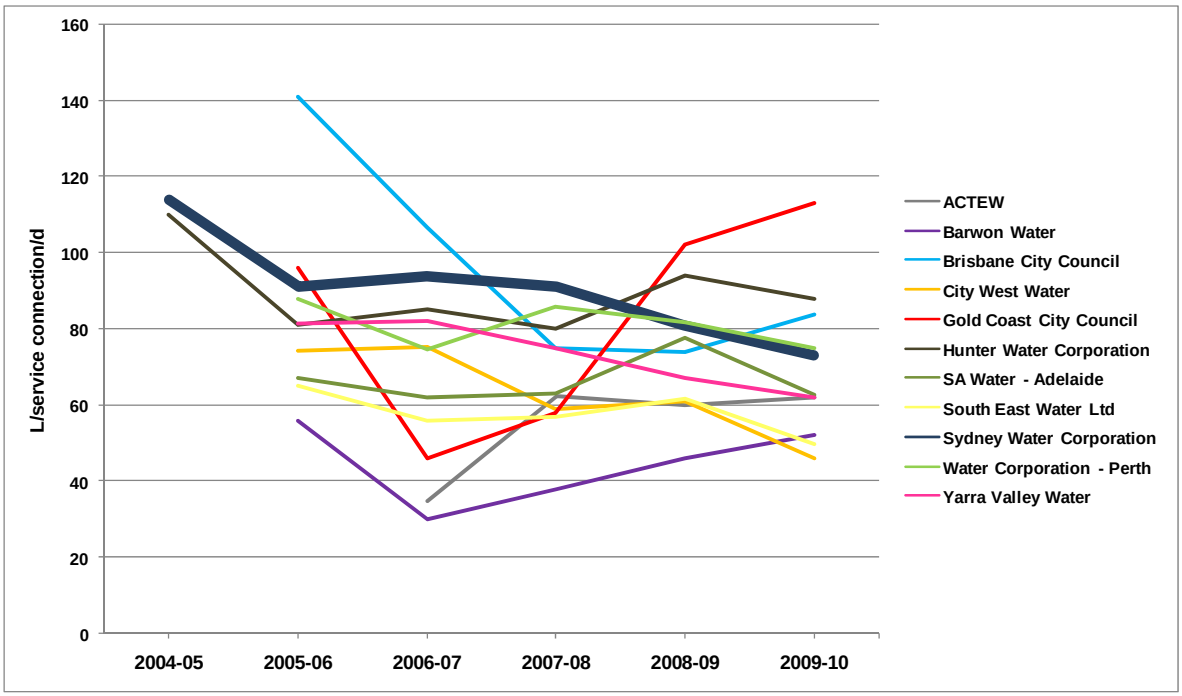


Figure 4.4 Water Loss (L/service connection/d)

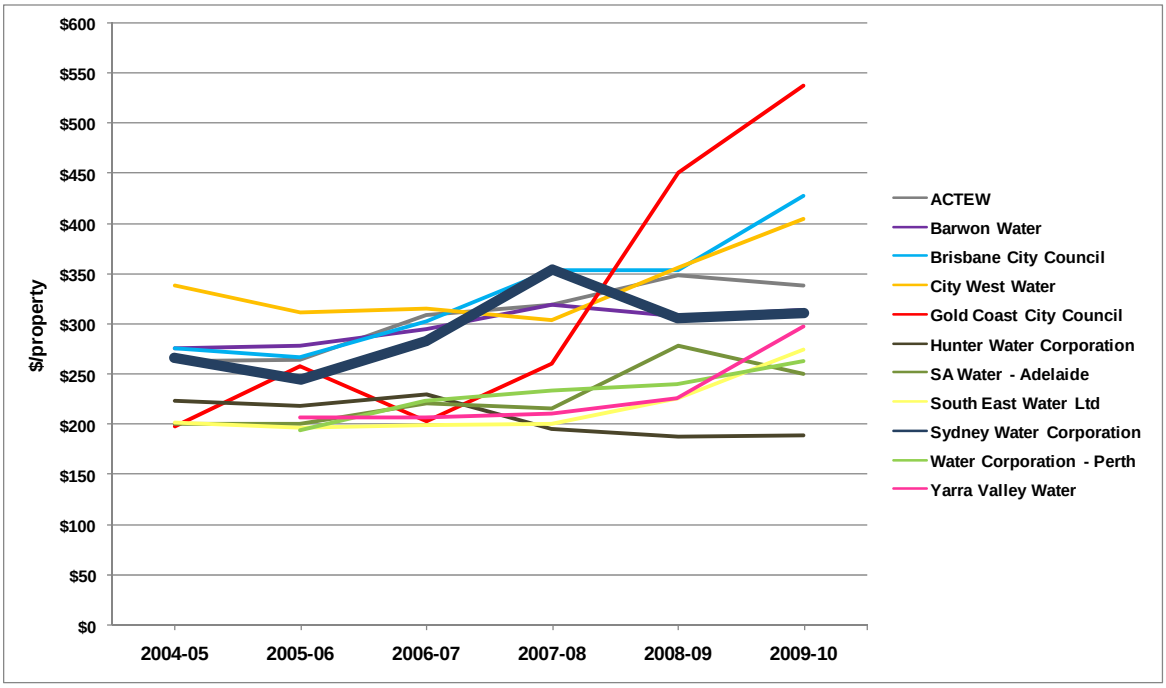


Figure 4.5 Water Operating Cost per Property

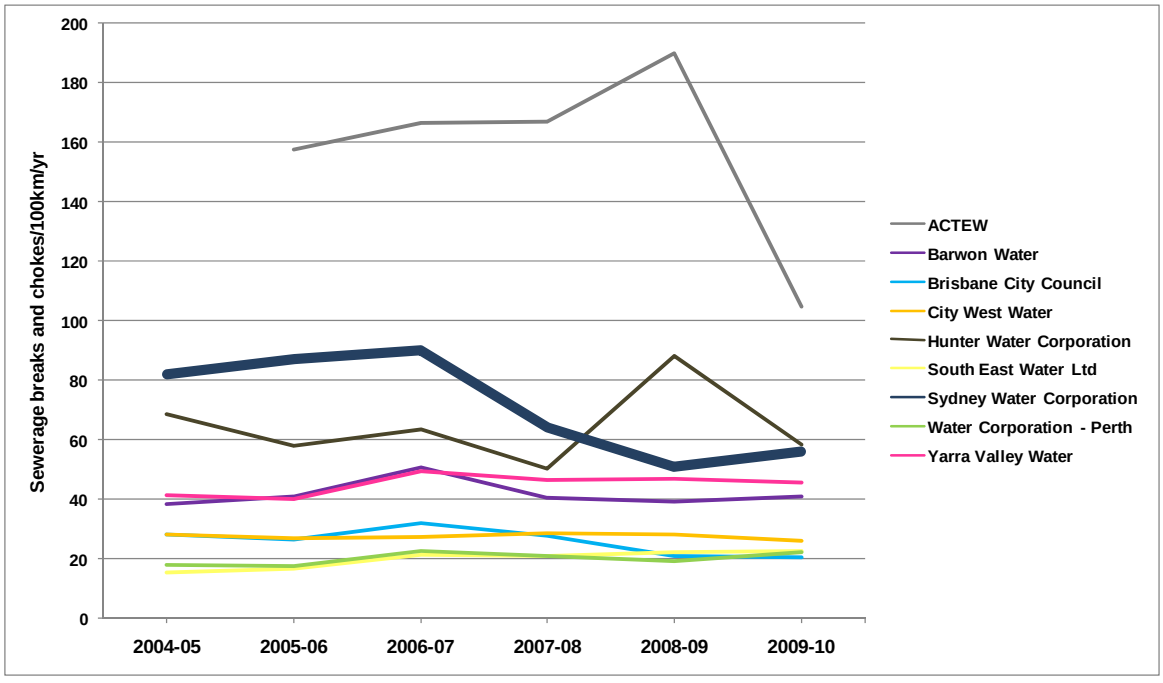


Figure 4.6 Sewerage Breaks and Chokes

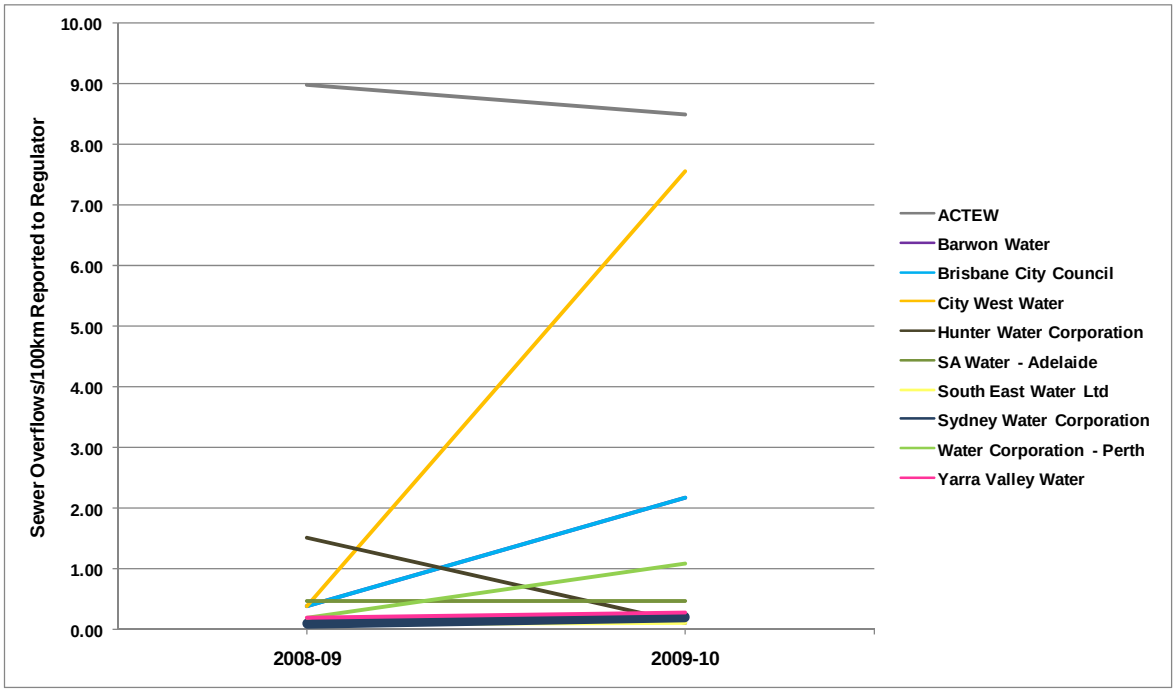


Figure 4.7 Sewer Overflows Reported to the Environmental Regulator

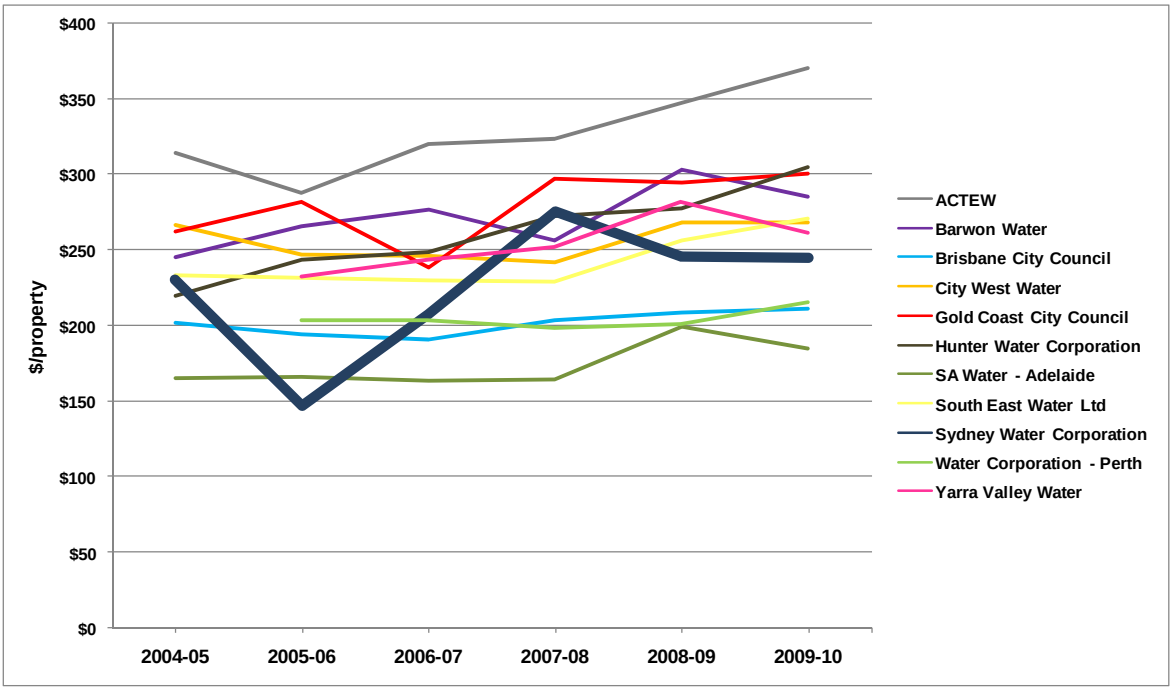


Figure 4.8 Sewerage Operating Cost per Property

4.13 Conclusions

We found that Sydney Water had well developed and robust program, project and asset management practices, supporting systems and documentation. Sydney Water indicated that their practices would continue to be refined as the organisation sought to further improve its performance.

Performance shows a reducing trend in mains bursts, leakage and sewer chokes. For most of the Operational licence measures performance is well below reference levels. This suggests that the ongoing asset replacement work is influencing performance and the risk of breaching these measures is low.

With the asset management processes now in place and the recent enhancements to the planned maintenance processes, there is an opportunity to take a closer look at risk to confirm that this is appropriate in the balance between further investment, performance and charges to customers. There is scope to lever further efficiencies through the closer definition of the scope and extent of work required to maintain performance.

We consider there are opportunities for improvement in the procurement practices, particularly in relation to the use of Alliances. We note that Sydney Water is investigating potential improvements and this should result in efficiency gains in the future.

We formed the view that the Submission, which comprises a range of projects at different stages of development, includes a level of total cost contingency which is greater than is likely for an overall program of work.

Our review suggested that the estimates used at the planning/business case stage may over-state actual costs and cost savings can be achieved during the project development stage.

5. Output Measures

5.1 Output Measures

Efficiency is typically defined as a relationship between inputs and outputs. Typical inputs include capital and labour resources, while typical outputs for a water business include maintaining required standards, meeting customer expectations and growth in demand. A business can be more efficient if it produces the same outputs for reduced inputs. Cost savings that are achieved at the expense of required outputs are not efficiency savings. It is therefore important to include defined and measurable outputs to assess whether a business has achieved the efficiency targets that it has been set. Output Measures are used as a means of monitoring the progress of the water business in delivering its plans. They enable the assessment of prudent expenditure and they allow reporting of variance from targets and are therefore important for future efficiency reviews. The Output Measures are not in themselves targets to be achieved in the price control period as there may be good reasons for variance. The main issue is to be able to identify actual outputs achieved against the related expenditure to provide greater clarity on any efficiency gains.

5.2 Past Performance

Sydney Water has reported on the output measures that were set in the 2008 IPART Determination to track the delivery of the Corporation's capital program over the period from 2008 to 2012. Sydney Water reports that 47% of the target measures have been or will be met, 11% have been exceeded and 42% of the targets were not met[5]:

Water Service

- Renewals of critical water mains – the target of 40 km has been met.
- Renewals of distribution mains – under target by 15% (356km of 420km) – due to effects of pressure reduction program and refinements in decision-making processes resulting in reduced lengths of main identified for renewal.
- Pressure control areas established – over-target by 37% (153 against 112) – due to scheme sizes being smaller than originally anticipated. The same geographical areas have been covered as originally planned.
- Bulk water meters – under target by 25% (150 of 200) – due to change in program to support efficient management of leakage.
- Water Pumping Stations renewals – under target by 61% (11 out of 28) – due to scoping and delivery of projects taking much longer than anticipated and need to defer work to periods of lowest water demand. In additional there was a major focus on improved contingency against power supply failure at various water pumping stations.
- Installation/renewals of SCADA systems – output met (2 out of 2).

[5] Conclusions should not be drawn on the basis of meeting, not meeting or even exceeding output targets. There are reasonable explanations why targets have not been met so it would not be appropriate to draw the conclusion that this was a negative. Similarly, exceeding a target is not necessarily be considered a positive. Each output measure must be assessed on an individual basis.

- Renewal of customer water meters – under target by 36% (272,157 out of 426,000) – due to changes in criteria used for replacing meters and delays from electrical work safety procedures.
- Additional generation capacity installed – output met (9MW out of 9MW).

Wastewater Services

- Renew critical sewers – over target by 4% (57km against 55km).
- Rehabilitate wastewater mains subject to dry weather overflows – under target by 23% (223km out of 290km) – due to the quantity of renewals identified from condition and risk assessment being less than originally planned. In addition some areas require shorter lengths to be rehabilitated.
- Major Wastewater Treatment Plant renewals – North Head completed.
- Wastewater Pumping Stations renewals – forecast to meet target of 100 out of 100.
- Increase capacity at WWTP – under target by 50% (3 out of 6) – Warriewood is forecast for completion by 2013 due to longer than expected project planning and approval stages, completion of Picton is dependent on overall strategy adopted for Hawkesbury-Nepean and licencing arrangements to be determined by OEH and system planning showed that North Richmond has sufficient capacity until 2031.
- Reduce wet weather overflows – under target by one as 6 out of 7 catchments completed – due to results of investigations which identified that work not required.
- Priority Sewerage Program Schemes – over-target by one as six schemes completed.

Recycled Water

- Provision of regulated recycled water services which includes the Replacement Flows project – Completed.

Stormwater

- Complete Alexandra Canal improvements to deliver water quality improvements satisfaction of DECC – Sydney Water is forecasting to obtain approval; the delay in delivering output was due to non viability of original scheme.
- Pipe and channel renewal and rehabilitation – under target by 80% (3km out of 15km) – due to investigations highlighting that approx. 9km not required and further 3.6km delayed due to negotiations with stakeholders and procurement delays.

Desalination

- Construction of 250ML/day desalination plant – Completed in June 2010.

Growth

- The 2008 AIR assumed an increase of 102,000 water and sewerage total properties over the period 2008 to 2012. The 2011 AIR reports actual and forecast total water and sewerage properties have increased by 46,000 and 51,000 respectively. This is effectively half of the output planned in the price control period.

5.3 Measures for Future Price Path

We are proposing the following Output Measures for Sydney Water. These are mainly based on the outputs planned by Sydney Water and have been adjusted to take into account any expenditure re-phased into the next price path. These may need further refinement through the Price Control process.

Output (or activity) Measure	Output
Water services	
Critical water mains renewals	51 km
Reticulation water mains renewals	287 km
Reservoir reliability program	13 reservoirs re-roofed 24 reservoirs re-lined
Water pumping station renewals program	24 pumping stations renewed
System reliability	At least 3 projects in construction phase
Renewal of customer water meters	384,400 meters
Wastewater services	
Avoid fail sewers	64 km
Dry weather flows	137 km
Wastewater treatment plant renewals	HV renewals at 11 WWTPs Major renewals completed at Cronulla, North Head and Malabar
Wet weather overflow abatement	Northern Beaches, Illawarra and Southern catchments completed

Table 5.1 Proposed output measures

The application of the Ofwat serviceability measures applied to companies in England and Wales should be considered to show the linkages between output measures and investment. Serviceability measures can be considered for water mains, sewerage networks and above ground assets such as treatment works, service reservoirs and pumping stations. The approach is to measure serviceability from a basket of existing output measures. From the value and trend of these measures we can assess whether serviceability is stable, improving or deteriorating. An intermediate marginal measure can be used. Thus if the serviceability assessment is stable then the investment to maintain assets would be maintained. Should the serviceability be improving against targets then there is potential to reduce investment. Conversely if the serviceability is deteriorating then additional investment would be required. An alternative would be to report against asset condition.

With respect to stormwater renewals, stormwater assets are currently maintained and prioritised on a condition based assessment. While this appears the most practical measure, we would welcome a more systematic way to capturing preventative and reactive operational maintenance activities (opex), in addition to monitoring capital maintenance spend (capex). In this way, Sydney Water can demonstrate the serviceability (performance) of the assets as well as their condition.

A number of enhancement schemes have been justified on the grounds of environmental or public health benefit. However, the initial cost benefit analyses of these projects, in particular, PSP, but also replacement flows, were not carried out by Sydney Water. It would be useful for Sydney Water to establish baselines for all projects carried out for environmental benefits, even where these are mandatory projects and to monitor the impacts. This will inform future cost benefit analysis.

6. Operating Expenditure

6.1 Methodology

In this section, we present the results of our review of the efficiency of Sydney Water's operating expenditure. We identify the major cost drivers and explain the variances in the current price path expenditure against the 2008 Determination. We comment on the prudence and efficiency of operating expenditure in the 2008 Determination period which is used to inform our view of future efficiency. We comment in Section 3 on the strategic management of the business and the structures and systems used to plan and manage expenditure.

We then make an assessment of an efficient level of expenditure for the period 2012 to 2016, taking into account our discussions with Sydney Water, documents presented and subsequent answers to questions we raised. We note the efficiencies proposed by Sydney Water. We discuss the cost drivers and efficient cost level recommendations for each of the operational areas – operations, maintenance and corporate – and the specific activities contained therein.

The methodology for the review of operating expenditure has focused on an evaluation of:

(i) Historical expenditure for financial years ending 2009 to 2011;

(ii) The current budget for year ending 2012; and

(iii) The projected costs for the financial years ending 2013 to 2016.

The evaluation of operating expenditure was undertaken using Sydney Water's 2011 Submission and supporting AIR and SIR spreadsheets. Our assessment is based on the actual operating expenditure in the Submission, the robustness and confidence of these expenditures taking into account the basis of the estimates and the confidence of the need, timing and scope of the requirements. We also take into account whether additional expenditure proposals have been through the internal approval and challenge processes.

We have interviewed the functional managers, reviewed supporting reports and documents and assessed the current position on the development and implementation of corporate systems used to set budgets, control and monitor costs and allocate expenditure to the IPART expense types.

We have taken particular attention to the efficiency proposals at functional level made by Sydney Water in its submission.

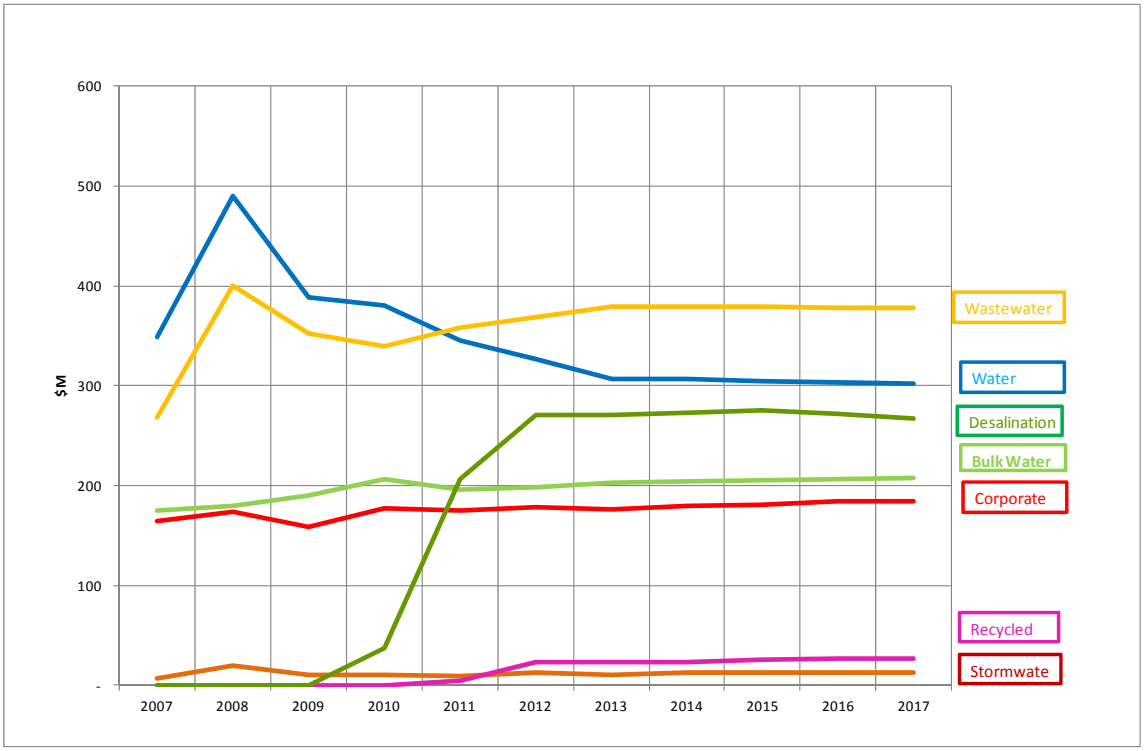
We present our analysis of the future expenditure proposals by Sydney Water and comment for each activity on the potential for efficiencies through the robustness of estimates, the need and timing of expenditure and absorbing of some activities within base opex as a surrogate for the application of internal challenge and budget control.

Our views on future efficiencies are based on the hypothesis of a Frontier Company, the continuing efficiencies that it makes through innovation and technological development and the catch up efficiency required of Sydney Water to achieve the performance of a Frontier Company over time.

6.2 Overview

In the 2008 Determination[6], Sydney Water was set efficiency targets of 0.7% per annum on the assumption that only a proportion of its costs were controllable. This was based on a catch-up efficiency of 1% per annum and continuing efficiency of 0.8% per annum pro-rated to controllable costs. Sydney Water's performance over the current price path has been generally consistent with the Determination. Figure 6.1 below compares actual expenditure over the years 2009 to 2012 with the Determination. The Figure shows expenditure for bulk water and desalination water which are pass-through costs. Forecast expenditure for 2012 shows an increase above the Determination, although after taking into account adjustments for the Rosehill scheme revenue and desalination water supplied, there is no material difference between actual expenditure and the Determination. There is, however, a material increase in expenditure for 2012 related to increased energy, chemical and contractor costs.

Sydney Water has proposed a level of operating expenditure for 2012 to 2016 up to 2.4% above the actual 2012 base year. This is also shown in Figure 6.1 below. This includes additional expenditure driven by external factors such as electricity and internal requirements including further asset maintenance and new IT systems. These are offset by savings; external from, for example, handing over the 'Wastesafe' activities directly to contractors and plumbing inspections to the Office of Fair Trading. Sydney Water has also identified a range of efficiencies on controllable costs. These changes give rise to a 16% rise in Corporate costs offset by reductions of 4% in the operations and maintenance functions.



Source: Sydney Water Submission

Figure 6.1 Sydney Water Actual and Proposed Operating Expenditure 2009 to 2016

[66] Review of Prices for Sydney Water Corporation's Water, Sewerage and stormwater and other services, IPART June 2008.

We report operating costs by the principal activities of the Operations, Customer Services and Sustainability Divisions. The Maintenance function comprises routine and corrective maintenance, asset management planning in the Maintenance and Asset Management Divisions. The Asset Creation Division costs are mainly capitalised and remaining operating expenditure has been included in Maintenance for the purpose of this analysis. The Corporate function comprises Corporate, Financial and Regulation, Human Resources and Managing Director Divisions.

The bulk water charges from the Sydney Catchment Authority and desalination water charges from the Sydney Water Desalination Plant are considered as pass-through costs and do not form part of the efficiency study. It should be noted from Figure 6.1 that the increase in total operating costs over the period to 2016 is almost entirely due to the SDP. Under the Operating Agreement with the SDP, we are advised that the plant will run for its full output for a period of two years to June 2012. Thereafter, should water storage in the SCA dams increase above 80% then the SDP will cease operation. Sydney Water has assumed that the SDP will operate at full output through the whole price path period.

An analysis of operating expenditure by water, wastewater, stormwater and recycled water product is shown in Figure 6.2.

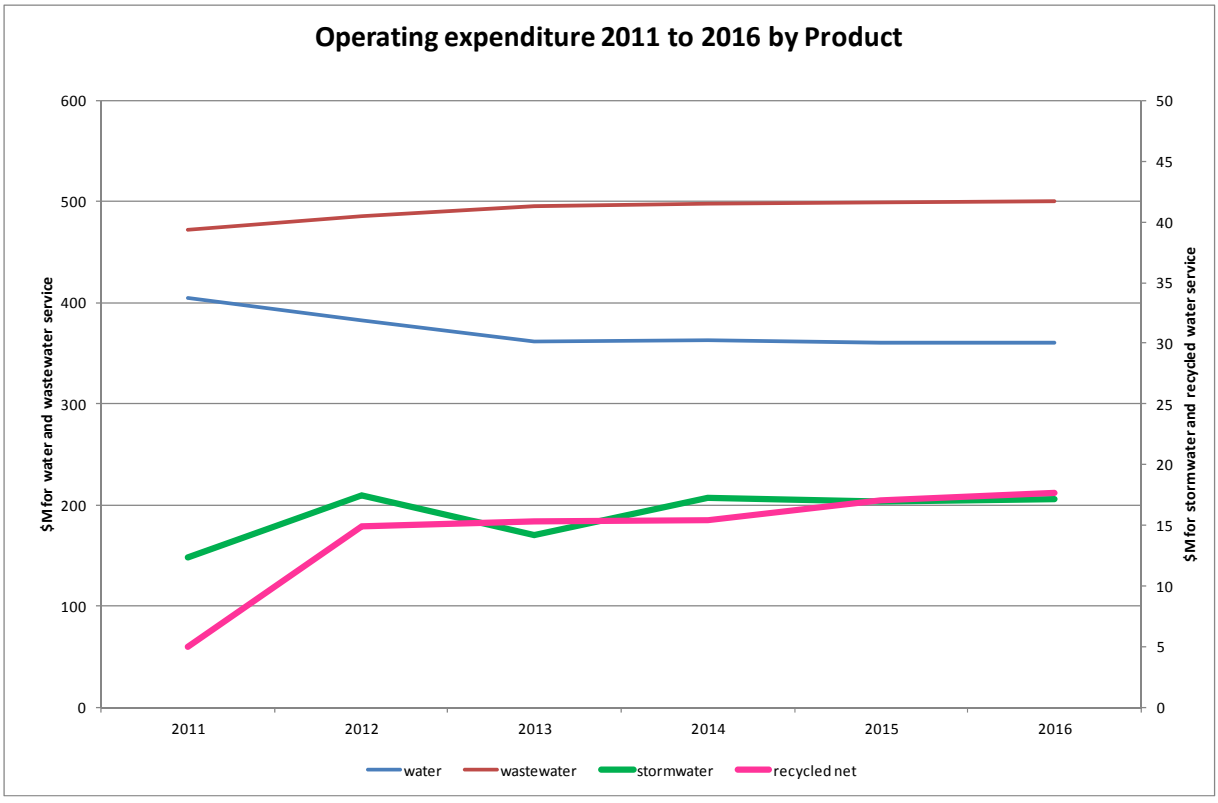


Figure 6.1 Sydney Water Actual and Proposed Operating Expenditure 2009 to 2016 by Product

The water service, which excludes bulk water and desalination water, shows a reducing operating expenditure over the current price path then a small reduction over 2012 to 2016. Conversely the wastewater opex show an increasing trend in the current price path. The reduction in water opex is mainly due to cessation of the Climate Change fund payment in 2012 offset by increasing maintenance costs.

The increase in wastewater expenditure relates to increasing transportation and treatment maintenance costs.

While a relatively small element of total operating costs, stormwater shows a marked increase in operational expenditure in 2012 which continues through to 2016. We understand this relates to additional operations at Rouse Hill. Operational expenditure for purchase of recycled water from the new plant at Camellia from 2012 is the main reason for increasing operating expenditure over the future price path although some of this is offset by revenue from water sales.

6.3 Operating Expenditure in Current Price Path

We are required to comment on the prudence of expenditure in the current price path and identify any areas of expenditure which are not consistent with the definition. We have analysed the operating expenditure by service area or product and identify and comment on material variances. Sydney Water advised us that the new RCM process for allocating opex to activity was implemented from 2011. For the earlier years 2009 and 2010 we have therefore relied on information in the AIR, although there may be inconsistencies in cost allocation between the early and subsequent years. Some of these comparisons may therefore only be indicative.

We have taken actual and forecast expenditure for the current price path from 2009 to 2012 and compared these values with the Final Determination 2008 brought up to the 2012 price base. We have calculated the variance at service level or product level as shown in Table 6.1. We have not been able to disaggregate the variance to sub-functional or Divisional level as Sydney Water has changed the methodology from an activity based cost (ABC) approach to the Regulatory Cost Model (RCM) method. Sydney Water commented that the RCM model is more transparent and provides greater clarity in analysis. While it has shown that there is no material difference with this new methodology it has commented that variance analysis at a disaggregated level is problematical. Sydney Water further said that the ABC model was complex and not transparent and they had difficulty to undertake a variance analysis of 2009 and 2010 data against the 2008 Determination. For future efficiency reviews it would be helpful to undertake variance analysis on a consistent basis for all years.

SYDNEY WATER CORPORATION CURRENT PRICE PATH - OPEX					
($M 2011/12)	2009	2010	2011	2012	Variance Actual to Determination
Actual/ forecast expenditure	**1100.2**	**1151.4**	**1295.4**	**1378.1**	
2008 Determination	**1080.8**	**1255.0**	**1281.1**	**1274.1**	
Expenditure > Determination	19.5	-103.6	14.4	104.0	34.3
WATER SERVICE VARIANCE					
Actual/ forecast expenditure	444.9	444.5	403.9	382.8	
2008 Determination	435.1	432.2	423.2	412.8	
Expenditure > Determination	9.8	12.3	-19.3	-30.0	-27.3
BULK WATER VARIANCE					
Actual/ forecast expenditure	190.4	206.1	195.5	198.8	
2008 Determination	198.9	210.9	205.6	210.6	
Expenditure > Determination	-8.5	-4.9	-10.1	-11.8	-35.2
WASTEWATER SERVICE VARIANCE					
Actual/ forecast expenditure	451.1	449.2	471.6	485.6	
2008 Determination	434.3	431.0	424.5	419.8	
Expenditure > Determination	16.9	18.2	47.1	65.8	147.9
STORMWATER SERVICE VARIANCE					
Actual/ forecast expenditure	13.7	14.3	12.3	17.5	
2008 Determination	12.5	11.6	12.1	12.1	
Expenditure > Determination	1.3	2.7	0.2	5.3	9.4
RECYCLED WATER (Regulated) VARIANCE					
Actual/ forecast expenditure	0.0	0.0	4.9	23.0	
2008 Determination	0.0	3.7	13.2	18.5	
Expenditure > Determination	0.0	-3.7	-8.3	4.5	-7.5
BULK WATER VARIANCE					
Actual/ forecast expenditure	0.0	37.4	207.2	270.4	
2008 Determination	0.0	165.6	202.4	200.2	
Expenditure > Determination	0.0	-128.2	4.8	70.2	-53.1

Table 6.1 Current Price Path Variance Analysis (Source: SIR 2011 and 2008 Determination)

There is an overall increase in expenditure of $34.3m above the Determination. When we exclude desalination expenditure, which is now a separate business, and bulk water charges paid to SCA, the total expenditure is $122.6m (3.5%) above the Determination. The main reason for this variance is a significant (8.6%) increase in wastewater service costs offset in part by savings from the water service expenditure. Sydney Water has shown the drivers of these variances in the SIR.

Water Service Variance

The Water Service shows a variance of -$27.3m (-4.2%) with increases in 2009 and 2010 more than offset by significant reductions in 2011 and 2012. .This variance is attributed in part to cost pressures external to the business including increases in energy (+$9.4m over the period), the DEUS Water Fund (+$52.8m), materials ($5.7m), BOO plant (-$24.1m) and the McArthur WFP Lease Payments from 2011 ($23.9m). These are external to the management of the business. Internal variances within the control of management include contractors (-$12.3m), labour (-$26.0m) and Corporate (-$53.9m) including a $34.3m saving on property. The reduction in contractor and labour components suggest that the level of maintenance has reduced over the period.

Sydney Water attributes some of this reduction in expenditure to lower demand management costs.

Wastewater Service Variance

The Wastewater Service shows a variance of $147.9m (8.6%) attributed to increases in energy ($23.7m over the period), chemicals ($12.0m) and the Blue Mountains lease costs ($22.3m) fm 2011. These are generally external to the management of the business. Internal variances relate to contractors ($72.4m) and labour ($18.7m).

The SIR reports no material variance on the wastewater service whereas significant reductions are shown in the water service. Sydney Water state that:

> *Corporate costs in the AIR are applied on a pro-rata direct expenditure basis (excluding bulk water) so any reduction in the allocation of Corporate costs to water service reflects the reduction in direct costs in that product.*

We would then expect to see an increase in wastewater corporate which is not evident in the SIR. The impact of these corporate adjustments appears to overstate the water service reductions and wastewater cost increases.

The increase in contractor and labour components is indicative of a greater level of maintenance than envisaged in the 2008 plans. Sydney Water attributes these cost increases to a refocusing of work from water to wastewater.

Contractor and labour inputs balance in part between the water and wastewater services and the net effect is an increase of $52.8m, mainly on maintenance. Sydney Water attributes this increase to a large backlog of complex work including sewer dig and repair jobs, higher activities for CCTV and sewer jetting, increased rates for ventshaft maintenance and periodic maintenance of assets such as the northern aqueducts and the spray lining of wastewater pipes. Further work was carried out to reduce odour complaints at treatment works where development is encroaching to the site boundaries. Sydney Water comments that this work has reduced the network failure rate from 90 to 55 chokes per 100km and delivered a saving of $26m in network cost.

The term 'backlog' suggest a one-off program of work which, when completed would result in a reduction of expenditure. No such reduction is evident from the expenditure profiles. Sydney Water subsequently commented that:

> *[the Maintenance Division] recognises that in documentation it provided this term was used incorrectly. At interview it was explained that the increased wastewater spend was a result of additional scope and work derived from the application of the decision frameworks.*

We confirmed that this additional work was not included in the 2008 Determination but was subsequently identified from asset surveys and risk assessments. With the new process and systems for routine maintenance Sydney Water is now able to prioritise its workload on the basis of risk and allow work to be bundled to drive greater efficiencies. Our view is that this is an opportunity to reassess the whole maintenance program and plan work around the risk of failure which is likely to lead to some work with lower risks to be deferred. There are opportunities for further efficiencies through bundling and scheduling of work and the use of mobile workstations.

Stormwater Variance

There has been a $9.4m increase in expenditure compared with the Determination. This represents increases in mainly in contractor and a small increase in labour costs. The only reference to increased costs in the Submission relates to higher stormwater channel weed and flood management mainly at Rouse Hill.

Recycled Water Variance

The 2008 Determination made an allowance of $23.9m for regulated recycled water related to the St Mary's and Rosehill (Camillia) recycled water schemes. The Rosehill scheme is covered by a S16A Direction by the NSW Government that Sydney Water is to fund the difference between the charges paid to the owner of the Rosehill scheme and revenue received from the sale of recycled water to customers. The Rosehill scheme commenced in October 2011 and the opex is based on an agreement with the owners. The $16.6m operating cost is offset by an annual $8.1m income. The $7.5m underspend in expenditure relates mainly to slippage in the commissioning of these projects.

Bulk and Desalination Water Variance

Actual demand was below the Determination. There has been no elasticity in demand following the lifting of water use restrictions and demand has remained lower than forecast. This has resulted in lower bulk purchases of water from the SCA and SDP.

Sydney Water explained the reason for the variance in desalination water costs:

> *Desalination water costs will be about $53m below the current Determination forecasts over the determination period. This is partly due to the later than expected handover of the plant and lower production of desalinated water. In addition, a plant shutdown was necessary for a short period in 2010-11 during construction of a new electricity sub-station at Kurnell by AusGrid. Further, some of SDP's operating costs were also capitalised in 2009-10 due to the extended plant commissioning period. These savings are partly offset by higher expenditure in 2011-12 due to a change in the agreed price of desalinated water between Sydney Water and SDP. Purchases from SDP now include the costs of the distribution pipeline that is to be transferred from Sydney Water in 2011-12.*

Corporate

Corporate expenditure is allocated across all the services. Total Corporate expenditure increases from $158.5m in 2009 to $178.6m in 2012. This compares with $173.9m in 2008. This includes the significant reduction in Corporate expenditure in the water service discussed above and suggests other cost movements. As no determination was published in 2008 for Corporate costs we do not have the information to compare this expenditure with the Determination.

External cost pressures

External cost pressures include energy where the $31.6m (22%) increase over the period relates mainly to an increase in tariffs although there is also a marginal increase in energy use. Sydney Water has taken action to offset some energy costs through on-site generation, which by 2012 will supply up to 20% of use.

The cost of materials is $17.7m (10%) above plan which includes chemicals.

Sydney Water has advised us that there is an inconsistency between the SIR and the Price Submission. The SIR shows the gross DEUS Water Fund payment of $52.8 million as a variance from the Determination. Figure 4.3 in the SWC Price Submission shows expenditure on the climate change fund was $15 million (net) under the determination.

The McArthur Lease payments ($23.9m) were included from 2011.

Controllable costs

The largest net cost increase of $50.1m over the period is for additional work by service contractors. This is due to additional asset maintenance expenditure for the wastewater system including clearing a large backlog of sewer work, CCTV, sewer jetting, vent shaft maintenance, periodic maintenance and addressing odour at sewage treatment works. To offset these cost increases, Sydney Water has made efficiency savings through:

i. On-site electricity generation at 11 locations
ii. Energy cost savings from smart electricity procurement and load shifting at pumping stations;
iii. Savings from fleet transport management;
iv. Customer and Community Relations cost reductions from reform of plumbing inspections, reducing water restriction patrols, back and front staff reductions and revenue collection costs; and
v. A change in Data Management expenditure from leasing to purchasing of desktop computers and related equipment.

6.4 Prudent and Efficient Expenditure in the Current Price Path

Sydney Water entered the 2008 Determination period with an expectation to maintain service standards of water pressure, continuity, leakage and sewage overflows. A good performance against these measures has been achieved through the period with no failure of the Operational Licence Measures. The business has been able to reduce customer demand significantly over the period and expenditure on demand management has been similarly reduced.

Increasing cost pressures of energy and materials are mainly outside the control of the business although actions have been taken to mitigate these increases through for example on-site generation and smarter energy procurement. We also noted that a review of chemical use had resulted in better optimisation of treatment processes.

In the water service, expenditure on maintenance has reduced with no observable reduction in performance. This suggests that efficiencies are being achieved and the benefits of the mains replacement program are being realised.

For the wastewater service, there has been a significant increase in contractor costs over the period relating to additional maintenance of assets, which was not included in the plans prepared for the 2008 Submission. There was a particular peak of expenditure in 2011 and 2012, which was over three times the average cost in 2009 and 2010. Sydney Water has made significant improvements in Asset Management and yet, given the focus and resources applied over the period, it seems unusual that this additional tranche of work was not identified at the time of the 2008 Submission.

In applying our prudence test to this additional maintenance expenditure, we test the decision making process and the method of procurement. For the decision process, we question whether some of this additional work would not have displaced other work considered to be less of a priority in the maintenance program. We consider that given more detailed planning at the 2008 Submission and the ability of the maintenance planning team to balance priorities over this period, some elements of maintenance could have been deferred or shown as not required to make headroom for some of this additional work. Furthermore, the significant increase in resources over a short period suggests an element of inefficient working.

Our view is that elements of the additional expenditure are not prudent in that, while work may need to be done, there were apparent shortfalls in the decision processes and implementation. We have concluded that 5% of maintenance expenditure above the Determination related to imprudent decisions and a further 5% due to implementation. We have applied these percentages to the $72m additional contract expenditure above the Determination. This results in an imprudent expenditure of $7.2m which is split equally to years 2011 and 2012.

The recent development of asset maintenance processes, systems and strategies should improve maintenance and planning in the future price path. This needs to be linked more closely to the capital program for asset maintenance.

In addition, some of the work was described as 'backlog' which would imply that once cleared, the level of maintenance and expenditure would return to previous levels. This is an issue to be addressed in the assessment of future expenditure.

Sydney Water did not agree with this finding and comments that:

> *Since 2008 the decision model for sewer investment has been refined to optimise the balance between cost and asset reliability outcomes. This highlighted a need to increase maintenance work to balance the risk, cost and customer outcomes in critical and avoid fail assets. An example is the increased preventive maintenance resulting from CCTV inspections. At the same time there were increases in contract costs, which are a result of market pricing.*
>
> *Also completed during the current price path period were complex works that had accumulated and could no longer be deferred. Throughout this report there is recognition of the improvements in asset investment models and risk management – in our opinion this should be reflected in an assessment that costs incurred resulting from increased contractor rates and work volumes for high and medium risk work are prudent and justifiable.*

In response, we are not challenging the need for the work or stating that all of the expenditure is not prudent. Our issue, in applying the prudence test is how the decision was made and the work executed. Given that this work was not identified in the 2008 Determination it is unclear, and we question, to what extent other work of lower priority could have been deferred. There was also a significant increase of maintenance activity over a short period which is indicative of some inefficient expenditure. Our finding relates to only a small element of this expenditure.

In summary we found that operating expenditure in the current price path was prudent with one exception. An element of wastewater maintenance expenditure above the 2008 Determination was not prudent in the way decisions were made and work implemented. We estimate this imprudent expenditure to by $7.2m in the current price path period.

6.5 Operating Expenditure in the Future Price Path

Expenditure proposals for 2012 to 2016

Sydney Water has proposed a level of operating expenditure for the period 2012 to 2016. By 2016, operating expenditure excluding desalination water and bulk water shows a 0.5% reduction on the 2012 base year. Expenditure is shown in Figure 6.3 below using the categories of Operations, Maintenance and Administration consistent with the IPART brief. Throughout this section, we have used the term Corporate for Administration to include expenditure for the Divisions listed in Section 3.

Figure 6.3 includes additional expenditure driven by external factors such as electricity and internal requirements including further asset maintenance and new IT systems. These are offset by savings; external from, for example, handing over the 'Wastesafe' activities directly to contractors and plumbing inspections to the Office of Fair Trading. Sydney Water has also identified a range of efficiencies on controllable costs. These changes give rise to a 16% increase in Administration and Overhead costs some of which are outside the control of Sydney Water such as the new carbon tax. There are reductions of 4% in both the operations and maintenance functions. If the carbon tax costs were allocated directly to the water and wastewater service then variance on the 2012 base would be marginal for all three expenditure categories.

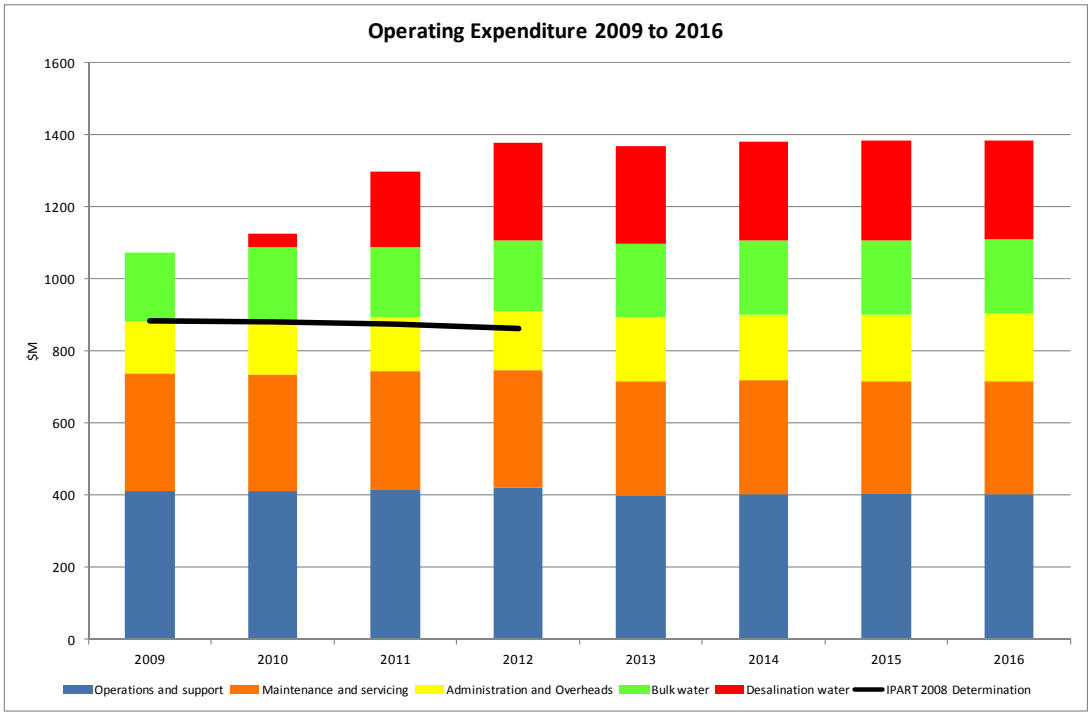


Figure 6.3 Actual and Forecast Operating Expenditure 2009 to 2016

Figure 6.3 shows expenditure by operations, maintenance and administration & overheads. For completeness we have included expenditure for bulk water and desalination water although these costs are not controllable by Sydney Water. The blue line shows Sydney Water's operating expenditure proposal, which is subject to this efficiency review.

Our analysis of the future operating expenditure starts by removing desalination water purchase costs and the SCA bulk water costs. This is shown in Table 6.2 below.

SYDNEY WATER CORPORATION PROPOSAL - OPEX - TOTAL						
($k 2011/12)	**2012**	**2013**	**2014**	**2015**	**2016**	**Total 2013 - 2106**
Operations	421.3	400.5	402.8	404.7	403.7	**1,611.7**
Maintenance	325.2	317.3	318.0	312.6	311.5	**1,259.4**
Administration	162.4	178.0	181.6	185.0	189.0	**733.6**
Bulk water	198.8	203.3	204.6	205.6	206.5	**820.1**
Desalination Water	270.4	270.8	273.4	274.9	272.0	**1,091.1**
Total	**1,378.1**	**1,369.9**	**1,380.4**	**1,382.7**	**1,382.8**	**5,515.8**
Adjustments and inconsistencies						
Less Rosehill scheme revenue	-8.1	-8.2	-8.3	-8.4	-8.5	
Less Bulk Water	-198.8	-203.3	-204.6	-205.6	-206.5	
Less Desalination water	-270.4	-270.8	-273.4	-274.9	-272.0	
Net opex subject to efficiency review	**900.7**	**887.5**	**894.1**	**893.8**	**895.7**	**3,571.2**

Table 6.2 Net Operating Expenditure subject to Efficiency Review (Source: AIR and Sydney Water)

Expenditure in 2012

Expenditure in the current price path for 2011/12 is shown as a forecast in Sydney Water's submission. We have reviewed this expenditure to assure ourselves as to the robustness of this forecast as this is the base year for projections into the next price control period. Total regulated expenditure shows a $6.1m increase from 2011 to 2012.

In the water service, there have been a $21.5m (5.3%) reduction in operating expenditure after separating bulk water and desalination water costs. This is mainly attributable to a reduction in demand management costs of $12.9m, outside the control of Sydney Water and water distribution $7.8m through a reduction of maintenance work.

For the wastewater service, there has been a $13.5m (3%) increase in expenditure with the main increase in wastewater customer support which we trailed to asset management costs. We are unclear why there should be a cost increase here.

With the commissioning of the Camellia recycled water plant there is an $18.1m increase in expenditure in 2012. There are additional operating costs for stormwater mainly at the Rouse Hill site.

Variance Analysis

Sydney Water explains in its Submission the drivers which increase and reduce expenditure over the period to 2016. These are due to external cost pressures and obligations and to management decisions to vary or change the balance of expenditure within its controllable cost base. While the overall proposed operating expenditure changes marginally from 2012, the underlying increases and reductions are important to understand. We show our analysis of expenditure variances in Table 6.3.

SYDNEY WATER CORPORATION PROPOSAL - OPEX - VARIANCES						
Net opex subject to efficiency review	**900.7**	**887.5**	**894.1**	**893.8**	**895.7**	**3571.2**
MATERIAL INCREASES ON 2012 BASE YEAR FOR EXTERNAL FACTORS						
(cumulative) ($2011/12)	**2012**	**2013**	**2014**	**2015**	**2016**	**variance 2012 to 2016**
Electricity		6.9	5.0	3.1	2.8	17.9
Carbon tax		14.5	0.6	0.6	0.7	16.4
BOO WFP excluding lease payments		0.6	0.8	1.2	0.3	3.0
Recycled water (St Mary's and Rosehill)		2.7	0.0	1.7	0.7	5.1
Blue Mountains Tunnel		0.2	0.2	0.2	0.2	0.9
Chemicals		0.1	-0.3	0.2	-0.6	-0.5
Macarthur WFP		-0.4	-0.4	-0.4	-0.3	-1.5
Demand management savings		-1.5	0.0	0.0	0.0	-1.5
Plumbing and Drainage to Dept Comm		-4.2	0.0	0.0	0.0	-4.2
Wastesafe		-7.4	0.0	0.0	0.0	-7.4
DECC Climate change fund		-17.4	0.0	0.0	0.0	-17.4
Total external factors		-6.0	6.0	6.7	3.9	10.7
2012 Base opex with external factors	900.7	894.8	900.8	907.5	911.4	**3,614**
MATERIAL CHANGES AS A RESULT OF SYDNEY WATER INTERVENTION						
IT Managed services		1.8	1.3	1.4	2.3	6.8
Increased maintenance activity		8.4	-0.5	-1.5	-0.1	6.3
IT Data management		0.8	1.2	1.3	1.5	4.8
General Insurance		2.1	0.1	0.1	0.2	2.5
Change in stormwater maintenance		-1.5	1.9	0.0	-0.1	0.4
Road restoration		-0.8	-1.0	-1.6	0.0	-3.4
Lower maintenance activity		-1.0	0.5	0.1	0.0	-0.4
Materials		-1.7	1.3	-0.1	0.0	-0.6
Vehicle leases		-0.5	-0.5	-0.4	-0.3	-1.7
Professional services		-2.5	-1.0	-2.4	-0.5	-6.3
Labour		-12.9	-4.2	-5.6	-4.2	-26.9
balancing line		0.8	1.3	1.6	-0.8	3.0
Total changes		-7.3	0.5	-6.9	-2.0	-15.7
2012 Base opex with intervention	900.7	893.5	894.0	887.1	885.1	
Revised total regulated opex	**900.7**	**887.5**	**894.1**	**893.8**	**895.7**	**3,571.2**

Source: AIR, Sydney Water and Atkins Cardno analysis

Table 6.3 Variance Analysis of Proposed Expenditure

Material changes on base year for external factors

Additional expenditure is from increased electricity costs and the carbon tax commencing in July 2012. Electricity costs are increasing mainly as a result of tariff increases and some increases in power consumption. Sydney Water has also included an estimate of the new Carbon costs coming in year 2012 from a detailed estimate of CO_2 emissions from direct operations, electricity use and supplier pass-through. A carbon price of $23/tonne CO_2-e is assumed for 2013 increasing to $29 in 2016. These are estimates at this stage. Sydney Water states that if the carbon price is to differ materially from the current assumption then it will seek a cost adjustment in the Determination. We assume this could be a two way adjustment.

Conversely there are reductions from operating expenditure where payments to the Climate Change Fund will cease from 2012. In addition, lower Wastesave costs arise from a change in the management of the disposal of waste from grease traps, where this work will be carried out directly by contractors. Responsibility for plumbing inspections will move to the Office of Fair Trading with a further reduction in operating expenditure. Reduced activity on demand management promotion shows further savings over the period.

Sydney Water has identified a change in capitalisation assumption where some work on trunk mains is expensed. There is no change in capitalised operating expenditure from 2012 to 2013 so we assume that this change has been made in the current price path.

Other cost increases relate to contractual commitments for the Recycled Water schemes at St Mary's and Rosehill, additional BOO treatment plant payments offset in part by some savings from the Macarthur WFP plant. The Blue Mountains Tunnel costs are included from 2011/12 and show incremental increases over the period.

The impact of these external factors is to increase total operating expenditure by $14.9m per annum by 2016.

Material changes on base year as a result of Sydney Water intervention

We have identified material changes in Table 6.3. The analysis is based on information provided by Sydney Water in its submission and subsequent working papers.

The largest change is a reduction in labour costs over the period to 2016. This is equivalent to an 8.3% reduction over the period to 2016. We discuss this further in functional expenditure.

Sydney Water has changed the focus of work carried out by service contracts, which it describes in its submission. The net impact is an increase of $8.2m by 2016. Data management including IT shows an increase of $4.8m by 2016 which Sydney Water relates to the larger IT program.

Savings in road restoration costs from local authorities are planned through carrying out this work with own contractors.

Further savings relate to vehicle leases and materials. These are offset by increases in general insurance and advertising.

We have used this variance analysis to inform our view on the extent to which Sydney Water is to deliver efficiencies over the period. We recognise the significant reductions in labour costs which we discuss later in this section. We also identify other area where efficiencies are proposed. We noted that the balance of maintenance activity has changed and resulting in a net increase in expenditure; we consider this as managing the maintenance process against priorities.

Variance Analysis by Function

Sydney Water has provided an analysis of operating expenditure to 2016 by Division. This analysis allows mapping of each Division's expenditure against service or product using the RCM methodology. This is helpful in providing a detailed view of variance and the supporting reasons. This variance from 2011, when the RCM analysis was first carried out, is shown in Figure 6.4 on a normalised basis.

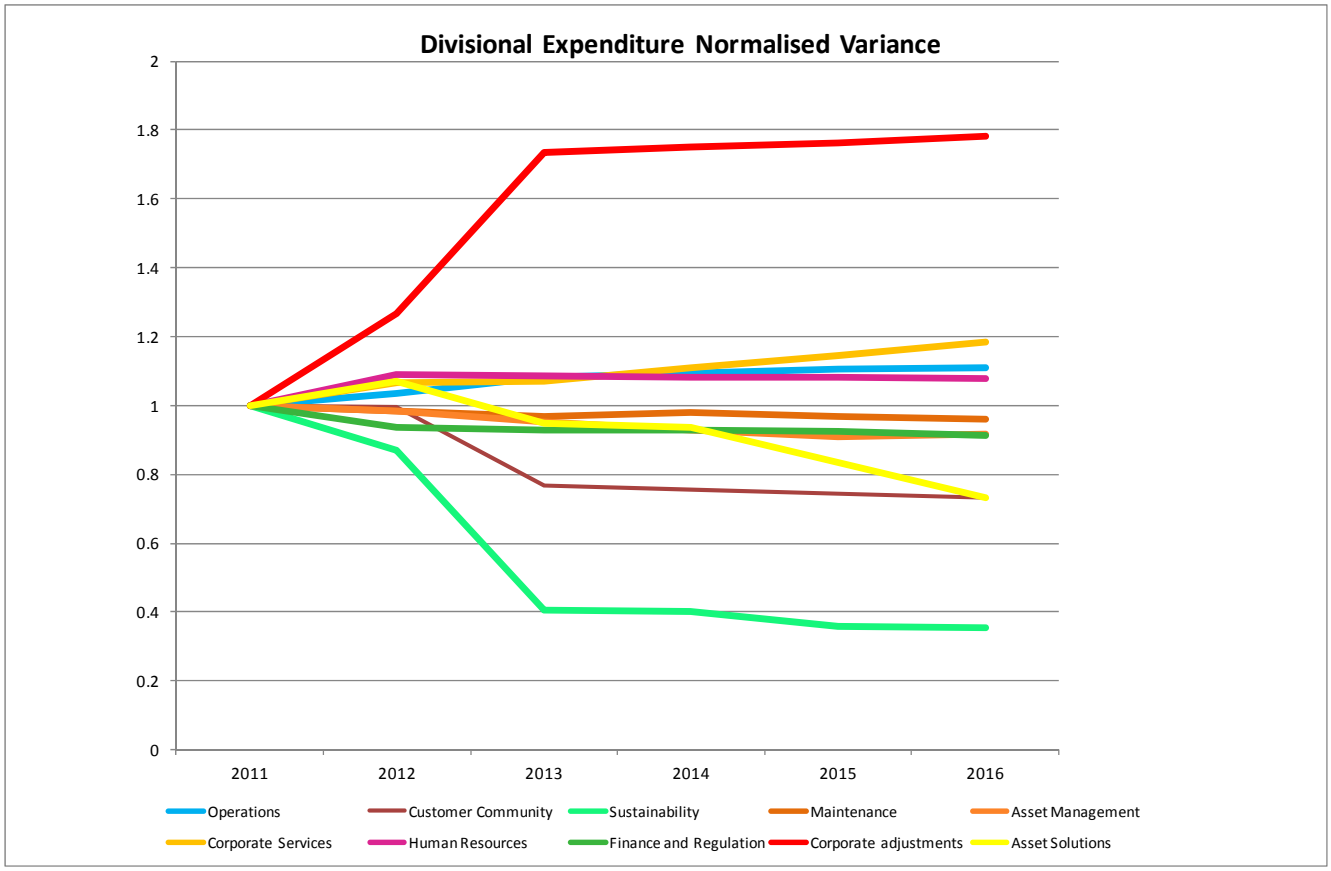


Figure 6.4 Future Expenditure Normalised Variance

The significant increases in corporate adjustments relates to the provision for redundancies and the carbon tax commencing in 2012. Conversely the reduction in sustainability is where contributions to the Climate Change Fund will cease. The impact of these two external charges is a $4.2m/annum reduction. Variances for other Divisions to 2016 are generally within the +/- 20%. Cost increases relate to Corporate, Operations and Human Resources. Significant cost reductions are evident for Customer and Community Relations, Asset Solutions, Finance and Regulation, Maintenance and Asset Management. For the purposes of our analysis we comment on variance by function, which groups the Divisions as described in Section 3, comprising Operations, Maintenance and Corporate.

Operations

This includes the Operations, Customer and Community Relations and Sustainability Divisions. The proposed expenditure is shown in Table 6.4 below.

SYDNEY WATER CORPORATION PROPOSAL - OPEX - OPERATIONS						
($M 2011/12)	2012	2013	2014	2015	2016	Variance 2012 to 2016
Operations	421.3	400.5	402.8	404.7	403.7	**-4.2%**
Sub totals						
Operations	313.2	327.1	330.6	334.7	334.8	6.9%
Customer and Community Relations	75.6	58.2	57.3	56.6	55.7	-26.3%
Sustainability	32.4	15.1	14.9	13.3	13.2	-59.4%
Analysis by Service						
WATER						
Operations	143.0	147.9	149.5	151.2	151.3	5.8%
Customer and Community Relations	33.6	24.9	24.7	24.5	24.1	
Sustainability	23.0	5.5	5.4	4.9	4.8	
Total Water	199.7	178.3	179.7	180.6	180.2	-9.7%
WASTEWATER						
Operations	147.5	156.0	157.6	158.3	157.6	6.8%
Customer and Community Relations	40.9	32.6	31.7	31.2	30.8	
Sustainability	9.1	9.3	9.2	8.2	8.0	
Total Wastewater	197.5	197.9	198.5	197.7	196.4	-0.6%
STORMWATER						
Operations	0.1	0.1	0.1	0.1	0.1	
Customer and Community Relations	1.0	0.8	0.9	0.9	0.9	
Sustainability	0.3	0.3	0.3	0.3	0.3	
Total Stormwater	1.4	1.1	1.3	1.2	1.2	-14.3%
RECYCLED WATER (Regulated)						
Operations	22.6	23.2	23.4	25.2	25.9	
Customer and Community Relations	0.0	0.0	0.0	0.0	0.0	
Sustainability	0.0	0.0	0.0	0.0	0.0	
Total Recyled Water	22.6	23.2	23.4	25.2	25.9	14.3%
PROPOSED EXPENDITURE	**421.3**	**400.5**	**402.8**	**404.7**	**403.7**	

Source: SWC product cost data

Table 6.4 Proposed Operating Expenditure – Operations

We comment on material variances for each Division and Product between the 2012 base year and 2016.

The Operations Division is showing increases in both the water and wastewater service. Nearly all the $17m electricity cost increases are attributable to this Division. This is offset in part by a $4.1m (5.6%) reduction in labour over the period.

The Customer and Community Relations Division shows a step reduction in expenditure between 2012 and 2013 mainly due to the reduction in water demand management activities and movement of the plumbing services to the Office of Fair Trading ($4.2m) and Wastesafe ($7.3m) outside the business. There is a $4m (11%) reduction in labour costs mainly from the customer service area.

The Sustainability Division was responsible for payment to the Climate Change Fund which is to be discontinued in 2012. This explains the significant cost reduction from 2012 to 2013. Expenditure through to 2016 shows an even trend. Labour forms some 60% of total expenditure; reductions in labour over the period account for $0.6m or 6%.

Maintenance

This function includes the Maintenance and Asset Management Divisions. We have included Asset Creation although most of its expenditure is capitalised. The proposed expenditure is shown in Table 6.5 below.

SYDNEY WATER CORPORATION PROPOSAL - OPEX - MAINTENANCE						
($M 2011/12)	2012	2013	2014	2015	2016	Variance 2012 to 2016
Maintenance	325.2	317.3	318.0	312.6	311.5	**-4.2%**
Sub totals						
Maintenance	230.3	226.1	229.1	225.9	224.7	-2.4%
Asset Management	89.0	86.0	83.8	82.2	82.9	-6.9%
Asset Solutions	5.8	5.2	5.1	4.5	4.0	-31.9%
Analysis by Service						
WATER						
Maintenance	93.1	90.3	89.6	87.0	86.4	-7.2%
Asset Management	28.7	27.2	27.1	26.3	26.4	
Asset Solutions	2.3	2.1	2.0	1.8	1.7	
Total Water	124.2	119.7	118.7	115.2	114.4	-7.8%
WASTEWATER						
Maintenance	130.5	130.8	132.2	131.6	131.2	0.5%
Asset Management	54.2	53.1	51.2	50.5	50.9	
Asset Solutions	3.3	2.9	2.9	2.6	2.2	
Total Wastewater	187.9	186.8	186.3	184.7	184.3	-2.0%
STORMWATER						
Maintenance	6.6	4.8	7.1	7.1	7.0	
Asset Management	5.9	5.4	5.4	5.2	5.4	
Asset Solutions	0.2	0.1	0.2	0.2	0.1	
Total Stormwater	12.7	10.4	12.6	12.4	12.5	-1.3%
RECYCLED WATER (Regulated)						
Maintenance	0.2	0.2	0.2	0.2	0.2	
Asset Management	0.2	0.2	0.2	0.1	0.1	
Asset Solutions	0.0	0.0	0.0	0.0	0.0	
Total Recyled Water	0.4	0.4	0.4	0.3	0.3	-22.1%
PROPOSED EXPENDITURE	**325.2**	**317.3**	**318.0**	**312.6**	**311.5**	

Table 6.5 Proposed Operating Expenditure – Maintenance

Total maintenance expenditure shows a reducing 4.2% trend over the period to 2016. By far the largest expenditure here is the Maintenance Division, which shows a 2.4% reduction. Nearly all this reduction is in the water service with wastewater expenditure relatively flat. This is due to the focus of planned maintenance towards the wastewater service. Savings in water operating costs assume a lower level of burst repairs from pressure reduction now in place and the level of mains replacement. Labour costs are forecast to reduce by $9.7m (10%), although this is partly offset by increases from maintenance contractors. Service contract costs increase by $4.1m by 2106. Savings from vehicle leases also contribute to the cost reduction.

The Maintenance Division has developed a preventive maintenance strategy and the necessary processes and systems to manage and monitor assets on a risk basis. An annual routine maintenance plan is being developed from a risk approach which is used to prioritise work. Further developments

include reliability block diagrams and failure mode effects analysis. These strategies and plans together with the new Maximo system should enable Sydney Water to manage maintenance more effectively to a level of risk acceptable to customers. Field teams have been equipped with mobile 'toughbooks' to enable them to receive, manage and report on jobs carried out.

The Asset Management Division shows a $6m (6.9%) reduction to 2016. Labour represents 28% of total costs, where $4.7m (17%) is planned. A review of the Division has recently been carried out to avoid duplication, identify activities which do not form part of the core business and improve the effectiveness and efficiency of asset planning. This review has also covered the Sustainability and parts of the Asset Solutions Division. There is a team supporting the growth program which appears unduly large compared with other water agencies. This has been recognised in part by the recent review.

The Asset Solutions Division costs are nearly all capitalised. The remaining costs mainly are from customer support. It seems curious that these costs are not capitalised as they appear to relate to capital project work.

Corporate (Administration)

Corporate expenditure (Administration and Support) over the period to 2016 is summarised in Table 6.5 below. This includes the Divisional expenditure for those listed in the table. This analysis differs from the AIR as we have used the product cost data provided by Sydney Water although total operating expenditure reconciles with the AIR.

SYDNEY WATER CORPORATION PROPOSAL - OPEX - CORPORATE (ADMINISTRATION)							Notes
($M 2011/12)	2012	2013	2014	2015	2016	Variance 2012 to 2016	
Corporate	162.4	178.0	181.6	185.0	189.0	**16.4%**	1
Sub totals							
Human Resources	13.9	15.2	15.1	15.1	15.0	8.0%	
Finance and Regulation	11.7	10.9	10.8	10.8	10.8	-7.4%	
Corporate Services	89.3	89.7	92.8	96.0	99.4	11.3%	
Corporate adjustments - Carbon tax	0.0	14.5	15.1	15.7	16.4		
Corporation Adjustments - other	42.5	43.8	43.7	43.4	43.4	2.3%	
Managing Director	4.5	4.0	4.0	4.0	4.1	-9.1%	
Total excluding carbon tax	161.9	163.7	166.5	169.3	172.8	6.7%	
1 Corporate is defined as extenditure for the Divisions listed in the table as distinct from Corporate in the SIR							

Source: SWC product cost summary and Atkins/Cardno analysis

Table 6.6 Proposed Operating Expenditure – Corporate

Table 6.6 identifies the carbon tax separately from other Corporate Adjustments as this helps in analysing variance for the Divisional expenditure. Total Corporate expenditure shows an increase of $11m (6.7%) over the period from 2012 to 2016 when the carbon tax expenditure is excluded. Nearly all this increase relates to Corporate Services IT costs, identified in Table 6.3 as $11.6m. This includes IT Management Services and Data Management. Corporation Adjustments include a provision for redundancies and finance lease payments for the Macarthur WFP and the Blue Mountains tunnel.

After allocating specific costs to service areas, the remaining costs are apportioned to the water, wastewater and stormwater services in proportion to direct costs.

Total Remuneration

We reviewed the total remuneration of Executives and Senior Managers within the tests of prudency and efficiency. Sydney Water provided us with information to support this analysis. We compared Sydney Water's data with other similar water utilities in Australia. We also made reference to a recent report to the UK Government on executive remuneration which we consider is relevant as our methodology compares Sydney Water with a Frontier Company.

We found that there were reasonable grounds to investigate whether the total remuneration of Executives and Senior Managers met the prudency and efficiency tests. However, there was insufficient good quality information which was consistent and readily available to allow us to form a robust view within the time available for this study. However, we have not made any recommended adjustments in our report.

Sydney Water commented that:

> *[we] would be happy to participate in a robust analysis [of total remuneration policy] over the next Determination*

and added that:

> *…….. for a more stable future outlook Sydney Water has commenced a review of its divisional structure, and there are likely to be opportunities for consolidation.*

In this context, we believe that some of the recommendations of a recent UK report, the Hutton Review of Fair Pay in the Public Sector (March 2011) are relevant. The report sets out to establish a framework for fairness in senior public service pay stating that:

> *This framework should be based on the principle of fairness as due dessert: reward should be proportional to the weight of each role and each individual's performance; should be set according to a fair process; and should recognise that organisations' success derives from the collective efforts of the whole workforce. This fairness framework will ensure that senior pay in public services is fair and seen to be fair, and will preserve the ability of public services to recruit talented individuals....*

This is an issue for Sydney Water to consider in its remuneration policy. We would expect our Frontier Company to set clear performance indicators under which a material proportion of remuneration would be made.

The Hutton report highlights some key principles to consider:

- Using pay multiples to track executive pay against that of all employees: *"...not cap pay across public services, but should require that....all public service organisations publish their top to median pay multiples each year to allow the public to hold them to account*";
- Preventing rewards for failure through earn-back pay for senior public servants: *"...To allow pay to vary down as well as up with performance, all public service executives should have an element of their basic pay that needs to be earned back each year through meeting pre-agreed objectives";*
- Sharing the rewards of greater productivity: *"To prevent executives monopolising the rewards of productivity increases, and allow all employees who have contributed to share the benefits, ...should identify ways of offering gain sharing schemes linked to achievement of the efficiency aspects of their business plans".*

The principles of the Hutton Report appear to be relevant to New South Wales agencies in respect of publishing data, introducing performance incentives into the remuneration structure and sharing the rewards of productivity across the business. We are unsure as to what extent NSW Government regulations may constrain this approach.

6.6 Sydney Water Proposed Efficiencies

The scope for efficiency savings was set out by Sydney Water in section 4.6 of its Submission. This includes

(i) A reduction in labour costs of $26.2m by 2016 equivalent to 8.3% of the 2012 labour costs;

(ii) Non-labour cost reductions including a new biosolids strategy, plant and equipment, waste disposal, repairs and maintenance rate and process improvements ($6.4m), a reduction in vehicle holdings ($3.5m) and inventory consolidation ($1.2m).

The 2008 Determination assumed that 38% of costs were controllable and used this factor to assess efficiency targets.

Reductions in specific maintenance activity are offset by additional maintenance on water and sewage pumping station, wastewater treatment plants and absorption of the impact of growth on the asset base. Our analysis of operating cost data shows that the impact on service contracts is a net $5.9m per annum increase in maintenance expenditure by 2016. The balance of maintenance work is for Sydney Water to decide, but the issue of changing the focus of maintenance is not in itself an efficiency. However, the new maintenance strategy and supporting processes based on risk provides an opportunity to test the level of maintenance against the level of risk which is assumed. In the examples of maintenance strategy we saw, the level of acceptable risk appeared to be low.

Our analysis of variance in Table 6.3 identifies material changes in expenditure over the period to 2016 as a result of Sydney Water intervention. We have taken into account the reduction in labour costs which Sydney Water proposes. These labour reductions include a significant savings from the Maintenance Division (10.3% of 2012 labour costs by 2016), Customer and Community Relations (10.6%) and Asset Management (16.5%). We have accepted that some of the non-labour activities are efficiencies and others relate to a change in the balance of workload.

6.7 Efficiency and Performance in the Future Price Path

6.7.1 Scope for Efficiency Savings

Our analysis of the information provided by Sydney Water at meetings and through subsequent questions and documentation has identified several areas where we believe there is scope for making efficiencies across the business. We discuss these areas below.

The Business Structure

The current structure of ten Divisions is unwieldy and not conducive to effective and efficient management. The structure has led to duplication of some activities and support functions and leads to additional management inputs. It is for Sydney Water to plan its management structure but we believe a simplified structure would give greater focus on effective and efficient delivery of services. From our experience and review of structures in utilities of a similar size, a structure of up to six Divisions plus the Managing Director would be appropriate.

Sydney Water commented that:

> *The current divisional structure reflected the need for unprecedented activity on many fronts. It was put in place over the last two Determinations to meet the challenges posed by the worst drought in 100 years. The structure enabled Sydney Water to deliver major recycling schemes, one of the world's largest water efficiency programs and the desalination project. At the same time, water quality, reliability and customer satisfaction was maintained or improved.*
>
> *By any measure, the structure worked. However, for a more stable future outlook Sydney Water has commenced a review of its divisional structure, and there are likely to be opportunities for consolidation.*

We have assumed that restructuring will bring efficiencies from 2013.

Strategic Planning

The lack of effective strategic planning is evident from the apparent lack of any robust long term plans and medium term business plans. While not a specific efficiency saving, this is an opportunity to develop robust plans leading to robust capital and operating expenditure which has gone through review and challenge. This should also reduce the risk of new requirements and expenditure being identified and promoted between Price Reviews and without the rigour of the review process.

Labour efficiencies

We note the significant reduction in labour planned over the period to 2016. A reduction in activities and operating expenditure should be reflected through the organisation. This is a significant reduction over the coming period. We note that provisions have been included for redundancy payments.

Corporate structure

The level of Corporate costs to operational and maintenance costs appears marginally high when compared with a Frontier Company. We consider there are opportunities for further efficiencies. .

Activities

The review of the Asset Management and Sustainability Divisions provides a good example of how the internal review process has identified some duplication of activities across the Divisions, other activities which are not necessary and a greater focus on core business. The need to challenge environmental standards in the interests of customers was recognised as was greater synergy across Divisions. The review identified the potential for efficiencies some of which are included in the Submission.

Operations

We formed the view that the Operations Division had not gone through an internal review process to the extent carried out by Asset Management and there was potential for further efficiencies through a similar internal review.

Maintenance and the Level of Risk

New risk management tools have been developed and systems are in place to provide a more informed risk-based approach to maintenance. In addition there is a continuing high level of capital maintenance planned. Even with our adjustment to capital expenditure, there is generally an even level of asset renewal activity over the future period. The risk management tools provide the opportunity for a more joined-up approach to asset management from both opex and capex activities. Having a new risk based

approach to maintenance provides the opportunity to have a more consistent approach to risk and take a more structured view on the level of risk that the business should manage. In a competitive market, the balance of risk and customer willingness to pay would force a business to look more closely at the level of risk it can afford. We have assumed that use of the new risk based approach in conjunction with capital asset management will bring further efficiencies over time.

Information Systems

There is an opportunity to improve the way that the business is planning its Information Systems and there should be a clear, rational and comprehensive strategy for the whole business. The justification for significant additional operating expenditure and its timing is not well founded.

6.7.2 Continuing Efficiency

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.

In the 2008 Determination, Sydney Water was set operating efficiency targets[7] of 0.8% per annum continuing and 1.0% per annum catch up as applied to controllable expenditure. The efficiency targets were offset by those identified by Sydney Water resulting in efficiencies of up to 0.6% p.a. in year 4. This broadly aligns with the operating cost efficiencies[8] applied to Hunter Water in its 2009 Determination. We note that Sydney Water achieved these efficiencies set for the current price path.

The 2009 Determination for water companies in England and Wales[9] established a continuing efficiency of 0.25%. This was lower than the 2004 Determination which set values from 0.8% to 1.0% including outperformance potential. This reflected the incentive to over-perform against efficiency target as there are financial benefits for each company. In New South Wales there is little incentive for a Water Agency to outperform a target and there is likely to be a tendency to use the Determination expenditure as a target. However, for consistency we have retained the 0.25% continuing efficiency.

6.7.3 Catch-Up Efficiency

The second element of operating efficiency is the catch-up from an agency's current position to that of the frontier utility or benchmark utility. Our qualitative assessment was based on a comparison of the agency operational control processes compared with current best practice in Australia and England. It is based on the professional judgement of our team formed from their broad and in-depth understanding of these processes across many utilities. Our assessment was based on identified improvements to processes and business opportunities which we discuss in Section 6.7.1 above. These improvements would generate efficiencies in future years to enable the agency to move towards the frontier utility. We make a total assessment of catch-up efficiency then net off those efficiencies proposed by Sydney Water. We have also taken into account the opportunities to restructure and to focus the shape of the organisation over time to be more effective in delivering services to customers. We also recognise the leverage of new

[7] Review of prices for Sydney Water Corporation's water, sewerage, stormwater and other assets, IPART June 2008
[8] Review of Capital and Operating Expenditure of Hunter Water (2009 Determination), Atkins Cardno December 2008
[9] Future Water and Sewerage Charges 2010 to 2015 Final Determination, Ofwat 2009

risk management systems for maintenance and a closer application of the latest asset management processes to drive further efficiencies.

We have made a judgement in relation to the impact of improved processes that could be achieved by the end of the future price path and have assumed a cumulative increase in efficiency over time. This gradual increase recognises that expenditures in the first year of the future price path are reasonably certain but that the confidence of these estimates reduces over time.

We have assumed an average 2% per annum catch up efficiency over the price control period. This is based on our assessment of Sydney Water's performance against the frontier and is within a 0% to 2.9% range of efficiency targets on total operating expenditure set for companies in England and Wales in 2009. We have taken note of the constraints in the rate of operating efficiency than can be achieved. We have assumed that the constraints of a government owned agency are greater than our frontier company. We have therefore phased the application of catch up efficiency from 1.5% in year 1 to 2.25% in year 4. These are offset by efficiencies proposed by the Corporation and factors to account for uncontrolled costs. The resulting additional efficiencies are modest in the first two years but become more challenging in the latter two. This should give sufficient time to put plans in place to deliver these efficiencies.

We have taken account of the efficiencies proposed by Sydney Water in the Submission to arrive at net efficiencies to be applied to operating expenditure as summarised in Table 6.7. We also make an adjustment to reflect that a significant proportion of Sydney Water's costs are not controllable. This proportion is unchanged from the 2008 Determination.

Ref	Efficiency Scope (%)	2013	2014	2015	2016
1	Continuing Efficiency at the Frontier	0.25	0.25	0.25	0.25
2	Cumulative Continuing Efficiency	0.25	0.50	0.75	1.00
3	Catchup Efficiency	1.50	2.00	2.00	2.00
4	Total cumulative efficiency	1.75	4.00	6.25	8.50
5	Sydney Water Labour efficency	1.46	0.47	0.62	0.47
6	Sydney Water Other efficency	0.31	-0.03	0.31	0.15
7	Sydney Water Cumulative efficiency	1.76	2.21	3.14	3.76
8	Net efficiency	-0.01	1.79	3.11	4.74
9	Sydney Water Controllable costs net of bulk water	38%	38%	38%	38%
10	Efficiency to be applied to operating expenditure	0.00	0.7	1.2	1.8

Source: Atkins Cardno analysis

Table 6.7 Proposed Operating Cost Efficiencies

We apply these efficiencies to the controllable costs.

6.7.4 Efficient Level of Operating Expenditure

We present in Table 6.8 our proposals for an efficient level of operating expenditure for the future price path period. The table includes the adjustments for the timing and scope of activities for each function and applies a combined continuing and catch-up efficiency to the revised expenditure.

SYDNEY WATER CORPORATION PROPOSAL - OPEX - ADJUSTMENTS						
($M 2012)	2012	2013	2014	2015	2016	Total 2013 - 2016
Operations	421.3	400.5	402.8	404.7	403.7	**1,611.7**
Maintenance	325.2	317.3	318.0	312.6	311.5	**1,259.4**
Corporate (Administration)	162.4	178.0	181.6	185.0	189.0	**733.6**
Bulk water	198.8	203.3	204.6	205.6	206.5	**820.1**
Desalination Water	270.4	270.8	273.4	274.9	272.0	**1,091.1**
Total Proposed Operating Expenditure	**1,378.1**	**1,369.9**	**1,380.4**	**1,382.7**	**1,382.8**	**5,515.8**
Adjustments and inconsistencies						
Less Rosehill scheme revenue	-8.1	-8.2	-8.3	-8.4	-8.5	
Less Bulk Water	-198.8	-203.3	-204.6	-205.6	-206.5	
Less Desalination water	-270.4	-270.8	-273.4	-274.9	-272.0	
Net Opex subject to the efficiency review	**900.7**	**887.5**	**894.1**	**893.8**	**895.7**	**3,571.2**
Application of operating efficiency targets						
Cumulative efficiencies from Table 6.6 (%)		0.0	0.68	1.18	1.80	
Efficiency adjustment ($M)		0.0	-6.1	-10.6	-16.1	
EFFICIENT OPERATING EXPENDITURE						
Operations	421.3	400.5	400.1	399.9	396.4	**1,596.9**
Maintenance	325.2	317.3	315.8	308.9	305.9	**1,247.9**
Corporate (Administration)	162.4	178.0	180.3	182.8	185.6	**726.7**
Less Rosehill scheme revenue	-8.1	-8.2	-8.3	-8.4	-8.5	**-33**
Total Efficient Operating Expenditure	**900.7**	**887.5**	**887.9**	**883.2**	**879.5**	**3,538.1**
Note - We have excluded bulk water and desalination water from the efficiency process						

Source: Atkins/Cardno analysis

Table 6.8 Efficient Level of Operating Expenditure

Sydney Water commented that:

> *2014 through to 2016 will see a reduction of [ ] opex across Operations, CCRD and Sustainability on top of existing efficiency plans. The major controllable cost is labour, hence this will represent a significant reduction in FTE above current plans, which already include staff reductions. This needs to be considered in the context of reduced serviceability spend, which will in the mid to long term increases demand on opex. Overall this increases risk of operational performance against licence standards.*

Our proposals are based on the range of efficiencies which have been set for other major water utilities. We have made allowance for the efficiencies that Sydney Water has planned for and recognise that in the public sector these efficiencies take longer to be achieved. We are not proposing to reduce serviceability expenditure which will be marginally above the current period, but we have assumed a lower increase in expenditure than that proposed. This is because out-performance against operational outputs suggests that the level of risk assumed is lower than appropriate. The relationship between performance risk and further investment should be tested over the future price path and findings reviewed at the next Determination.

6.8 Conclusions

Sydney Water has presented a submission where it is proposing significant efficiencies to offset increasing costs from external factors and changes in the cost pressures within the business. We have reviewed Sydney Water's business processes for operations, maintenance and corporate activities and related costs. We have identified the new management processes now being implemented to leverage further dynamic efficiencies in the way activities are prioritised and managed. We have looked closely at the business structure and shape and believe that allocative efficiencies can be made in how the business is structured. We believe there are further efficiencies to be made mainly in the latter part of the period.

The benefits of a longer term business plan would have helped us see the future direction of the business and see how efficiencies can be rolled out in the longer term. This would have helped us to take longer term decisions on the scope for efficiencies.

We have tested our assumptions of efficiencies and made some estimates of how this could be achieved, although it is for the Directors to decide the balance of efficiencies and how the business can best be structured to meet its commitments.

These efficiencies are challenging but the Corporation has highly experienced professionals who are motivated to deliver. We have identified efficiencies which are higher than our proposals but we have noted the likely constraints in the rate of operating efficiencies that can be achieved over the price control period. These constraints of a government owned agency are greater than our frontier company.

SYDNEY WATER CORPORATION PROPOSAL - OPEX - ADJUSTMENTS BY SERVICE							Notes
($M 2012)	**2012**	**2013**	**2014**	**2015**	**2016**	**Total 2013 - 2106**	
Water	326.0	306.2	306.5	305.0	303.4	**1,221.0**	
Wastewater	368.1	378.8	379.5	378.7	378.1	**1,515.1**	
Stormwater	13.1	10.7	13.0	12.8	12.9	**49.5**	
Corporate	178.6	176.5	179.6	180.3	183.7	**720.1**	
Recycled Water	23.0	23.5	23.7	25.5	26.2	**98.9**	
Bulk water	198.8	203.3	204.6	205.6	206.5	**820.1**	
Desalination Water	270.4	270.8	273.4	274.9	272.0	**1,091.1**	
Total SWC Proposed Operating Expenditure	**1,378.1**	**1,369.9**	**1,380.4**	**1,382.7**	**1,382.8**	**5,515.8**	
Adjustments and inconsistencies							
Less Rosehill scheme revenue	-8.1	-8.2	-8.3	-8.4	-8.5	**-33.4**	
Less Bulk Water	-198.8	-203.3	-204.6	-205.6	-206.5	**-820.1**	
Less Desalination water	-270.4	-270.8	-273.4	-274.9	-272.0	**-1,091.1**	
Net Opex subject to the efficiency review	**900.7**	**887.5**	**894.1**	**893.8**	**895.7**	**3,571.2**	
Application of operating efficiency targets							
Cumulative efficiencies (%)		0.00	0.68	1.18	1.80		1
Efficiency adjustment ($M)		0.0	-6.1	-10.6	-16.1		1
EFFICIENT OPERATING EXPENDITURE							
($M 2012)	**2012**	**2013**	**2014**	**2015**	**2016**	**Total 2013 - 2106**	
Water	326.0	306.2	304.4	301.4	297.9	**1,209.9**	
Wastewater	368.1	378.8	376.9	374.2	371.3	**1,501.2**	
Stormwater	13.1	10.7	12.9	12.7	12.7	**49.0**	
Recycled water	23.0	23.5	23.6	25.2	25.7	**98.0**	
Corporate	178.6	176.5	178.4	178.2	180.4	**713.5**	
Less Rosehill scheme revenue	-8.1	-8.2	-8.3	-8.4	-8.5	**-33.4**	2
Total Efficient Operating Expenditure	**900.7**	**887.5**	**887.9**	**883.2**	**879.5**	**3,538.1**	
1. Efficiencies applied pro-prata to proposed expenditure							
2. Bulk water and desalination water are excluded from the efficiency process							

Source: SIR and Atkins/Cardno analysis

Table 6.9 Efficient Level of Operating Expenditure by Service

7. Capital Expenditure

7.1 Methodology

In this section, we present the results of our review of the efficiency of Sydney Water's capital expenditure. We identify the major cost drivers and explain the variances in the current price path expenditure against the 2008 Determination. We comment on the efficiency of capital expenditure in the 2008 Determination period which is used to inform our view of future efficiency.

The methodology for the review of capital expenditure has focused on an evaluation of the information provided in the Information Returns and gaining an understanding of Sydney Water's external and internal environment as well as drivers for capital investment which we discussed in Sections 2 (Business Environment) and Section 3 (Strategic Management Overview) of this report. Our views are guided by the evaluation of asset management and capital investment processes through interviews and Sydney Water presentations, which we discussed in Section 4 of this report. We have commented on the main asset management systems and processes used to budget, track, monitor and report capital expenditure.

We then make an assessment of an efficient level of expenditure for the period 2012 to 2016. We discuss the cost drivers and efficient cost level recommendations for each of the capital drivers (Existing Mandatory Standards, New Mandatory Standards, Growth, Government Programs and Business Efficiency) and the specific activities contained therein.

We have selected a representative sample of capital projects from the 2008 Determination and proposed for 2012 to 2016 to gain an understanding of the efficiency and prudence of the investment; prudence as defined by IPART:

> *The prudence test assesses whether, in the circumstances existing at the time, the decision to invest in an asset is one that Sydney Water, acting prudently, would be expected to make. It should assess both the prudence of **how the decision** was made to invest and also the prudence of **how the investment was executed** where the asset has been built (i.e. the construction or delivery and operation of the asset), having regard to information available at the time.*

A summary of the projects reviewed is listed in Appendix A. Each project has a summary of our findings presented in Appendix B.

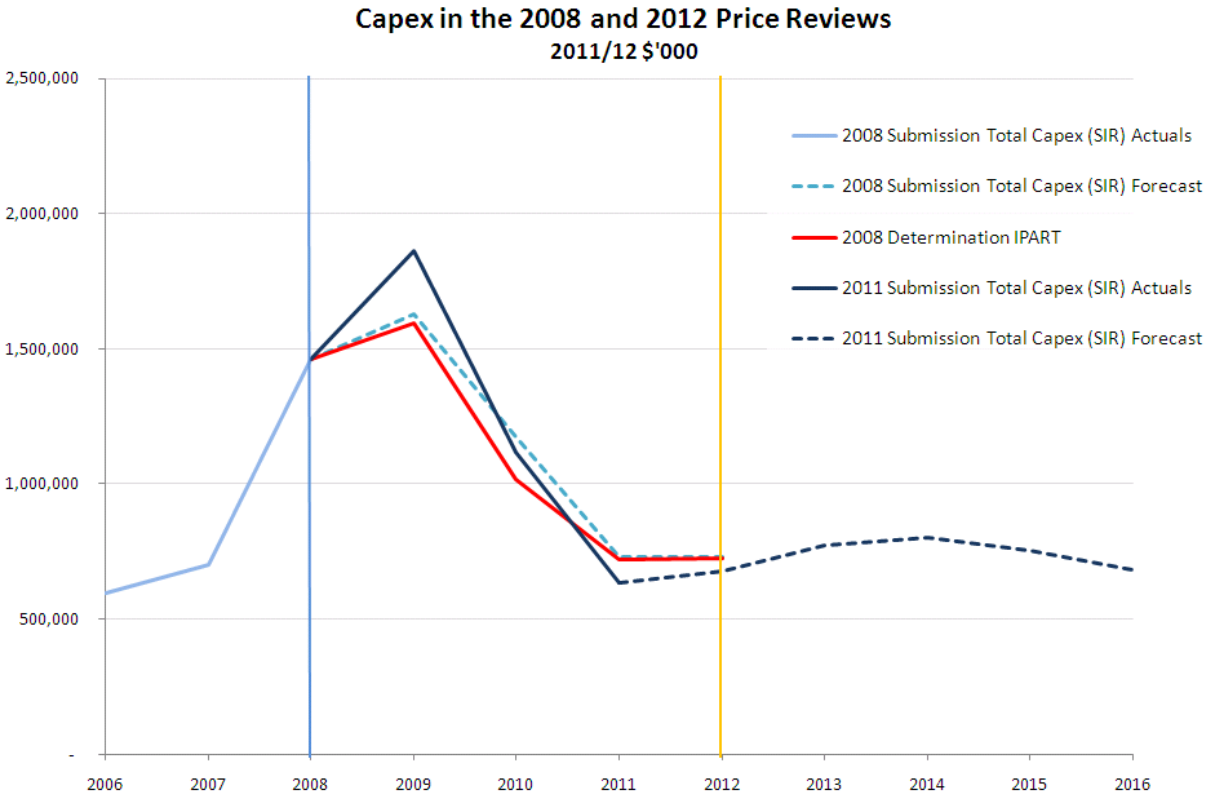
We present our analysis of the future expenditure proposals and comment on each driver on the potential for efficiencies through the robustness of estimates, the need and timing of expenditure and the impact of internal challenge and budget control.

Our views on future capital expenditure efficiencies are based on the hypothesis of a Frontier Company, the continuing efficiencies that a Frontier Company makes through innovation and technological development and the catch-up efficiency required of Sydney Water to achieve the performance of a Frontier Company over time.

7.2 Overview

During the 2008-12 price path, Sydney Water embarked on one of the largest capital programs in its history with the construction of the Sydney Desalination Plant. Historically, Sydney Water typically invests between $600m and $700m per year on capital projects. In 2008 and 2009, capital expenditure exceeded

$1.5bn per year (see Figure 7.1 below). In the 2012-16 price path, capital expenditure is projected to return to previous levels.



Source: Sydney Water Information Return 2008, 2012 and Atkins/Cardno analysis

Figure 7.1 Total Capital Expenditure 2006 to 2016

The investment in desalination clearly outweighs other capital projects and to some extent obscures the "business as usual" over the 2008-12 price period. Figure 7.2 shows total project and actual capital spend over the previous price path as well as projected capital expenditure from 2012 to 2016 without desalination capex.

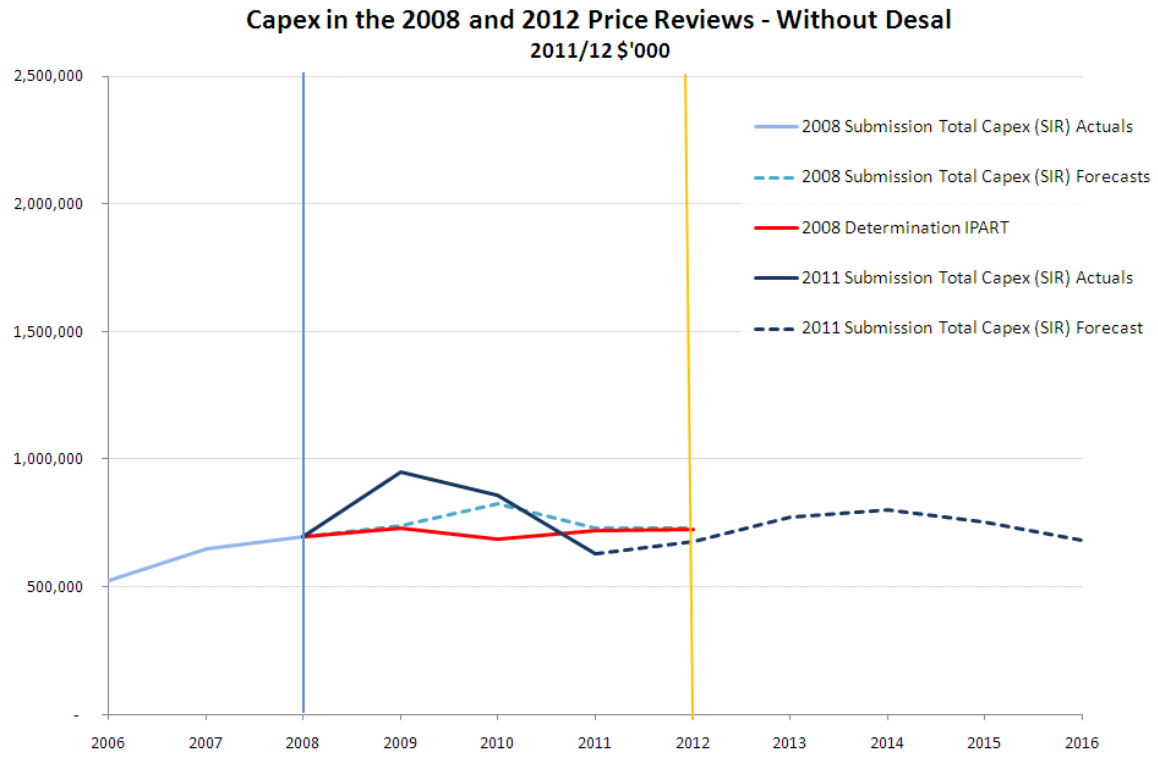


Figure 7.2 Capital Investment 2006 to 2016 (without desalination)

Figure 7.2 shows actual capital spend during the 2008-12 period, the IPART determined capital profile, and the capital expenditure profile originally submitted by Sydney Water at the 2008 Price Review. The 2011 submitted capex forecast is also shown.

When desalination capex is removed, we can see more clearly the variances in projected, allowed and actual capital investment during the last period. Overall, Sydney Water spent more in the earlier years, and less towards the end of the period, generally maintaining the overall expenditure to the IPART determination total envelope. Note that in Figure 7.2, historic figures have been inflated to 2011/12 equivalents, which places a greater "value" on earlier spend. In nominal terms Sydney Water's capital expenditure was approximately equal to the total allowance amount. However, the fact that the spend occurred earlier means that in "real" or NPV terms, slightly more capital was invested than allowed for.

The 2011 Submission projections, extending from 2012 to 2016, show a similar level of underlying capital investment continuing through the next price period. Key features of the 2012-16 capital program include:

- Increasing water capex due to Existing Mandatory Standards and Growth Servicing;
- Broadly equivalent levels of wastewater Mandatory Standards, but an increase in Growth Servicing;
- A decline in wastewater capex for new standards and government programs;
- A drop in corporate Capital Maintenance and similar levels of spend on business efficiency projects, with some new capex for Corporate Growth projects;

- No Government mandated recycled water projects (Section 16A) are expected for the 2012-16 price period, however the level of investment in non-16A project remains similar to that realized over 2008-12.

7.3 Investment Drivers

7.3.1 Capital Expenditure by Component

A similar analysis has been carried out for capital expenditure by component or product area shown in Figure 7.3.

The IPART Determination values included corporate overheads and are therefore not directly comparable with Sydney Water AIR/SIR figures from 2008 when corporate overheads are separated out.

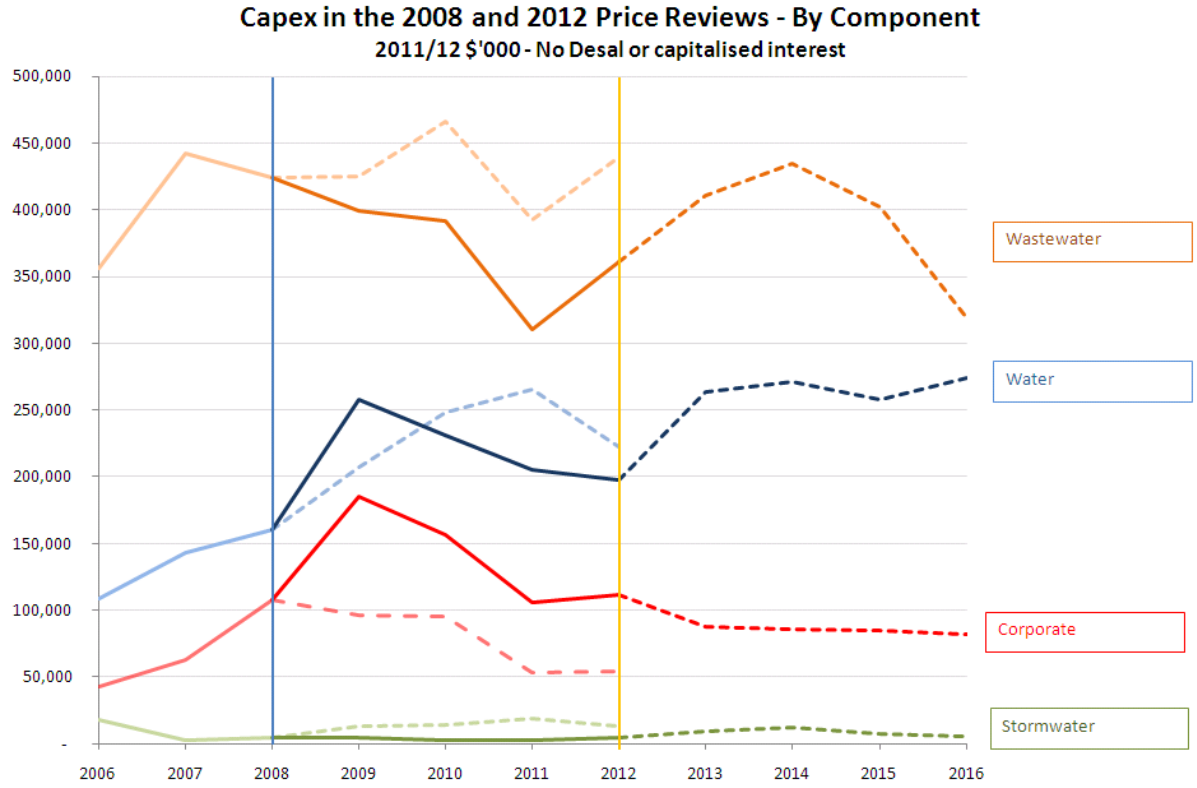


Figure 7.3 Breakdown of Expenditure in Current and Future Price Paths by Component

Figure 7.3 shows the underlying movements within the total capital program, by product. Solid lines are actual figures, while dashed lines are forecast figures for the SIR/AIR submissions in 2007 and 2011. The chart therefore shows forecasts made for the 2008-12 price path and also for the 2012-16 price path. In the current price path, Sydney Water expenditure for the Water service was generally as projected, although it spent less on Wastewater and Stormwater. Corporate expenditure was significantly more than projected.

Figure 7.3 also shows projected capital spend over the next price period. There is a decline in corporate spend as compared with the 2008-12 period outturn and a continuation of the increase in water

expenditure observed since 2006. Wastewater expenditure shows a peak in the future price path, although on average it is similar to current trends. The Stormwater expenditure continues on a relatively even profile.

We reviewed a representative sample of programs/projects with significant expenditure in 2008 to 2012 and 2012 to 2016 to understand the scope of programs/projects, the program/project delivery process, the planned and actual program/project delivery, the reasons for variance in forecast and outturn costs and the contribution to outcomes. Our key findings are summarised in the following sections under the relevant component. Individual scheme summary sheets are included in the Appendix under Capital Projects Reviewed.

7.4 Water Service Capital Expenditure

Water capital expenditure is projected to increase between 2012 and 2016, following an overall increase in real terms from 2005 to 2012. Figure 7.4 below shows water capex by purpose, to get a better understanding of the drivers for this increase. Expenditure is shown to 2017 to observe trends, although the price path covers the period 2012 to 2016.

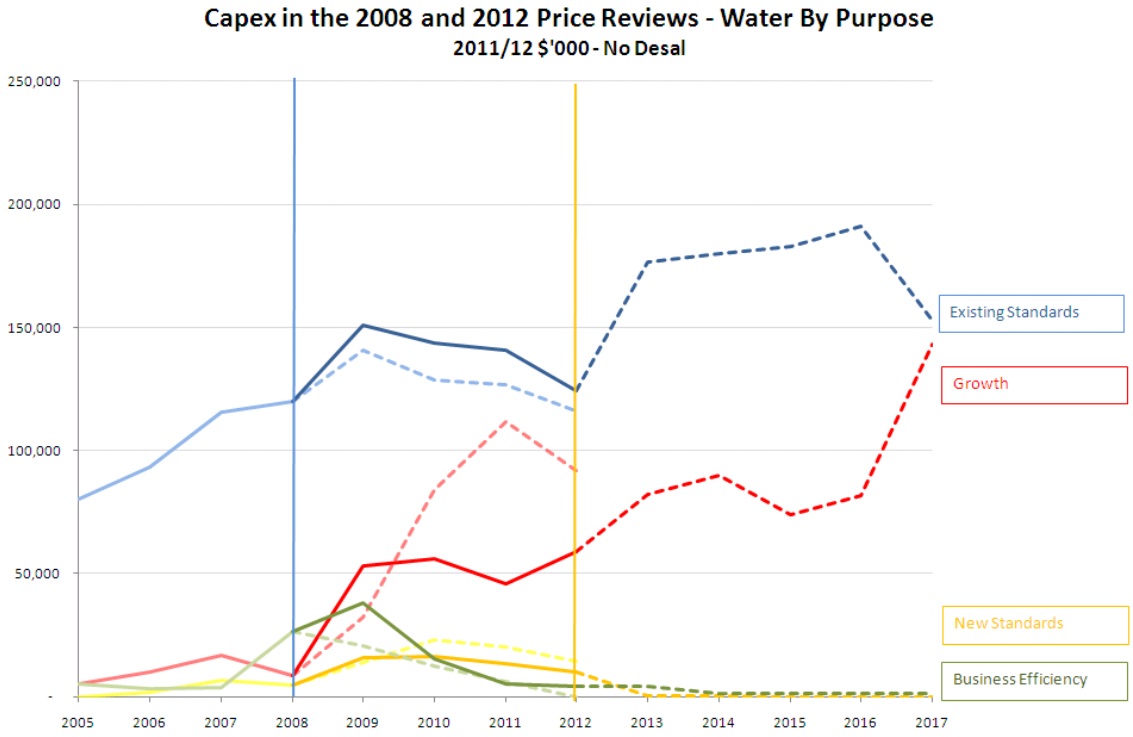


Figure 7.4 Water Capital Expenditure by Purpose 2005 - 2017

The analysis shows that maintaining existing standards is absorbing increasing amounts of capital spend and actual expenditure in the 2008-12 period was slightly higher than forecast. Growth is the other main expenditure, where lower than expected growth between 2008-12 during the global financial crisis resulted in an underspend in this period. Sydney Water is projecting a continued increase in capital maintenance activity to maintain existing standards beyond 2012 and a step change in growth following

the slowdown in 2011. Asset serviceability as measured in outputs shows an improving trend over the current period, which questions why there needs to be a further increase in maintenance expenditure.

Expenditure on new standards and business efficiency measures is relatively small and both showed underspend during the 2008-12 period, with no significant capital projects forecast over the next price period.

7.4.1 Existing Mandatory Standards

Current Price Path

WEM 006 - Critical Water Main Renewals 2008-12

The program covers larger diameter mains (>300mm) and other diameters which have a higher consequence of failure; for example a single source of supply or located under railways. The length of critical mains identified at the start of the current price path was 3,000km (15% of the network). This was subsequently increased to 4,800km of mains as being critical which equates to 22% of the water main network A risk-based approach is taken to identifying and prioritising renewals. An economic model ranks all critical water mains by risk (including probability and consequence).

40km of mains were programmed for renewal under the 2008-12 price path. 32 km of mains were renewed under this program and an additional 8km renewed under other projects.

This is an ongoing program that will continue through the 2012-16 price path.

WEM007 - Reticulation Water Main Renewals 2008-12

The program includes a planned renewal of 420km of reticulation water mains over the 2008-12 price path of which 348km is likely to be renewed. Sydney Water has 16,200km of reticulation water mains which is 78% of the network. Mains with failure frequencies exceeding the trigger level (>3 failures over a two year period) are investigated, evaluated and prioritised for renewal based on failure rate and criticality. Renewals are progressed if the NPV of maintenance costs exceeds the cost of renewal.

The average annual expenditure on reticulation mains renewals in the 2008-12 price path is equivalent to 1.2% of current replacement cost. The average annual length of renewal on reticulation mains in the current price path is equivalent to 0.46%.

This is an ongoing program that will continue through the 2012-16 price path.

WEM009 - Reservoir Reliability Program

The program involves the renewal of reservoir roofs, relining of walls and renewal of some mechanical/electrical equipment including re-chlorination facilities. Sydney Water has 265 service reservoirs in its water supply network. The majority of these reservoirs are constructed of steel. Most of the reservoirs were roofed in the late 1960s/early70s to ensure the maintenance of drinking water quality in the network. A number of these roofs are reaching the end of their remaining life.

This is an ongoing program that will continue through the 2012-16 price path.

WEM012 - Water Pumping Station Renewals 2008-12

Sydney Water owns 150 water pumping stations. 118 are conventional pumping stations supplying reservoirs, while another 32 are booster stations supplying areas with low water pressure. The program aims to renew assets that have reached the end of their economic life.

This is an ongoing program that will continue through the 2012-16 price path.

System Reliability

This project commenced in 2008/09 with $2.5m spent in the current price path. Expenditure on this program is to be ramped up in the next price path.

Future Price Path

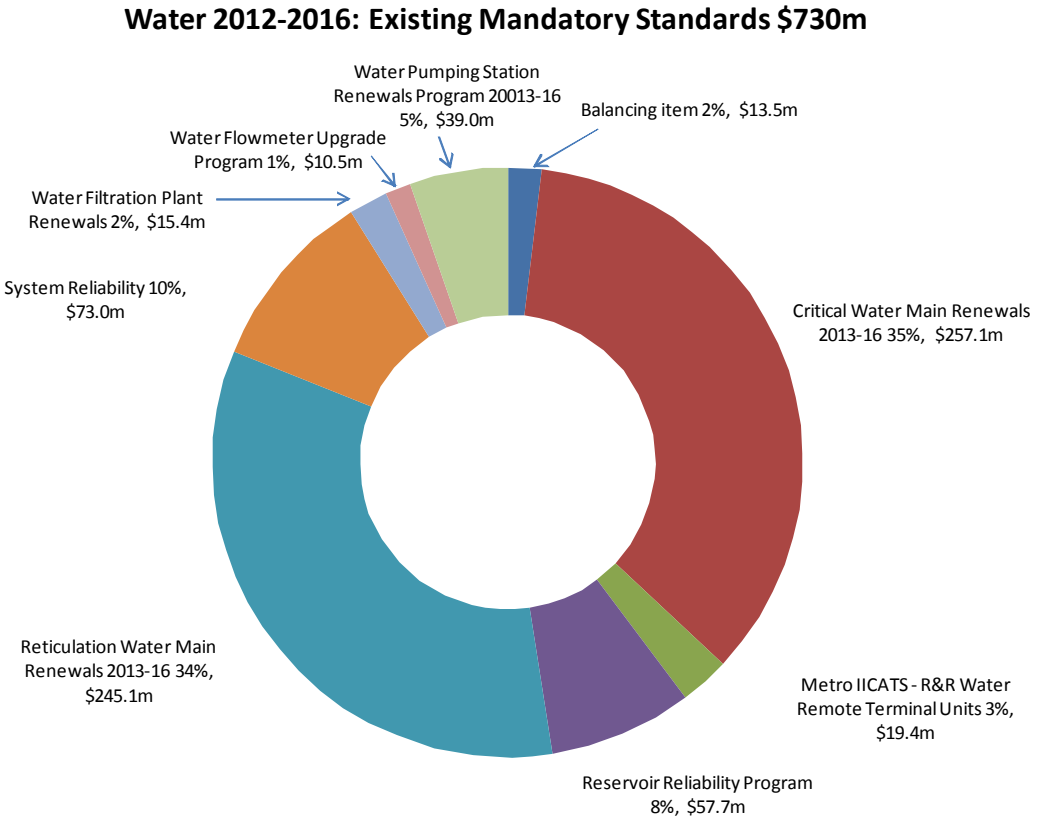


Figure 7.5 Water Service Capex – Existing Mandatory Standards 2012-16

WEM 006 - Critical Water Main Renewals 2012-16

The program is a continuation of the 2008-12 program and involves the renewal of larger diameter mains with a high consequence of failure and associated high risk rating. The SIR has the total for the 2012-16 price path as being $257.1m. This is an increase of 79% over the 2008-12 price path. The length of renewals is programmed to increase from 40km in the current price path to 66km in the next price path. Sydney Water explained that the increased renewal expenditure is due to the increased length (from 3000km to 4800km, an increase of 60%) of mains classified as critical water mains. This has resulted in the renewal strategy changing from plan-to-fail to no-fail for an additional 1,800km of mains.

Table 7.1 shows the breakdown of mains already condition assessed and identified for renewal and the remaining mains that have only been desktop assessed. We were advised that typically about 12% by length of condition assessed mains are found to require renewal. We are of the view that if all High A risk

and 50% of High B risk mains were renewed by the end of the 2012-16 price path Sydney Water's risk from failure of these mains would be significantly reduced. We propose that the expenditure is based on the renewal of 51km of mains. This equates to an expenditure of $200m over the price path and an expenditure of $40m, $48m, $52m and $60m in 2012/13 to 2015/16.

We consider it reasonable to have a transition period from one strategy to another strategy rather than a step increase from $32m to $60m on one year as proposed by Sydney Water. We note that the planned expenditure increased from $31.6m in 2009/10 to $68m 2010/11 which presumably was the time that the length of mains categorised as critical was increased. However, from 2009 to 2011 the average annual expenditure on critical water main renewal was $39m against a planned expenditure of $77.5m and there has been no apparent major problems arising from this under-spend, We recognise the need to increase expenditure on critical water mains but have allowed for a phased increase over the period, from $40m in 2012/13 rising to $60m in 2015/16 which is still a significant increase on current price path expenditure. This will give time to prepare a rational program applying the risk based approach which we discuss below.

Our Asset Management Obligations audit suggested the following improvement:

The separation of water and sewerage mains into no-fail (critical) and plan-to-fail categories allows Sydney Water to focus its resources on assets with greatest consequence of failure. The process could be further refined by allocating a risk rating to all assets based on a consistent multi-criteria consequence of failure and condition rating (likelihood of failure). This allows a transition from less critical to critical assets rather than a definite separation, as is the current case

It is our view that this definite separation that has contributed to the sudden jump in expenditure over the price paths.

		Condition Assessed		Desktop Assessed			
	km	% condition assessed	Length requiring renewal (km)	Length assessed (km)	% likely to require renewal	Length likely to require renewal (km)	Total length requiring renewal (km)
Very high risk	0	100%					
High A risk	51	66%	33.66	17.34	12%	2.08	35.74
High B risk	69	39%	26.91	42.09	12%	5.05	31.96

Table 7.1 Lengths of Critical Water Mains That Have Been Condition or Desktop Assessed

WEM007 - Reticulation Water Main Renewals 2012-16

The program is a continuation of the work in 2008-12. In the current program 348km of mains have been renewed against a planned program of 420km. It was explained that the variance was due to the effects of the pressure reduction program and refinements in the decision making process resulting in reduced lengths of mains identified for renewal. It is planned to renew 300km of mains during the 2012-16 price path. The current rate of 28.5 breaks/100km/year is reasonable. We are of the view that a reduction of in the planned renewals by the end of the future price path is unlikely to significantly impact on the level of mains breaks.

Sydney Water has responded that renewals decisions are based on economic criteria as well as triggers such as number of mains breaks and customer interruptions. We are in agreement with this approach. The 2012-16 Business Case did not include NPV analyses for the program. However, the 2008-12 Reticulation Mains Renewals Business Case shows the following benefit / cost ratios at varying discount rates:

Discount Rate	Benefit/Cost Ratio
4%	1.82
7%	1.19
10%	0.83

As a commercialised entity we would expect Sydney Water to be basing its economic analyses using the WACC (7.5%) as a discount rate. Using this rate, the benefit cost ratio above is slightly over 1.1 which suggests that some of the projects within the program could be quite marginal and a reduction is not likely to have a significant impact on lifecycle costs. However, we have noted Sydney Water's comments regarding the lengths of mains renewed, renewals in more complex areas and that the effects of the pressure reduction program have already been taken into account. We also note that the length of reticulation mains has reduced by 9% through re-categorising some as critical mains. As a result we have reprofiled the proposed expenditure over the period to a 6% reduction of the average 2009 to 2012 expenditure by 2016.

During the interview, we were advised that the Networks Alliance had identified accumulated costs savings of 17% by June 2012 and 25% by June 2013, since the beginning of the Networks Alliance. From the available information it did not appear that these efficiency gains had been factored into the future price path. We would expect to see the results of these efficiency gains incorporated. We have made adjustments as a percentage across the whole program for cost estimates/contingencies and procurement process and these are listed below.

WEM009 - Reservoir Reliability Program

The program is a continuation of the 2008-12 program which involves the renewal of reservoir roofs, relining of walls and renewal of some mechanical/electrical equipment including re-chlorination facilities. Sydney Water explained that some of the assets are at the end of their useful life; Table 4.2 indicates that 15% of civil assets are in a poor or very poor condition. The proposed reservoir expenditure is, on annual average, 0.68% of reservoir current replacement cost and as most of the reservoirs are of steel is considered appropriate. We have reviewed the program and consider that a re-phasing of the program is reasonable commencing with an expenditure of $12m in 2012/13 rising to $15m by 2015/16. This is a reduction of 6.5% on the proposed Sydney Water expenditure, but is a 92% increase on the 2008-12 expenditure.

We were provided with a copy of the Kurnell Reservoir re-roofing planning study, which was a comprehensive document. The report indicated that cost estimate for the preferred option was $1.35m. We were provided with a list of reservoirs scheduled for re-roofing, which presumably will form part of the program business case, that had the estimate as $2.8m. Sydney Water explained that the report (dated August 2011) was based on 2008 tender prices at two smaller reservoirs and excluded costs such as design and project management. The $2.8M estimate was based on a TOC developed in early 2011 for

renewing the roof of the Bonnyrigg Reservoir. We have made adjustments as a percentage across the whole program for cost estimates / contingencies and procurement process and these are listed below.

WEM012 - Water Pumping Station Renewals 2012-16

The program is a continuation of the 2008-12 program, which involves the renewal of assets which have reached the end of their useful life. Assets are programmed for renewal if the future cost of maintenance exceeds the cost of renewal and prioritised based on risk. The approach to the risk assessment process is based on the likelihood of a consequence occurring, but no weightings are applied to any of the consequence categories.

The scope of the proposed 2012-16 investment includes the renewal of mechanical and electrical equipment and ageing HV equipment, which is 40% of costs. The average renewals expenditure in the current price path, as a percentage of current replacement cost, is 0.4%. This will increase to 0.7% in the 2012-16 price path.

From our review we were satisfied of the need for the expenditure and in particular the criticality of the HV equipment. We have slightly re-phased some of the expenditure in first two years of the program.

We were advised that cost estimates in the latter years in the 2012-16 price path were 'order of costs' and that a review of the current contract model is underway. We would expect to see some efficiencies and cost savings arising from improvements in procurement practices and a higher reliability of cost estimation. We have made adjustments as a percentage across the whole program for cost estimates / contingencies and procurement process and these are listed below.

System Reliability

This program commenced in the current price path with some preliminary planning work undertaken. This is a new initiative and Sydney Water is seeking management approval to proceed.

Sydney Water staff have collated over 1,000 risks from resilience plans, vulnerability assessments, climate change assessments, risk registers from operators etc. An initial review of reliability issues has identified 24 projects with an estimated cost of $170m which have been assessed as having a benefit/cost ratio greater than one. Sydney Water is seeking funding of $70.5m in the 2012-16 price path to implement a number of projects which are yet to be identified.

We were satisfied of the need for such a program to improve the water and sewerage system resilience, but given that the program is in the preliminary stages and there has been little opportunity for detailed options analysis and cost estimating, we have re-phased the project expenditure with $38.1m of the proposed $70.5m expenditure being deferred to the following price path.

7.4.2 New Mandatory Standards

Current Price Path

WNM001 - Water Pressure Management Program

The Water Pressure Management Program is part of the leakage management strategy to maintain leakage at 105ML/d as required under the Operating Licence. The program commenced with a few pilot areas and has been ramped up in the last few years. In the past, 20% of the serviced area had pressures in excess of 80m. The program targeted areas with high levels of pressure, leakage, high night flows and main breaks history. As a result of this program, average pressure across the network will fall from 57m to 50m. Each pressure area was economically justified on benefit cost grounds.

Future Price Path

WNM001 - Water Pressure Management Program

At the interviews we were advised that the 2011/12 expenditure would be $0.5M below the figure quoted in the SIR, but an additional $1.9m into 2012/13 (not included in the SIR, which only has a $0.5m allocated as balancing item) is required to finalise projects and for customer consultation. We are of the view that the additional $1.4m required in the next price path is reasonable.

7.4.3 Growth

Current Price Path

WGO001 - North West Growth Centre 2008-12

The North West Growth centre project is one of the major capital investment areas for Sydney Water, as part of the Metropolitan Development Plan. The area is projected to accommodate about 70,000 new properties. Sydney Water investments over the 2008-12 period were planned to service growth, with Package 1 estimated as $100.7m compared with a 2008 determination allowance of $108m. The Sydney Water P_{50} estimate was $122m). The uptake of new properties was slower than expected due to the global financial crisis and resultant slowdown. This results in a number of investments that were deferred, comprising

- WPS 200 + rising main project deferred, based on recommendation of System Performance assessment; and
- Riverstone STP upgrade deferred because existing plant capacity to be fully utilised.

The underspend was also due to lower than expected outturn costs for Rouse Hill STP and Package 1 attributed to delivery efficiencies.

WGO002 – South West Growth Centre 2008-12

As with the North West Growth Centre, the South West Growth Centre (SWGC) is a key part of the Metropolitan Development Plan with a projected 110,000 new properties to be constructed. There has been overspend on the SWGC due to the acceleration of some development and early initiation of planning activities for the 2012-16 period. The two projects reviewed which were implemented under the SWGC in the 2008-12 price path were:

- Oran Park and Turner road water mains projects (P_{50} = $87.9m, P_{80}= $98.7m, Outturn cost = $74.6m (excluding SW costs, $84m with SW costs); and
- Spring Farm water main (sub project): Delivered through Alliance: P_{80} $11.7m, ToC$11.2m, Outturn $9.7 excluding SW, $10.8m with SW.

The strategic plan for the SWGC, which detailed the overall servicing plan, was completed by consultants in 2007. Options analysis was carried out at a strategic level. The water strategy determined early that drinking water would be sourced from existing dams in the "fatal flaw" analysis. Alternatives such as bore water and rain tanks were considered. In 2009 some precincts were released and Sydney Water proceeded with more detailed planning with a Scheme Development Plan. This document was produced internally. Hydraulic modelling was carried out and trunk infrastructure developed. Cost estimation was done internally on unit rates using the internal cost estimating system. This is verified and updated regularly against delivered projects.

The next document developed was the Asset Options Report, which is for a smaller area that the Scheme Development Document. As soon as an area is released, Sydney Water obtains the master plan and develops a Scheme Plan for each precinct. In the case of the SWGC, Sydney Water also carried out the Trunk Scheme Plan because of the overall size of the project. However, this is not typical.

A more detailed cost estimation was then developed by consultants, for a 30 year plan period for the two final options amounting to $16m to $18m. A scoring matrix for benefits was calculated. The scores were divided by costs to get a cost benefit ratio and the final result was the selected option.

Future Price Path

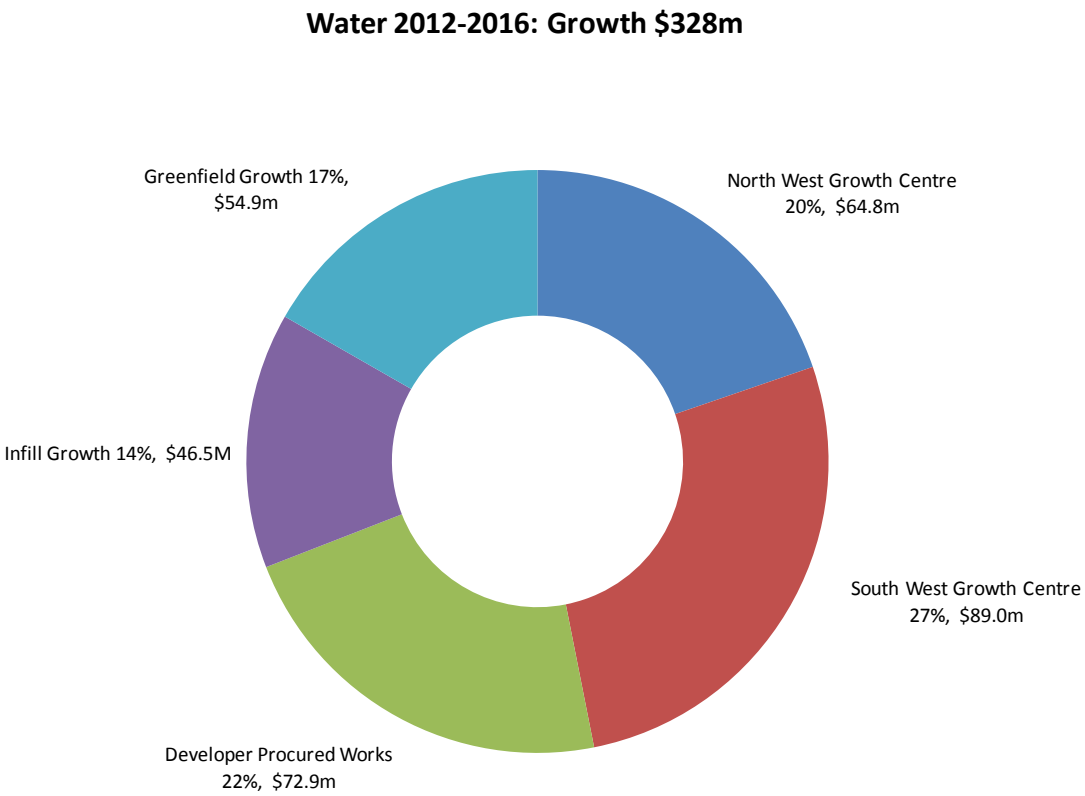


Figure 7.6 Water Service Capex – Growth 2012-16

WGO001 - North West Growth Centre (NWGC) 2012-16

The NWGC program is a continuation of the 2008-12 program and is being developed in conjunction with the Metropolitan Development Program. A sum of $64.8m has been specifically allocated to the water component of this program for the 2012-16 price period.

The capital projects to be delivered form part of a the NWGC strategy, which was developed in 2008, and future delivery component have not yet been developed in detail in the latest business case reviewed, which requested funds for planning and the appointment of a management contractor.

The development of the NWGC strategy appears to have undergone an extensive optioneering exercise, with an elaborate multi-criteria analysis (MCA). Infrastructure implemented during the 2012-16 price path

will be as according to this strategy, and the main opportunities for efficiency will be in timing, business efficiency (Sydney water overheads and costs) and procurement efficiency (Contractor overheads, costs and efficiencies).

Sydney Water has based its connection and population serviced projections on those in the Metropolitan Development Plan and figures correspond broadly to the median Australian Bureau of Statistics projections.

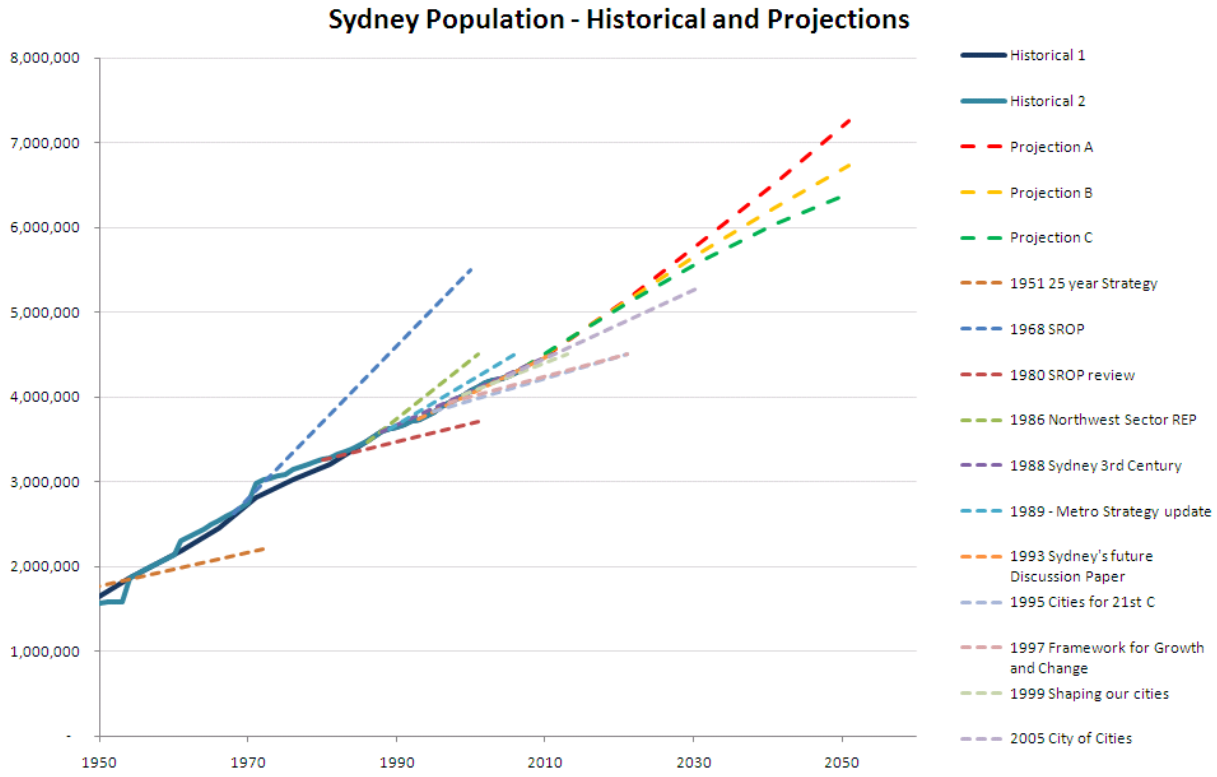


Figure 7.7 Population Growth Projections Sydney 1950-2010

Figure 7.7 Figure shows previous population growth projections developed under various development plans compared to actual population in Sydney and current projections extending to 2050. Sydney Water's current projections appear to be appropriate and conform to growth seen in recent years.

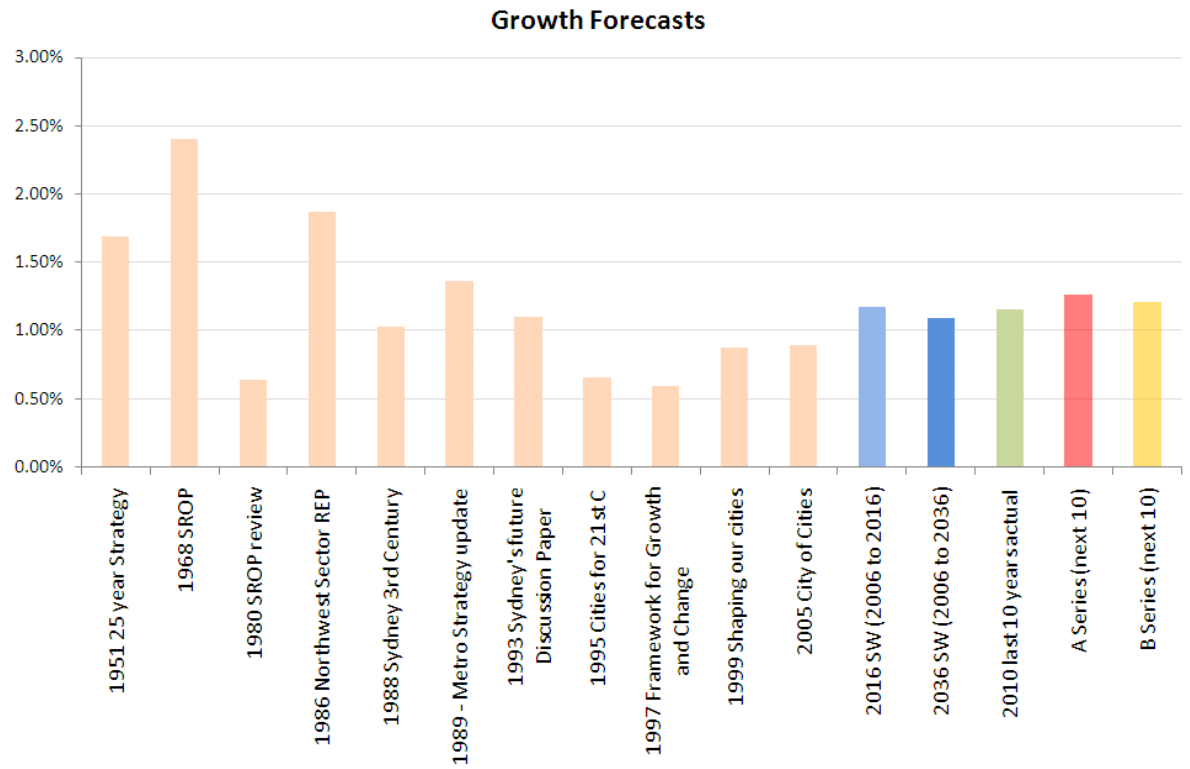


Figure 7.8 Growth Projections 1950 – 2011 (Sydney)

Given the lag in the 2008-12 period (see the Growth Curve in Figure 7.7), it seems reasonable that a re-bound effect will take place during 2012-2016 period. However, the extent of this rebound will depend on economic circumstances and developer plans and are outside the control of Sydney Water. We have assumed some rebound, but recognise the uncertainties in the timing of future investments. We have therefore applied a probability to each year's expenditure from 80% in 2013 to 50% in 2016 with the residual carrying over into the subsequent year. The main impact is that expenditure in 2016 is deferred by six months.

We note that capex estimations are still at a relatively early stage and have not yet reached P_{50} or P_{80} accuracy levels. However the estimates which are submitted in the AIR/SIR do often contain considerable contingency (based on our analysis of the 2008 estimates and outturn costs) and as such, some adjustment should be made to allow for this contingency.

We have also made adjustments for business efficiency that we consider to be appropriate for projects of this nature, where extensive planning costs are capitalised. We noted that in the 2008-12 price path, the North West Growth Centre accrued about 11.1% of outturn costs in Sydney Water overheads. We would expect some efficiencies on this in the coming price period, as large amounts of the area plan have already been developed.

We have also made some procurement efficiency adjustments, which we consider possible in the light of an economic climate which is less favourable than in 2008 when previous alliance contracts were negotiated. Given the major downturn in construction work, we consider that Sydney Water should be able to negotiate substantial reductions in unit rates for contractors and alliance partners.

There are no specific adjustments (i.e. removal of specific works) for this scheme.

WGO002 – South West Growth Centre 2012-16

This project is also a continuation of the 2008-12 SWGC project and in the coming price path, Sydney Water has projected a total of $119,173k, of which $89,038k will be spent on water projects. Our overall comments on Sydney Water's growth projects detailed above also apply for the South West Growth Centre. We note that in the 2008-12 price path, development occurred faster than predicted by Sydney Water. As such, we have not made any adjustments for timing and have accepted the current projected spend profile submitted in the AIR / SIR.

We note that Sydney Water accrued significantly more overheads to the SWGC than to the NWGC, which were presumably for planning during the 2008-2012 period. We would not expect such significant overheads in the next price period as the area plan strategy has now been defined and we would further expect that overhead levels converge to those accrued at the NWGC. We have therefore adjusted future capital to reflect this reduction in overheads.

We have made the same adjustments for procurement efficiencies that we expect will be obtained due to the more favourable "buyers market" as with other infrastructure projects (renewals, NWGC).

We note also that estimations in the AIR/SIR may contain excess contingency and have adjusted the proposed capital allowance to reflect this contingency, with increasing uncertainty (and therefore contingency) in the later years.

7.5 Wastewater service capital expenditure

In the 2008-12 price period, actual wastewater expenditure was significantly under the level projected in the previous price review. As shown in 7.9, the main component of the underspend between 2008 and 2012 was in growth. Maintaining existing standards actual spend was slightly higher than forecast, while the government programs, new standards and business efficiency projects all resulted in less expenditure than projected in 2008. Expenditure is shown to 2017, although the future price path relates to the period 2012 to 2016.

Going forward, maintaining existing standards will continue to be the major area of expenditure and is projected to remain roughly in line with historic levels. Growth is expected to pick up after the financial crisis induced dip of 2010-11, while expenditure for new standards and government programs is projected to decrease over the future price period relative to 2008-12.

From 2012 to 2016 there is a small expenditure forecast for business efficiency programs. In the previous price period, even the modest amounts anticipated were not spent.

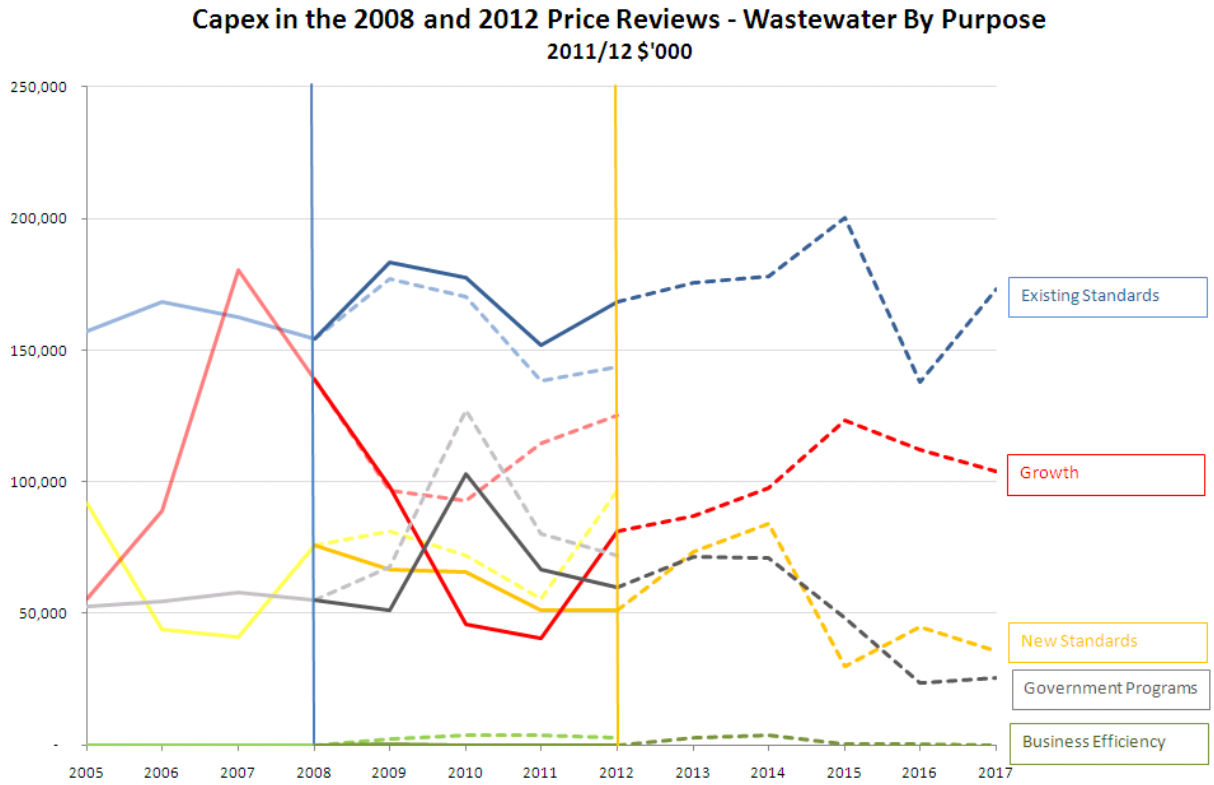


Figure 7.9 Wastewater Capital Expenditure by Purpose 2005-2017

7.5.1 Existing Mandatory Standards

Current Price Path

SEM003 - Avoid Fail Sewer Rehabilitation Program 2008-12

This program renews high risk sewers before they reach the end of their service life. Sewers have been classified as either "Avoid Fail" or "Run to Fail" based on the consequence of failure. The "Avoid Fail" strategy applies to high risk sewers which have an unacceptable consequence of failure. Sydney Water has 2,700km of sewers, including 350 km of pressure mains, classified as Avoid Fail. This accounts for 11% of the network. Sydney Water aims to reduce the lifecycle costs through identifying sewers at risk before further structural deterioration necessitates structural repair. Structural rehabilitation can be around four times the costs of non-structural rehabilitation.

The work is mainly related to rehabilitation of concrete sewers. Since the early 1990s a significant increase in concrete corrosion has been observed with some sewers reported to be corroding at 5mm per annum. Increased concrete corrosion has been due to:

- Implementation of a trade waste policy in the 1980s which reduced the discharge of hydrogen sulphide inhibiting chemicals into the sewerage system;
- Sealing of some sewer vents in response to odour complaints in the 1990s.

This is an ongoing program that will continue through the 2012-16 price path.

SEM002 - Dry Weather Overflow Reduction Program 2006-09

SEM006 - Dry Weather Overflow Reduction Program 2009-12

These programs address renewal of "Plan to Fail" sewers which accounts for 89% of the sewerage network. The strategy aims to:

- Minimise the number of customers experiencing 3 or more sewer blockages in 5 years;
- Minimise overflows to waterways; and
- Renew sewers where breakdown maintenance is no longer cost-effective.

The strategies adopted to individual sewers are based on service and structural grades and these strategies range from breakdown maintenance, root cutting/ control, dig and repair or re-lining.

This is an ongoing program that will continue through the 2012-16 price path.

SEM010 - Wastewater Treatment Plant Renewals Program 2008-12

This program includes the renewals of wastewater treatment plant assets which have reached the end of their useful lives.

Renewal needs are initially identified through 5 year plans and level 1 condition assessment. This is then followed by the development of one year plans that identifies assets for renewal based on condition, performance, business efficiency, safety risk and obsolescence using processes such as FMECA and HAZOP. Assets are programmed for renewal if the future cost of maintenance exceeds the cost of renewal.

This is an ongoing program that will continue through the 2012-16 price path.

Future Price Path

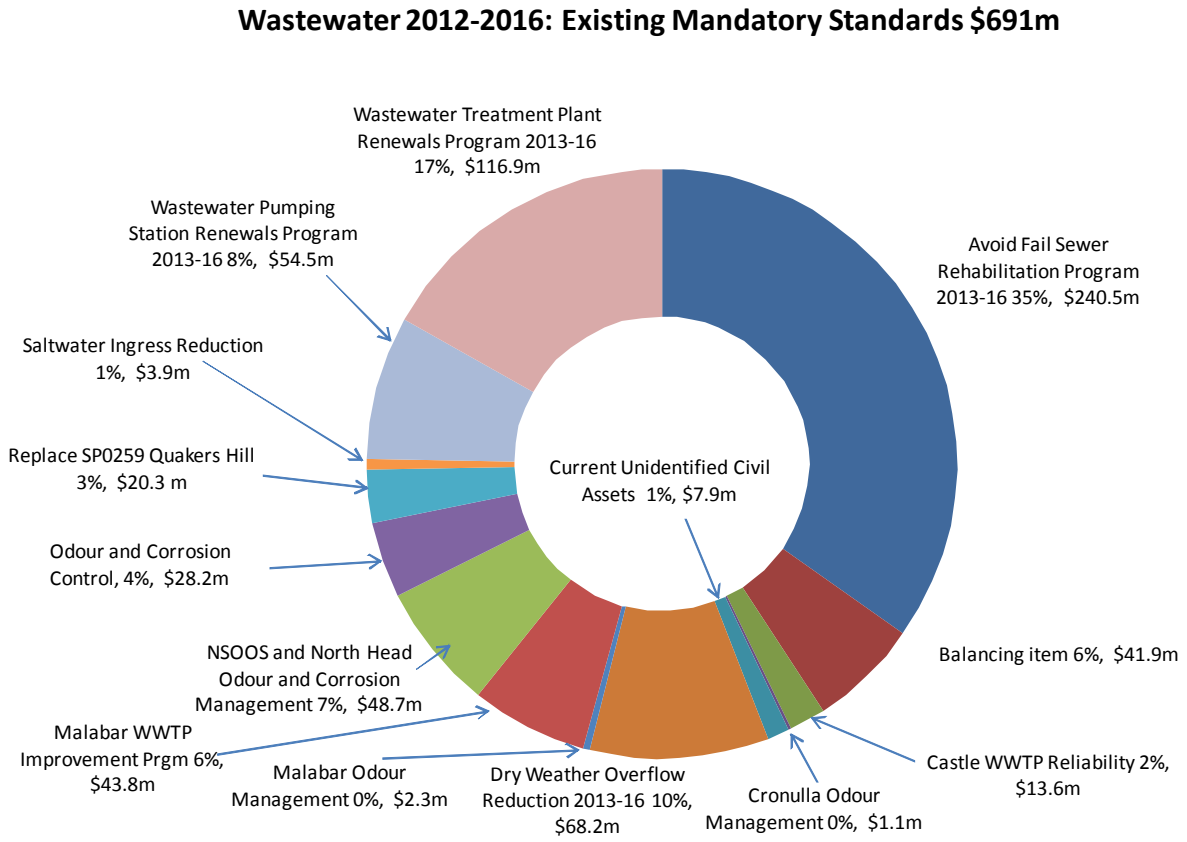


Figure 7.10 Wastewater Capital Expenditure – Existing Standards 2012-16

SEM003 - Avoid Fail Sewer Rehabilitation Program 2012-16

The program is a continuation of the 2008-12 program and involves the renewal of high risk sewers before they reach the end of their service life. 57km of sewers will be renewed in the current price path and this will be increased to 66km in the 2012-16 price path. 44.2km of sewers are rated as being at high or very high risk while another 41.2km are rated as being medium risk with a remaining life in the order of 1-7 years. Actions such as installation of pre-treatment facilities by major trade waste generators, which is mainly implemented and a $28m investment in odour and corrosion control are likely to reduce the rate of corrosion in the future. Sydney Water commented that the pre-treatment is restricted to only a small section of the network and the benefits of the odour and corrosion control investment are unlikely to be quick enough. We note that some investment in the program will commence in 2012/13. Innovative strategies such as use of a sacrificial alkali gel to extend the asset useful life will allow some major renewal projects to be deferred, although the longer term effectiveness of this strategy is uncertain. As a result we propose that the program expenditure is reduced slightly from 2014 onwards. The overall reduction is 3% from that proposed by Sydney Water

SEM006 - Dry Weather Overflow Reduction Program 2012-16

The program is a continuation of the 2008-12 program and addresses renewal of "Run to Fail" sewers which accounts for 89% of the sewerage network. We were advised that investment in this program over the past few years had mainly overcome the backlog of work. This is reflected in reduced expenditure projections for the future price path in Sydney Water's submission. As Sydney Water's performance on sewer blockages/dry-weather overflows in recent years is well within its Operating Licence and this performance continues to improve, we are of the opinion that a further modest reduction in expenditure in the future price path would not cause any significant deterioration in asset performance and service levels and reflect the uncertainties in the future program.

SEM010 - Wastewater Treatment Plant Renewals Program 2012-16

This program includes the continued renewals of wastewater treatment plant assets. The average annual renewal rate in the current price path equates to 0.6% of current replacement cost. This will be increased to 0.76% in the future price path.

We were advised that cost estimates in the latter years in the 2012-16 price path were 'order of costs' and that a review of the current contract model is underway. We would expect to see some efficiencies and cost savings arising from improvements in procurement practices and a higher reliability of cost estimation. We have made adjustments as a percentage across the whole program for cost estimates / contingencies and procurement process and these are listed below.

7.5.2 New Mandatory Standards

Future Price Path

SNM003 - Wet Weather Overflow Abatement 2012-16

The program is designed to abate repeat wet weather overflows to properties and those impacting on swimming and environmental sensitive environments. This is an ongoing program and the major items of expenditure such as Northern Beaches ($50m), Illawarra ($27m) and Quakers Hill ($17m) have already commenced in 2011/12.

We noted from discussions with Sydney Water that while the program has reduced levels of faecal coliforms in watercourses and beaches, the levels continue to still be above recommended guideline values after rainfall events due to the impact of stormwater. Sydney Water has demonstrated its commitment to improving environmental outcomes with $173m in the current price path and a further $184m programmed in the 2012-16 price path. This equates to a total expenditure of over $420m ($ 11/12) from 2005 to 2016. The Environmental Regulator has also been responsive to Sydney Water's constraints as demonstrated through deferring the Northern Beaches project from 2010 to 2012 due to Sydney Water's priority requirement to construct the desalination plant.

We were advised that the program will be reviewed by Sydney Water and the Environmental Regulator during the next price path. This program has been active since 2005 and a benefits realisation review is warranted. We are of the view that most of the 'no deterioration' projects, which have yet to be identified, could be deferred onto the next price path and implemented following the review of the cost-effectiveness of the overall program and future direction for the program. We have allowed $6m expenditure for 'no deterioration' projects in the price path to be expended in areas of significant deterioration should they arise.

7.6 Growth

Current Price Path

WGO001 - North West Growth Centre 2008-12

As with water capex, a large component of Sydney Water's growth capex was spent on the two Greenfield growth areas in the North and South West of Sydney. The completed Package 1 wastewater components include wastewater trunk infrastructure to North Kellyville, Riverstone and Alex Avenue. Wastewater capital expenditure was below the levels projected in 2008 as lower than expected demand meant that the Riverstone STP upgrade could be deferred, using existing headroom. Headroom is also being obtained through reductions in consumption levels following the drought restrictions, which have been relatively inelastic. Sydney Water considers that these demand reductions are permanent and resulting from the installation of water efficient appliances. Underspend was also achieved due to efficiencies from the Rouse Hill STP upgrades.

The investment was delivered by D&C contract, using an external project manager. The work was awarded as a single design and construct contract for water and wastewater disaggregated into packages. The contract awarded was for $68m. Project management costs were $15m. Other capitalised costs include $11.5m for Sydney Water internal costs.

WGO002 – South West Growth Centre 2008-12

As with the water component of the project, the wastewater component is to meet growth needs in the South West. Expenditure on wastewater has been less significant than on water, with Sydney Water making use of interim solutions during periods of low wastewater demand, such as pump-out of wet wells prior to eventual connection to trunk sewers.

Projects delivered during 2008-12 include the augmentation of two pumping stations at a total value of $11m. The pumping stations were delivered by Sydney Water's Civil Project department.

Future Price Path

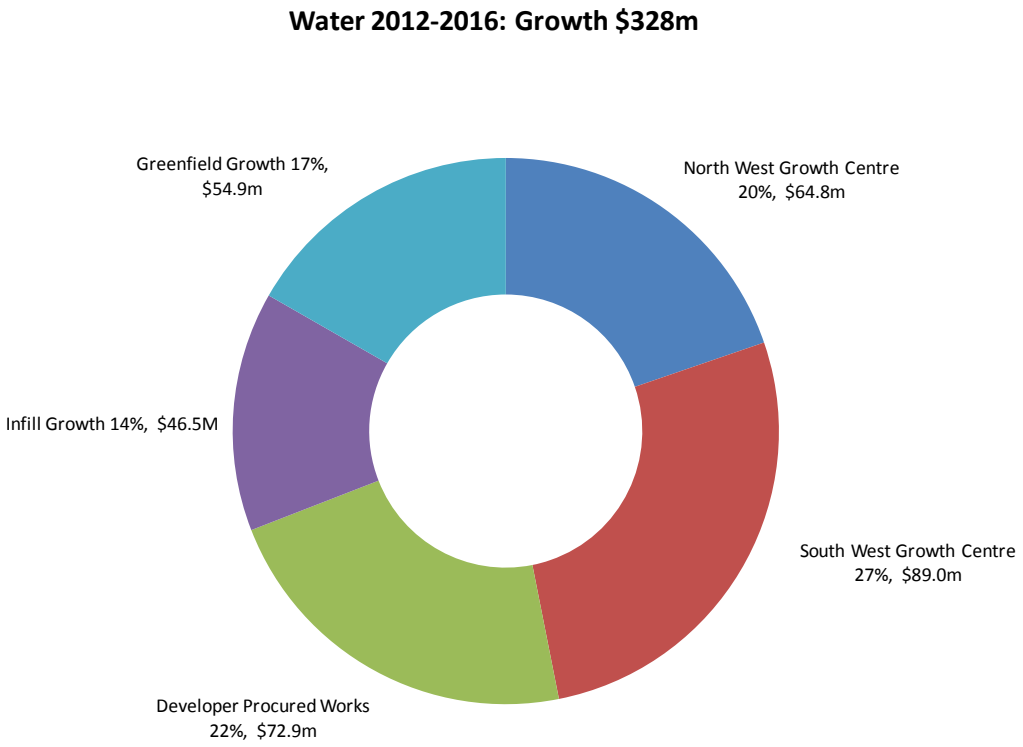


Figure 7.11 Wastewater Capital Expenditure – Growth 2012-16

WGO001 - North West Growth Centre 2008-12

The NWGC program is a continuation of the 2008-12 program and is being developed in conjunction with the Metropolitan Development Program. $121.5m has been specifically allocated to the wastewater component of this program for the 2012-16 price path.

As discussed above in Section 7.4.3, we consider that Sydney Water's growth projections are in line with the Metropolitan Development Plan and other recent forecasts. These appear to be prudent and allow for the latent demand catch-up following the slowdown during the 2008-10 financial crisis. We have not made any adjustments to anticipated future capex based on timing.

Our comments for wastewater spend in the NWGC are essentially the same as for the water expenditure, given that both water and wastewater options have been delivered under the same strategic area plan and are procured according to the Sydney Water procurement framework. We would expect similar business, estimating and procurement efficiencies as those anticipated for water service investments.

WGO002 – South West Growth Centre 2012-16

This project is also a continuation of the 2008-12 SWGC project and in the coming price path Sydney Water has projected a total of $119m, of which $31.1m will be spent on wastewater projects. As discussed above, we have not made any adjustments for timing as we consider the levels of capex to be appropriate and to reflect existing most likely growth projections.

We noted above that the SWGC accrued a higher level of overheads for the projects reviewed than the NWGC and we would expect that this level of overhead to decrease in the future price path, reflecting the fact that substantial amounts of planning have been completed.

We also anticipate the same levels of estimating contingency and procurement efficiency to be attained in wastewater as in water, and have adjusted the proposed capital spend accordingly.

7.6.1 Government Programs

Current Price Path

Priority Sewerage Program (PSP): Freemans Reach, Glossodia and Wilberforce Sewerage Scheme

The Priority Sewer Program, or PSP, was previously referred to as "backlog sewer schemes". We reviewed Stage 2 of the program, which was implemented during the 2008-12 price path, in particular the Freeman's Reach, Glossodia and Wilberforce Scheme. Stage 2 involved a total of eight villages with 2755 lots, of which 1935 had been completed at the time of the review. Of the stage 2 program, seven villages have been completed, only one village has no connections yet.

The Government instructed DEC/EPA to study the on-site systems (circa 1997). The EPA was given a list of villages to study and to prioritise into A, B and Cs. Sydney Water is delivering wastewater services to villages identified in the 2011-2015 Operating Licence.

We were not made aware of Sydney Water's participation in the development of the priority list, or contributing to any cost estimates. Nor were we able to obtain any cost/benefit or feasibility studies for the PSP schemes. The basis for "A" classification is therefore unknown.

Sydney Water decided to use the spare treatment capacity at Richmond TP rather than build a decentralised plant or opt for decentralised treatment. The cost of the scheme is to be passed across the entire ratepayer base.

The options analysis used to chose the eventual solution allowed a 30% weighting to economic criteria. Weightings are decided in internal workshops. The option selected was a pressure sewer scheme, which is used extensively in the US but rarely in Australia. This option requires each customer to have a small pump and pump box installed and allows sewer mains to rise, rather than following a fixed gradient as gravity sewers require. The option was the best as selected under the Multi-Criteria Analysis and also lowest NPV. We note that decentralised treatment was considered, but eliminated at the early stages of the options analysis.

Future Price Path

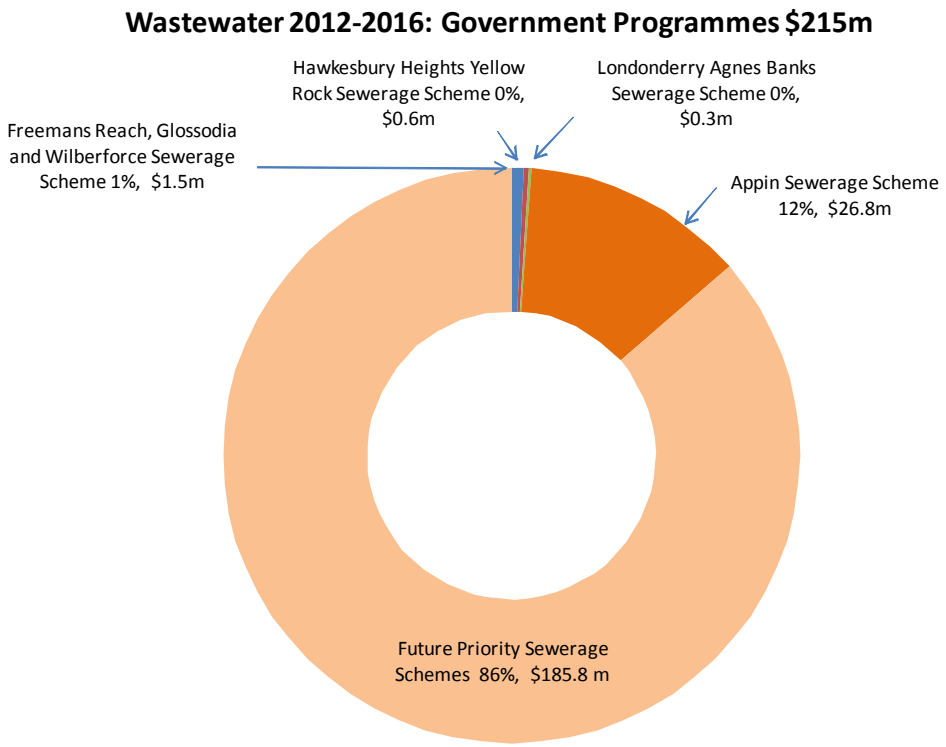


Figure 7.12 Wastewater Capital Expenditure – Government Programs 2012-16

Priority Sewerage Program (Future PSP)

Sydney Water presented their future Priority Sewerage Program for 2012-16 following the audit on the major PSP project of the 2008-12 price path. We note that Sydney Water does not control the schemes which are included in its operating license, as these are mandated by government and that the rate of PSP has been increased with the incoming government. We also note the continuing lack of cost-benefit analysis which might serve to justify these projects on economic, environmental or public health grounds.

Given the mandatory nature, we consider nonetheless that Sydney Water has an obligation to deliver the PSP projects as efficiently as possible and has an obligation to protect the interests of the wider customer base who will be paying for them. As such, we expect procurement efficiencies to be realised as Sydney Water finds more innovative and appropriate ways to deliver the projects, perhaps by using smaller contractors typically used by councils who implement small village sewerage schemes, rather than large alliances.

We do note, however, that Sydney Water had already imposed a significant efficiency in its cost estimating, using a benchmark figure of $65k per lot serviced, which is significantly lower than the outturn costs for Stage 2. We therefore accept that there is reduced contingency in the estimates for PSP submitted in the SIR/AIR. We also note the relatively low level of overheads accrued to the Stage 2 PSP and have therefore proposed no business efficiencies for future PSP.

7.7 Stormwater

Stormwater expenditure during the 2008-12 price path did not attain the levels projected in the AIR in the 2008 submission. The largest component of Stormwater capital expenditure is renewals and the renewals program was considered as part of the audits.

7.7.1 Existing Mandatory Standards

Current Price Path

Stormwater Renewals 2008-12

Sydney Water determines the need for Stormwater asset renewals based entirely on an inspection program and condition assessment. While some assets are "run to fail" and others are "avoid fail", reactive maintenance data is not used to prioritise renewals. This is because there are very few reactive Stormwater work orders. Condition based assessment and prioritisation seems the most appropriate method.

The Stormwater renewals program was significantly underspent in the 2008-11 period. Part of the reason for this was the transferral of identified capital work to maintenance and the lack of capacity within Sydney Water for design services with Stormwater expertise as stated in the 05/06 business case. Investment also follows the cycle of inspections, with an approximately 2 year lag. 6km of renewals every 4 years equates to 1.5km per year or 0.3% of the asset base, which implies a 300 year life (approximately). Given the apparent lack of failures, the level of renewals may be appropriate.

Future Price Path

Stormwater Renewals 2012-16

Sydney Water has projected a significant increase in Stormwater renewal activity over the 2012-16 path ($39m), as compared with what it was able to achieve between 2008 and 2012 ($25m, of which $11m were corporate overheads). However the level of activity projected is lower than what it anticipated in 2008 for the current price path ($64m projected in 2008).

The business therefore appears to overestimate the amount of capital investment it will be able to realise in Stormwater.

We note, however, that a comprehensive and detailed asset management plan has been drawn up for Stormwater assets and that investment follows asset surveying and is condition based. We also note that the current level of replacement when analysed as a % of asset value, gives asset lives of around 300 years. Even the increased level of investment proposed in the 2011 submission would suggest an asset life of 214 years (assuming an asset value of $1,823m in 2006/07 as described in the asset management plan).

As such, we suggest that the level of capital expenditure be maintained on the assumption that the investment needs of an aging asset base will need to be met at some point and that Sydney Water will have the capacity to spend this amount during the next price period. We have proposed that the level of overheads accrued to the projects be reduced through business efficiency measures, but not made any adjustment for estimated costs (contingency) or procurement (rates) as Stormwater work is awarded through competitive tender and is likely to be reasonably efficient.

7.8 Recycled Water

Recycled water capital expenditure was classified differently in the 2008 and 2012 AIR/SIR submissions, making direct comparisons more difficult than that for other areas of expenditure. In 2008, expenditure

was split into the categories of existing and new mandatory standards, government programs and growth. In the 2012 submission expenditure was split into Section 16A schemes and non-Section 16A schemes.

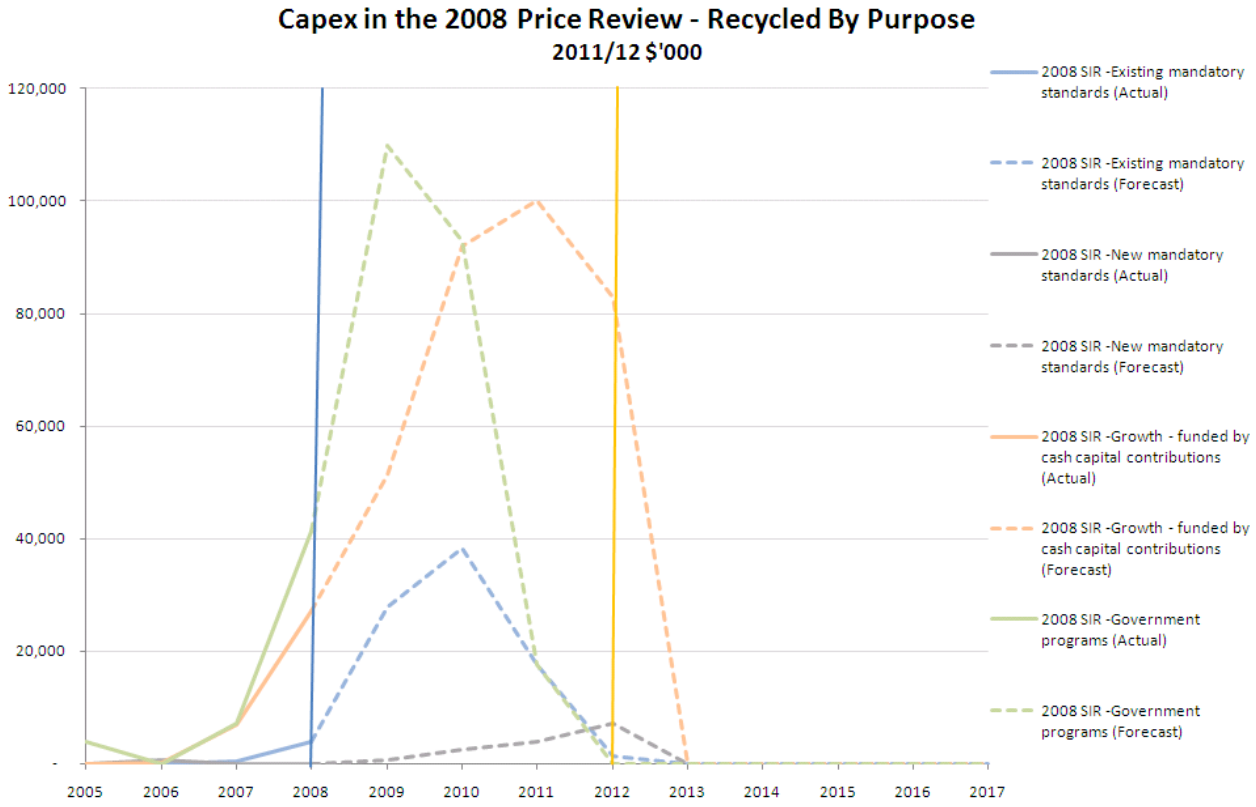


Figure 7.13 Recycled Capital Expenditure in the 2008 submission

In 2008 Sydney Water forecast substantial recycled capital investment for government programs and also growth, funded by cash contributions. In practice, while the main government program project, the St Mary's replacement flow project, was delivered, many of the cash contribution projects did not happen, leaving to an overall underspend.

Expenditure in the 2012 submission is classified into 16A and non-16A projects. Going forward, recycled capital expenditure is projected to be around the $20m/year, all for non-Section 16A related schemes.

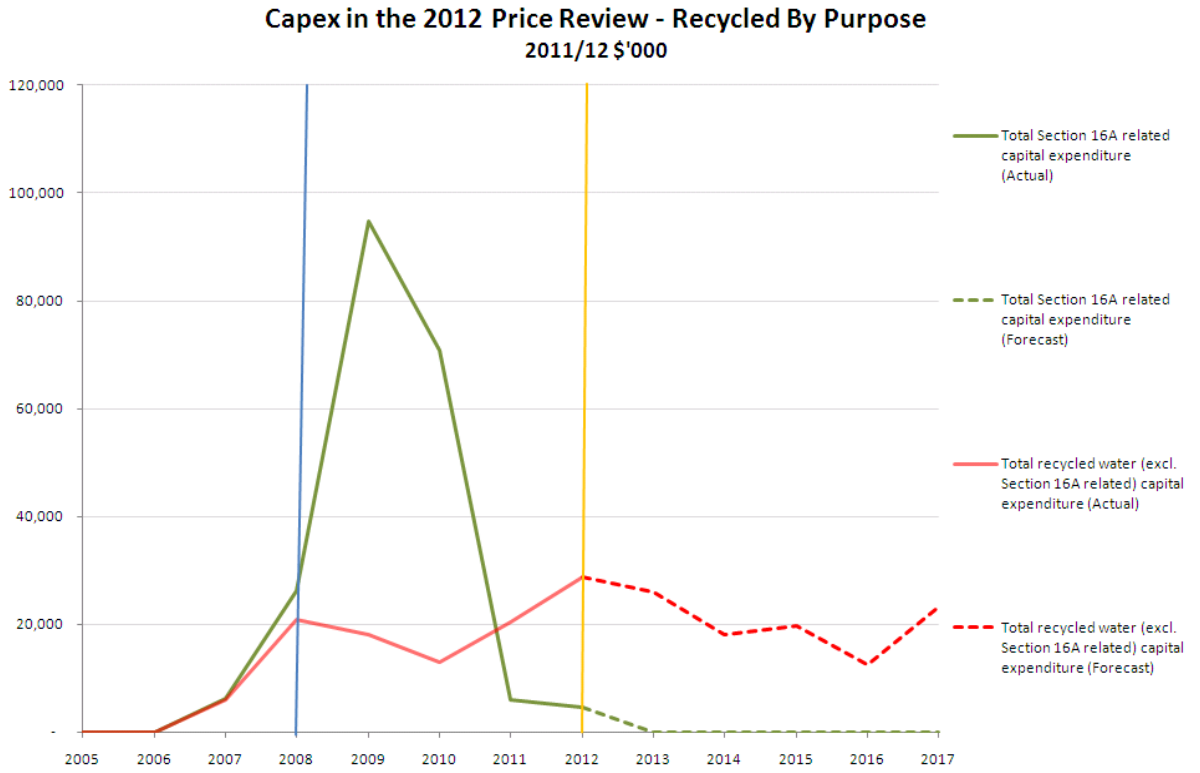


Figure 7.14 Recycled Capital Expenditure in the 2012 submission

7.8.1 Government Programs

Current Price Path

Replacement Flows Project

The project was originally referred to as the Western Sydney Recycled Water Initiative (WSRWI: Replacement Flows) and is now known as the Replacement Flows Project.

The plant capacity is up to 50Ml/d with up to 18 GL/annum discharged into the river. Treatment is by reverse osmosis, 65ML of effluent are required to produce 50ML of recycled water. The concept of "Replacement flows" allows up to 50Ml/d less water to be released from Warragamba Dam. The concept behind recycling and replacing flows was to reduce nitrogen levels to water similar to water from Warragamba. Normal treated effluent is around 15mg/l of nitrogen. Warragamba water is around 1mg, which created a requirement for a reverse osmosis process. In addition to this, in 2004 there was a market assessment done identifying all the potential recycled water schemes. St Mary's was identified because the inland sewage treatment plants were producing high quality effluent already compared to the ocean plants which are only primary treatment. This made favoured an inland recycling project.

Under the government policy to get to 12% of water needs (70GL in total) by 2015 from recycled water, Sydney Water was directed to implement the St Mary's project. It was a major component of the 2006 Metropolitan Water Plan (to secure Sydney's water supply). In 2007 the NSW Premier instructed Sydney

Water to carry out the western Sydney recycling scheme. A letter to IPART instructed the regulator to take the costs into account.

The project was procured through an open tender DBOM contract for the St Mary's water recycling plant, following and expression of interest process. Two contracts were awarded: a D&C and an O&M. the contracts were modelled on the desalination arrangements with an availability and usage charge.

The total estimated cost was $215m and outturn cost was $206m.

7.9 Corporate Services

The other significant area of capital expenditure is corporation-wide projects, classified in the SIR under Corporate. Figure 7.15 shows Corporate expenditure by driver through the current and future price path. Year 2017 is shown for information, although this does not form part of the future price path.

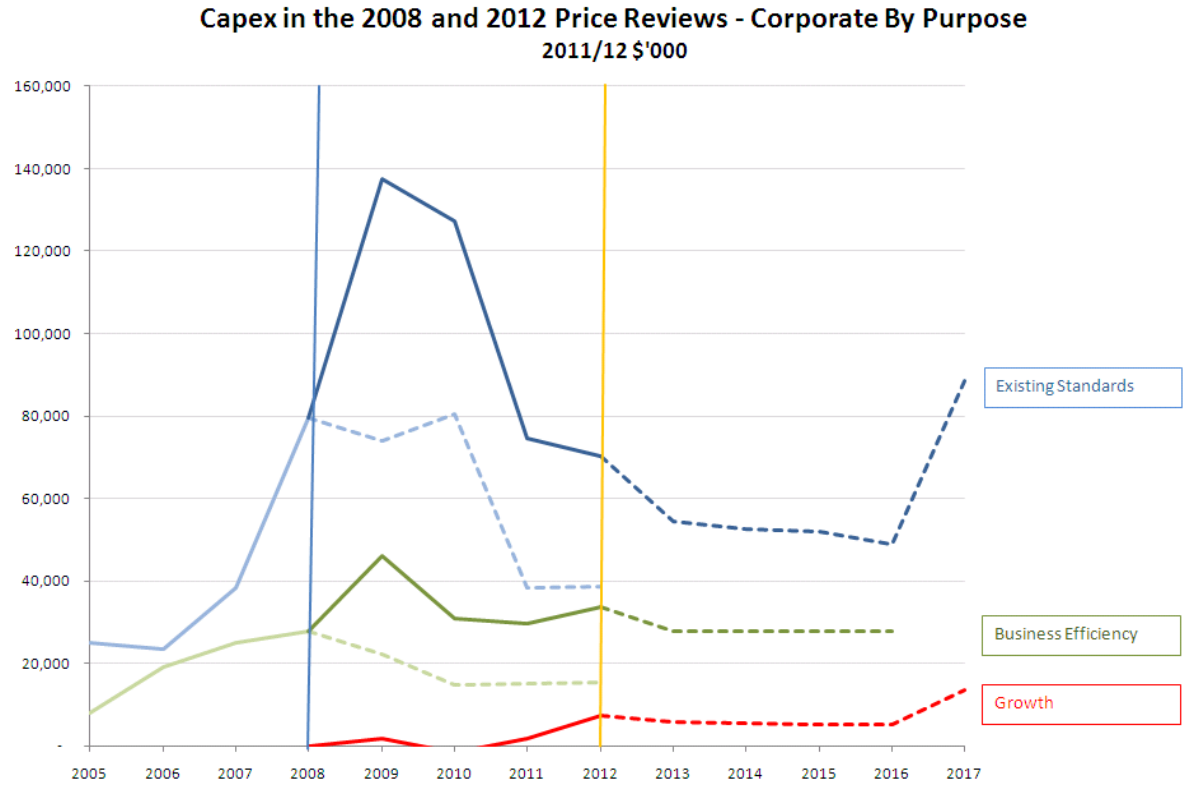


Figure 7.15 Corporate capital expenditure by purpose 2005-2017

Between 2008 and 2012, capital expenditure on corporate projects significantly exceeded the amounts projected in the 2008 price submission. Actual expenditure was $560m compared with some $300m in the IPART 2008 Determination. Both existing standards and business efficiency projects exceeded projected spend.

In the 2012-16 price path, Sydney Water is projecting somewhat lower expenditure against Existing Standards than that observed between 2008 and 2012. Business Efficiency expenditure continues at a similar level as the current price path. In addition to this, some future projects have been identified to support business growth.

We focused our analysis on three of the most material areas of Corporate expenditure in the current and future price plans: IT Services, the Metering Replacement Program[10] and Property. We identified two more IT projects that were not included in our original sample for review and analysis, but which represent significant initiatives and were worthy on further investigation. In Section 3 we comment on the Information Technology Strategy which is relevant to the review of these projects.

Information Technology and Property expenditure generally sit under either Existing Mandatory Standards or Business Efficiency. We had some difficultly separating out the drivers as most expenditure is listed under balancing items. For the purposes of this review, we have included all relevant commentary under the headings of Information Technology and Property. Metering is an Existing Mandatory Standard where we have followed the same format as for IT and Property. The analysis of Corporate expenditure by all purposes and the breakdown of Mandatory Standards by type of investment is shown respectively in Figures 7.16 and 7.17.

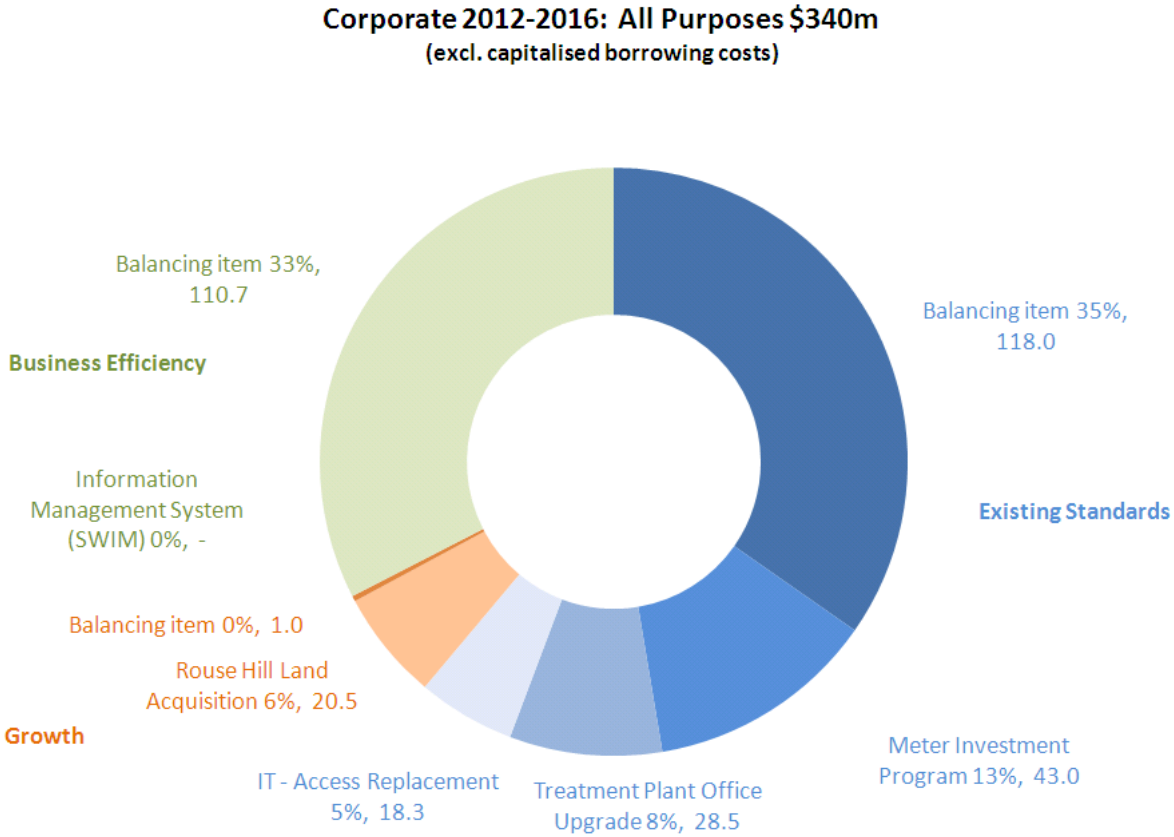


Figure 7.16 Corporate Capital Expenditure – All Purposes 2012-16

[10] For the purposes of asset classification and output measures, the metering replacement program is classified under the Water Service.

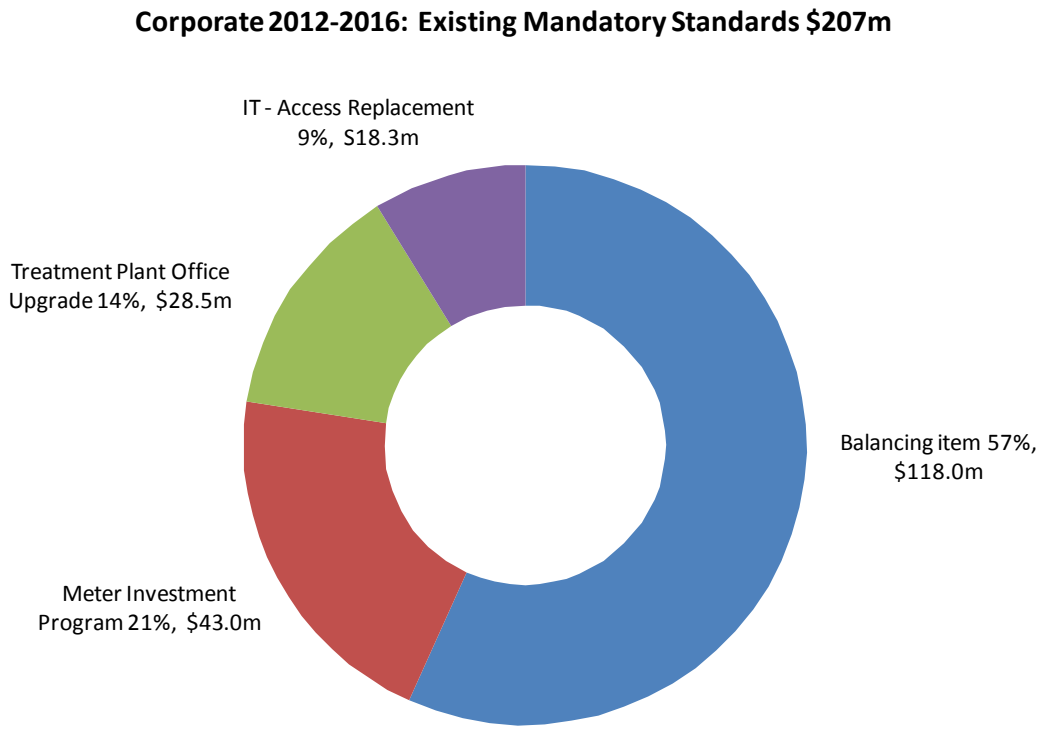


Figure 7.17 Corporate Capital Expenditure – Existing Mandatory Standards 2012-16

7.9.1 Information Technology

Current Price Path

IT Program – General

We formed the view that the level of maturity of IT business planning was not very well developed and that this probably explains the significant variances both in the substantial programs of work and significant level of expenditure when compared with the Submission for the 2008 Determination. This has led us to apply the Prudence Test to this expenditure and focus on the reasons for this significant variance.

Based on the evidence presented to us, we concur with some of the key observations made in Sydney Water's 2010 IT strategy about past performance and we believe that they directly impact on the prudence and efficiency of the Corporation's 2008-2012 IT program. The 2010 strategy highlights issues related to resources, decision making and procurement. Sydney Water's capability and maturity level would not be considered to be frontier at the present point in time (see Section 3.5 in the Strategic Management Overview).

In particular, we observed that the method for estimating costs, both capital and operational expenditure associated with IT projects, was not robust and may have impacted on the strength of and approval processes for the business cases made at the time to justify expenditure. The Corporation stated that it has now developed a better understanding of the life cycle costs of projects and that IT opex costs are built in from the capital investments for 2012-16. It was acknowledged that factoring in the opex implications would have had a negative impact on some of the business cases made at the time.

IT Program - Maximo

Sydney Water uses Maximo (IBM) as its enterprise asset management system. WAMS was originally installed in 2000 and is used in conjunction with the corporate Geographic Information System (Hydra) to manage the pipe assets. It is also integral to Sydney Water's customer contact systems, providing a means to capture and transmit work requests to field crews. FMX, installed in 1998, uses a separate version of Maximo to manage facility assets (including the pumping stations, treatment plants and reservoirs). The Corporation identified critical operational business risks if nothing was done and the proposed investment aimed to consolidate the two Maximo systems into a single system based upon the latest version, migrate and consolidate all data and replace twelve legacy systems with Maximo functionality.

Figure 7.18 shows the timeline and costs for development of the various business cases and cost estimates compared with the 2008 Determination. This is indicative of the unsatisfactory scoping and estimates for the system in the early stages of the project and indicates the timescale over which the implementation took place. The outturn cost for the system was well above earlier business cases and 25% over the July 2008 Business case.

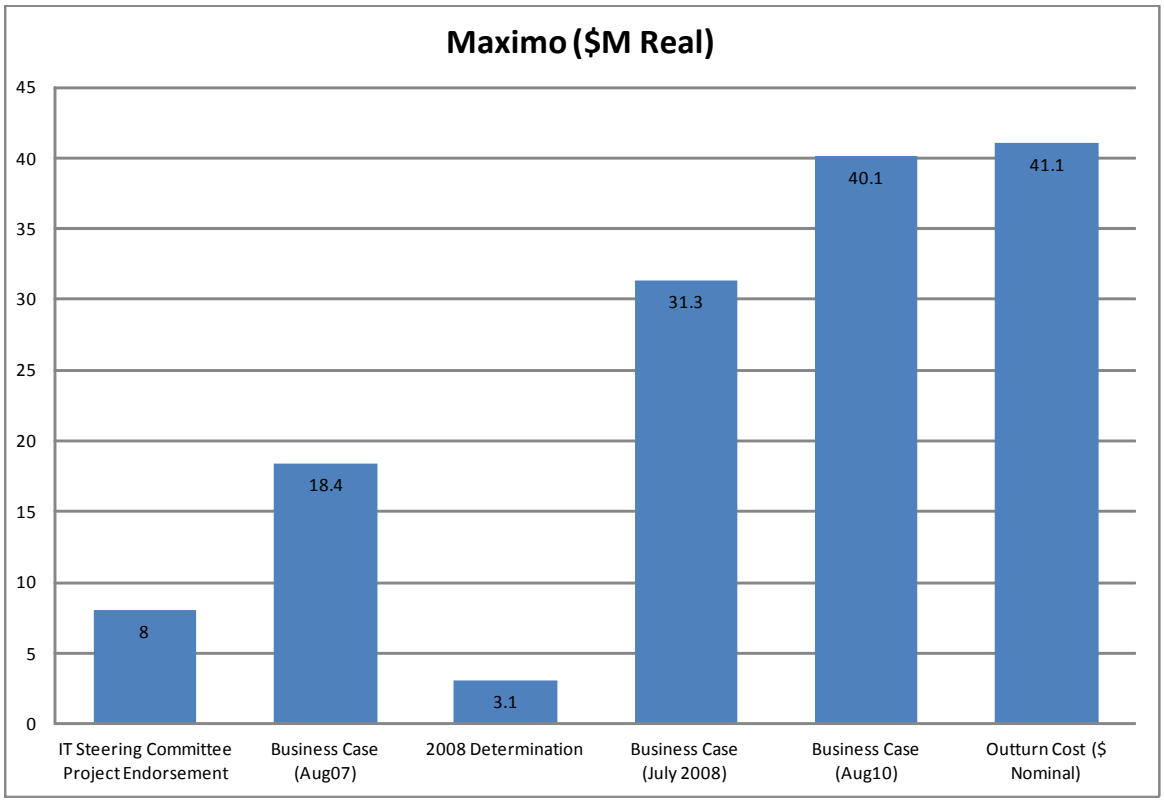


Figure 7.18 Maximo Investment History

Future Price Path

IT Program - General

It has been challenging to assess Sydney Water's IT program for 2012-16. There is a lack of visibility in the submission and in the SIR for expenditure over the next price path. In particular, we cited the failure to itemise IT expenditure on projects with a value greater than $10 million. The Corporation explained that this was an oversight due to a miscommunication internally.

Sydney Water has overspent considerably on IT capital expenditure during both the 2004 to 2008 and 2008 to 2012 price paths when compared with its original submissions and we have some concern that this trend may continue in the future price path. Capital expenditure between 2008 to 2012 is forecast to outturn at $260m, which represents 8.7% of total capital expenditure minus the desalination plant (6.4% if the plant was to be included). This was against a proposed expenditure in the 2007 Submission of $142m or 4.9% (minus the desalination plant). The Corporation's 2011 submission identifies $204 million on IT renewals and new projects, which represents 6.8% of Sydney Water's total capital expenditure. We have compared Sydney Water's rates of investment with other data that is available and concluded that it is on the high side. KPMG benchmarking indicated in a report to Sydney Water an industry average range of 3.3% to 5.7% of IT spend against total capital expenditure for UK water companies for the period 2010-2015. Our own analysis of water and sewerage companies' Final Determinations in England and Wales indicated an average of 5.5%. We also identified some work done by Southern Water in 2009, which showed that based on IT spend models provided by a leading industry research organisation, companies spend an average of 6% of capital expenditure on delivering IT services and improvement projects. For the utilities sector, the report indicated the figure to be 5.1%.

Investment	Product	Asset Type	SW Driver	2012-13 ($2011-12 Real)	2013-14 ($2011-12 Real)	2014-15 ($2011-12 Real)	2015-16 ($2011-12 Real)	Total 2012-13 to 2015-16
IT Capital Program	Corporate	Information Technology	Renewal	18,450,000	18,450,000	18,450,000	18,450,000	73,800,000
IT Capital Program	Corporate	Information Technology	Business Efficiency	27,675,000	27,675,000	27,675,000	27,675,000	110,700,000
New Hawksbury Nepean River System model	Corporate	Information Technology	Growth	665,477	240,389	129,689	0	1,035,555
Access Replacement	Corporate	Information Technology	Renewal	487,805	951,814	3,714,398	13,136,284	18,290,301
							Total	203,825,857

Table 7.2 – 2012 -2016 Proposed IT Expenditure

We were unable to reconcile the 2012-2016 proposed IT expenditure with the presentation and subsequent supporting documentation provided by Sydney Water. The sum of the total proposed capex in the presentation was $216.1m and on further analysis we identified that it included expenditure beyond 2016 and also failed to include any projects with a value under $10m. Sydney Water re-issued its proposed investment plans for 2012-2016 and while they are broadly in line with the SIR total for Information Technology ($204.1m), the revised plans do not take account of ACCESS Replacement ($18.3m) or the Hawkesbury-Nepean model ($1m) which are included in the SIR. We are unclear why they do not reconcile though the Corporation states:

> *This information provides justification for an expenditure of $224m (including $20m for ACCESS and Hawkesbury-Nepean model) for the four year period. Sydney Water will prioritise the projects based on business benefit and risk mitigation to keep within the submission of $204m.*

We have included below details below in Table 7.3 details of major projects >$10m including proposed expenditure during the future price path.

Work Package Name	Work Package Type	Item Description	Total Cost ($M)	2012-2016 ($M)	Driver	Estimate notes
Customer Management System 2 Self Service	New Capability	The scope of this work package is to deliver identified CMS functionality to the Sydney Water web e.g. change of address etc.	13.2	7.1	This Customer Management Solution Release Two (CMS R2) program objective is to deliver enhanced capability of the CMS solution; these enhancements will improve the customer experience at Sydney Water. The new capabilities will include: Web self-service for Property Owners via a "Manage My Account" portal Web self-service for Property Managers via a "Manage My Properties" portal. Improvements to Outbound Correspondence.	Business Case prepared 2011
Sub Total			**13.2**	**7.1**		
BAU Refresh of Personal Computer Equipment	Renewal	Regular business and usual refresh of desktops, laptops, and tablets.	31.0	16.0	Infrastructure life-cycle	Based on existing costs
FMIS Upgrade or Re-Platforming	Renewal	Initative to upgrade PeopleSoft version. IT Strategy confirms that Peoplesoft will be the platform for FMIS over the next 5 year period. Note: 9.1 was released in 2009 and will be supported until Sep 2015 based on the Oracle Life-cycle policy lifetime-support-applications-069216.pdf. This upgrade may or may not be required depending on future of Peoplesoft past 15/16. The FMIS strategy will indicate the exact nature of this project i.e. upgrade or re-platform.	10.0	5.0	Risk assessment based on product life-cycle and age.	Estimate based on projects of a similar size and nature
FRM Re-platforming	Renewal	Work to implement the strategy Field Mobility Strategic Enhancement Pathway i.e. Replatform FRM onto the appropriate platform.	16.0	16.0	Risk assessment based on product life-cycle and age.	Estimate based on initial implementation project.
GIS Program - GIS Renewal (Phase 3)	Renewal	Sydney Water's IT support for the GIS capability has been identified as requiring re-platforming and renewal to address current IT risk issues as well as increased business demand for new GIS capabilities. This program being addressed by three projects: - Hydra Upgrade (Phase 1) - GIS Strategy Review & Remediation (Phase 2) - GIS Renewal (Phase 3)	37.0	10.0	Risk assessment based on product life-cycle and age.	Estimates based on figures provided by Deloitte in GIS Strategy Review.

Work Package Name	Work Package Type	Item Description	Total Cost ($M)	2012-2016 ($M)	Driver	Estimate notes
GIS Program - GIS Strategy Review & Remediation (Phase 2)	Renewal	Sydney Water's IT support for the GIS capability has been identified as requiring re-platforming and renewal to address current IT risk issues as well as increased business demand for new GIS capabilities. This program being addressed by three projects: - Hydra Upgrade (Phase 1) - GIS Strategy Review & Remediation (Phase 2) - GIS Renewal (Phase 3) This strategy needs to also consider the AMD requirements to look at moving the GIS capability to the portal in Sydney Water's information.	7.5	7.5	Risk assessment based on product life-cycle and age.	Estimates based on figures provided by Deloitte in GIS Strategy Review.
GIS Program - Hydra Upgrade (Phase 1)	Renewal	Sydney Water's IT support for the GIS capability has been identified as requiring re-platforming and renewal to address current IT risk issues as well as increased business demand for new GIS capabilities. This program being addressed by three projects: - Hydra Upgrade (Phase 1) - GIS Strategy Review & Remediation (Phase 2) - GIS Renewal (Phase 3)	15.0	15.0	Risk assessment based on product life-cycle and age.	Estimates based on figures provided by Deloitte in GIS Strategy Review and Business case prepared Apr 2011.
Minor IT Applications Renewal	Renewal	Contestable budget to cover risk mitigation activities for the Silver and Bronze tiered applications. Access to funding requires full business case and Steering Committee endorsement. This is 2M based on 5% of the nominal renewals budget of $40M.	14.0	8.0	Contestable funding based on business case as required. Typically risk based on product lifecycle.	Estimate 5% of renewals budget
Server Platform Refresh Program	Renewal	Every year approx. 1/5 of the fleet needs refreshing. Request for Tender to refresh, support and maintain the server platform. Support and Maintenance for a minimum of 5 years	19.1	11.2	Risk assessment based on infrastructure life-cycle and age. Contract refreshed 2011.	Estimate based on size, growth and current contract price.
Storage - SAN Equipment	Renewal	Storage contract replacement is due FY12/13. This initative will evaluate the storage landscape and implement the appropriate procure the appropriate technology solution to support the storage requirements for at least five years. This includes the consideration of the blended in-house outsourced recommendations out of the Storage Strategy.	25.0	15.0	Risk assessment based on infrastructure life-cycle and age. Current contract expires 2011.	Estimate based on size, growth and current contract price.

Work Package Name	Work Package Type	Item Description	Total Cost ($M)	2012-2016 ($M)	Driver	Estimate notes
e-Developer Re-platforming	Renewal	e-Developer will likely require some action with the life of Staffware unknown and Tibco's stated intent to end of life the product.. Whether this is driven by Risk Mitigation or a significant re-platforming due to New Business Capabilities will be the subject of an investigation project currently planned for FY11/12 or FY12/13. This initiative to implement this action.	10.0	10.0	Risk assessment of the solutions fit for purpose, life-cycle and age. Underlying technology lifecycle. Planned investigation of urban development (e-developer) process.	Estimate based on projects of a similar size and nature
Access Replacement Program	Renewal	Project is to replace Access billing system and satellite systems to provide modernised business processes, supported by a core Customer Information System (CIS) and a limited number of additional applications to deliver Sydney Water's target state business capabilities & services.	Unknown	18.3	Guiding Principles used by the Project: to maximise operational efficiency and achieve process simplification; mitigate risk by replacing legacy billing systems near end of useful lifes and prepare the busines for the future.	Requested but no breakdown of costs provided.
Renewal Total			**184.6**	**131.9**		

Table 7.3 Areas of Major IT Investment in Future Price Path

Overall, we identified for the next price path that there was a lack of robust supporting documentation presented to us both in terms of methodology documentation, financial data and business cases put forward for the majority of IT investment. In many cases, the Corporation is only at the stage of producing 'one pagers' with very little or no other supporting documentation and, as their name suggests, they do not address either at all or in sufficient detail the decision making process.

By way of example, we highlight the case presented by the Corporation for GIS ($59.5m of which $32.5m is proposed in the next price path). Based on our review of the information made available to us, we formed the view that the Corporation's plans are still very much in their infancy and there is a lack of clear direction for this project. The Corporation's proposed expenditure is based on proposals in a 2007 report, which has not been updated. The review included a Gantt chart, but it appears that little or no action has been undertaken since 2007. We would expect the decision making process for this and other projects to address the need and scope of project, the planned project budget, program and outputs, the options considered in the appraisal and the appropriate prioritisation and timing for the scheme. We would also expect to see the assessment of the project outcomes and contribution to Sydney Water's capital program drivers (a significant proportion of IT expenditure falls under business efficiency, but there is relatively little developed about how these projects will contribute to efficiency). Where step increases in funding are requested, we encourage the Corporation to consider quantifying to as great an extent as possible not only the benefits for the business but the eventual benefits for the customer in order to justify investment.

In summary, we formed the view that the IT investment planning cycle does not appear to be aligned with Sydney Water's business planning process and it is not sufficiently developed to justify all of the proposed expenditure. This is further reinforced by our view that Sydney Water appears to be an outlier when benchmarked against other companies' expenditure on IT as a proportion of total expenditure. Sydney Water responded that its IT asset base was not sufficiently developed and as stable as UK water companies. We have to make a decision based on what we have seen, discussions with Sydney Water and comparisons with frontier companies. We formed the view that cost estimates, information and processes provided were not sufficient to justify the level of expenditure proposed over the period. We therefore propose a reducing expenditure profile to meet the 5.5% (of total capex) comparative benchmark by 2016.

Current and Future Price Path

IT Program - Customer Management System and Billing System

While we understand the reasons behind Sydney Water's decision to implement separate customer contact management and billing systems, we believe that the IT maturity level of a Frontier Company would lead it to follow the path of an integrated system – which is both the preference and the norm in many of the utilities with which we are familiar. The latter approach is more likely to promote best value also when considering the whole life least cost solution.

Clearly, it is important to have an understanding of the local context which influenced Sydney Water's chosen path. In 2002, the Corporation terminated its project for a combined billing and contact management system when the supplier failed to deliver on project commitments. The Corporation's starting point moving forward was to implement separate systems and thus the costs of implementing a combined system with an alternative supplier has never been undertaken. In Sydney Water's own words:

> *…Ultimately the organisation's appetite for a big bang CRM and billing replacement simultaneously could not be justified in light of previous failed attempts at doing so. A clear*

finding from the Auditor General's report on CIBS was to incrementally implement a replacement program in smaller and more manageable chunks.

In 2003, the Sydney Water Board commissioned a review by Accenture, which was then updated in 2005, of the sustainability of the billing system, ACCESS. Accenture supported Sydney Water's decisions to build functionality alongside ACCESS, rather than within ACCESS, for customer management and to later replace ACCESS with a new billing system. Accenture put forward other options that could be considered, i.e. CRM standalone or CRM integrated into billing though it did not make a clear statement of preference for which approach would be more suitable. Accenture was not asked to consider the technical or financial implications of replacing legacy billing system, but to consider the options if it is retained.

In 2007, Cap Gemini recommended considering SAP as combined provider, which is of relevance given the options currently being considered by Sydney Water. Cap Gemini stated that

…While there are limited examples of utilities implementing SAP CRM without SAP IS-U, we would recommend keeping SAP CRM in the frame for consideration at this stage. SWC could engage SAP locally to establish if they would be confident to propose SAP CRM standalone without SAP IS-U in a competitive tendering process.

Figure 7.19 shows the timeline and costs for development of the various business cases and cost estimates. This is indicative of the unsatisfactory scoping and estimates for the system in the early stages of the project and indicates the timescale over which the implementation took place. Outturn costs for the system are forecast to be consistent with the June 2009 business case.

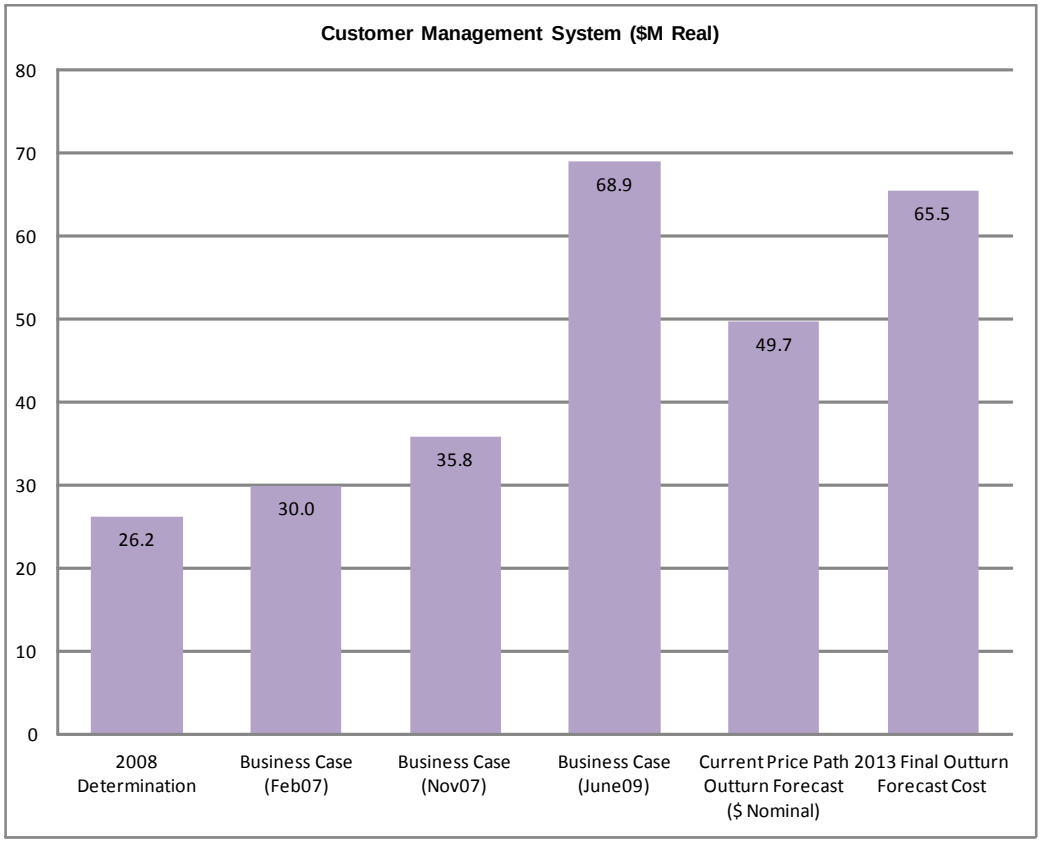


Figure 7.19 CMS investment history

We challenged Sydney Water about the lack of visibility about its plans for a new billing system of which a *"..nominal..."* or *"...placeholder.."* amount [the Corporation's description] has been included in the Sydney Water's submission. While the Corporation stated that it "...will prioritise IT projects based on business benefit and risk mitigation to keep within the submission of $204M...", we are concerned that actual investment will increase significantly as has been the case for some of the major IT projects in the current price path. The Company's 2010 IT Strategy stated that:

> *...Large programs of work requiring significant IT capital investment will not be able to be funded within the $40-50M average [capital expenditure each year] – these will result in 'spikes' of investment relative to the breadth and complexity of the replacement program....During the 2010-2015 cycle, programs that sit above this level are the ACCESS replacement and the GIS renewal.*

Furthermore, we are also concerned that the preferred approach may be wider than a replacement billing system in scope. The Corporation has recently invested heavily in "best of breed" applications (respectively the Customer Management System and Maximo) yet one of the products under consideration has amongst other modules applications which perform these tasks. Implementation of an Enterprise Resource Planning Systems (ERP) was also cited[11] and would appear to go against the Corporation's stated IT strategy, which has focused and is focusing on a "best of breed" application approach. The Corporation responded that *"...Currently there are no plans for the implementation of an ERP solution across Sydney Water"*.

In response to our requests for more information on its proposed expenditure and the timeline for the project, Sydney Water stated that:

> *The Sydney Water IPART submission 2012-2106 includes $18.3m to commence work on the replacement of our legacy mainframe billing system (ACCESS).*
>
> *Since preparing our submission, Sydney Water has been working with Accenture to develop a detailed plan for the replacement for ACCESS. The initial conclusion of this study indicates that a replacement of all the systems that support the billing process would take up to five years and require a large capital investment.*
>
> *As a result of this information, Sydney Water is exploring options for minimising delaying this investment as much as possible, while still giving due regards to the risks associated with the timing of any investment.*
>
> *Even given our intention to defer the expenditure, it is now considered likely that an investment greater than $18.3m will be required in the 2012-16 determination period. Should this be the case, we will make every effort to accommodate the expenditure within the Corporation's forecast capital envelope. Any remaining investment required will be included in the 2016-17 submission.*

We would have expected this information to have been incorporated into Sydney Water's submission. Our concern is that any underspend in other areas of the Corporation's capital program will be diverted to this and other IT projects which will have not progressed through the efficiency review process. This occurred in the current price path.

7.9.2 Meter Replacement Program

Current and Future Price Path

Replacement of damaged, faulty and broken meters is an essential activity in order for Sydney Water to correctly bill customers and maximise revenue. The accuracy of billing is also the biggest source of

[11] Cited during the review and in the Sydney Water Corporate Plan 2011-12 to 2015-16: Strategic initiatives committed to in SCI 2011/12 - IT Strategy - Develop ERP strategy and deployment options by 2-15/16 (p17).

customer complaints and Sydney Water has an obligation to comply with the National Measurement Act (accuracy of +/-4% required).

Sydney Water is forecasting a variance of 153,843 meters (-36%) under output target. This was as result of the changes in criteria used for replacing meters in late 2007 and delays from electrical work safety procedures which led to a significant reduction in the amount of planned replacements (as opposed to faulty exchanged and new installed meters which appears to have been broadly as anticipated). However, the forecast outturn costs are broadly in line with the 2007 SIR as a result of a significant increase in the costs of meter installation due to site access and conditions being more difficult than assumed as well as on the grounds of increased health and safety requirements and the significant increase in the number of large meters actually installed. In the first instance, the risk appears to have been borne exclusively by Sydney Water under the terms of the original meter installation contract which had a provision for variations on all non-standard jobs. This resulted in 40% to 50% variations of all jobs in the first two years, totalling $5.8m. The contract was re-negotiated in 2010 with a cap of 5% variations permitted under specific circumstances. We believe that some of the increased costs were down to the contract design and that the revised contract demonstrates that it was not originally executed in the most prudent or efficient fashion. We have therefore made a deduction of $2.4m (50% of $5.8m) for the current price path.

The current criteria for replacing meters is 3,600 KLs and 15 years for 20mm diameter meters and 10 years for larger sized meters. However, the Corporation's investigations indicate that it is likely that there will be a further lengthening of the asset lives of 20mm domestic meters. This has the potential to result in a material reduction in the profile of the meter replacements in the future price path from 2013, when validation of Sydney Water's initial findings will be completed. We formed the view based on past performance and the evidence currently available that a more realistic profile would involve reducing the number of meters to be replaced annually between 2013 and 2016 by approximately 10%.

We have also challenged the prudency and efficiency of the proposed remote meter program for 25,000 properties. There is $1.2m and $4.8m budgeted respectively in the current and future price path and, while we recognise there are some clear benefits, we are not convinced by the overall strength of the business case:

- The Corporation is proposing a hardware solution when our experience suggests that a customer service option is effective, i.e. making appointments to visit properties where meter reading requires access to premises.
- Sydney Water's own evidence appears to suggest that a customer service focused solution achieves positive results and calls into question the need for the proposed solution. The number of meter/billing related complaints does not appear to be attributable in any significant way to the issue of lack of meter reads.
- While Sydney Water's program is targeted at 25,000 metered properties, there are only approximately 4,000 properties which could be described as having chronic inaccessible meters (not read > 24 months); we note that 341 meters are identified as being located in hazardous locations and while we acknowledge this is a challenging issue, it is not sufficient to justify the program in itself.
- The case for remote metering a small number of properties (10,000 properties) was ruled out partly on the grounds that this would result in some houses in the same suburb having remote meters and others not "….which may result if customer complaints". There is however no

evidence to suggest that the pattern of distribution of 25,000 inaccessible meters would be any different.

- Sydney Water identified a compliance risk that "if inaccessible meters continues to increase, the management of inaccessible meters could become a KPI in the future" however IPART was able to confirm to us that it has not considered regulating this area and that it is highly unlikely to be an indicator in the future price path.
- The benefits stated by the Corporation relating to the cost and revenue impacts that accrue for remote metering against obtaining meter reads through inspections do not appear to be significant enough to justify the proposed expenditure.

Taking account of the reduction as a result of the change in age profile as well as the 19,000 remote meters planned in the first two years, we are proposing a revised meter replacement profile of:

Indicative Numbers	2012/13	2013/14	2014/15	2015/16	Total
Exchanged - Faulty	12,000	12,000	12,000	12,000	48,000
Installed - New	12,000	12,000	12,000	12,000	48,000
Tested	1,700	1,650	1,650	1,650	6,650
Replaced (Original)	65,000	85,000	85,000	85,000	320,000
Replaced (Revised)	65,000	76,500	76,500	76,500	294,500
Remote Reading (Original)	10,000	10,000	0	0	20,000
Remote Reading (Revised)	0	0	0	0	0
Total (Original)	**100,700**	**120,650**	**110,650**	**110,650**	**442,650**
Total (Revised)	**90,700**	**102,150**	**102,150**	**102,150**	**397,150**

Table 7.4 Revised Meter Replacement Profile

We also identified that Sydney Water will benefit from additional revenue from manufacturers under the terms of the warranties for meters as well as from customers if the proposed new ancillary charges for services are approved. The Corporation estimates that the income generated or saved is likely to be in the region of $175,000. This had not been offset in the future capital expenditure requirements as it is not considered to be material.

7.9.3 Property

Current Price Path and Future Price Path

The key outcome of the overall reform agenda for Sydney Water's Property Program over the last decade has been property rationalisation. We have highlighted elsewhere in this report the robust asset management plans that Sydney Water has in place for its operational activities. However, we did not see compelling evidence which demonstrated that the property assets managed by Corporate Services are managed with the same rigour and clear objectives. We identified the lack of an up to date property strategy, which clearly set out the Company's plans and objectives for the current and future price paths. There was a patchwork of strategic documents and plans with which we were provided[12] and which

[12] Property Strategy (2000), Workplace Accommodation Strategy (2003), Office Consolidation Proposal (2004), Depot Consolidation Strategy (2004) and Property Asset Consolidation Efficiency Project Procurement Strategy (2006).

broadly set out the Company's approach but they had not been updated and there was no single overall strategic overview.

We formed the view that this lack of an up to date strategy impacts on the robustness of the Company's business planning in this area and probably explains the significant variances both in terms of monetary investment, but also in terms of substantial programs of work which were not originally contained in Sydney Water's 2007 submission, which have been realised during the current price path.

Our review of business cases also suggests that there was a significant backlog of work which built up and which further explains the high level of activity in 2008-12. It is thus arguable that Sydney Water's approach was not most efficient way of managing its property program. The consequences of deferrals on the business – as cited in a Sydney Water business case - are likely to have been:

- Increasing maintenance costs;
- Increasing OHS issues (risks, incidents, fines), e.g. condemned sites were still occupied and used;
- Reducing productivity and impact on delivery of business operations;
- Non compliance with codes and standards; and
- Decreasing staff morale.

While we can see evidence of effective project management on an individual project basis, we saw little evidence of monitoring of or demonstrating best value at a program level.

We challenged the Corporation how it could give us comfort that the significant increase in capital expenditure from that planned in the current price path will not be repeated in the future price path. Sydney Water explained that the program up to 2012 has benefited 90% of employees thus a sense check demonstrates that there are not many other major sites that require significant capital investment (the major area of future capex relates to the Treatment Plants Office Upgrade).

The property expenditure is a second example, after IT procurement, where significant expenditure was made in the current period which was not identified, costed and subject to the rigour of an efficiency review. This is a further example of what we found to be an inadequate comprehensive strategy and rigour of an investment program. It is surprising that these proposals were not included in the 2008 Determination as major expenditure is reported in 2009 and 2010.

7.10 Prudence and Efficiency in Current Price Path

The IPART brief requires us to comment on the efficiency and prudence of capital expenditure in the current price path. The prudence test relates to how decisions are made on the basis of information available at that time and how the investment was executed.

We have considered the efficiency and prudence of capital investments during the 2008-12 price path and comment under key headings.

Strategy

The water and wastewater growth projects reviewed appeared to have investigated a number of options and carried out comprehensive multi-criteria analysis. In the examples audited, the chosen options were almost always the least cost options, as well as the options which scored well in non-financial categories. Economic or Financial criteria appear to be given an approximate weighting of 30% in the multi-criteria analysis, which would be the minimum we would recommend, especially given the subjectivity of other criteria. Some projects have no direct community consultation (because the communities do not yet exist)

and their preferences are assumed by Sydney Water in internal workshops. Given that the project costs are not born by the stakeholders involved in the workshops, but by Sydney Water's wider ratepayer base, no parties except Sydney Water have an interest in minimising capital or operational expenditure. For this reason, it may be appropriate to increase the weighting of the financial component and to place a stronger emphasis on cost-benefit analysis where projects are carried out for environmental reasons.

Recommendations to ensure prudent expenditure in future include:

- compulsory cost benefit analysis which goes beyond multi-criteria scoring to estimate financial and economic benefits of major investments, including for all projects which are mandatory;
- establishment of an environmental and or social baseline prior to project implementation and monitoring of project impacts and results;
- the need for community / government financial contributions for projects which are not cost-beneficial for Sydney Water.

We have not made any adjustments to prior spend to allow for inappropriate choice of water, wastewater, stormwater or recycled infrastructure options. We have applied adjustments to future capital expenditure.

Timing

Sydney Water demonstrated examples of using interim solutions to delay capital investment, which appear only to have been applied in a number of instances and represent a welcome development and approach to delivering "just in time" infrastructure where possible. In the audits we were not able to identify projects which had been delivered unnecessarily early. We also observed a step approach to matching supply and demand and noted that long-term reductions in demand are resulting in infrastructure life extension and use of headroom in treatment and networks. We note that it would be useful for Sydney Water to quantify these savings (the results of delaying investment, and additional headroom due to reduced demand), as customers may feel that water efficiency measures are not translating to savings on their bill. While this is a partly a public relations exercise, it could be important in maintaining water efficient behaviour.

We have not made any adjustments to prior capital spend to allow for timing/premature investments.

Procurement

The procurement methods used by Sydney Water for the 2008-12 infrastructure investments appear to be reasonable and some effort has gone into developing procurement guidelines and strategy. In the instances of competitive tender which were studied at audit, due process had been followed with appropriate independent scrutiny and advice. This resulted in an effective tender process.

However, we have concern on the procurement process not delivering value for money where the form of contract appears to unduly reward alliance contractors. Alliances may offer less value for money and some of the unit rates agreed appeared excessive. We have not offered any retrospective adjustments to capex to account for these unit rates, we have adjusted future capex to allow for improved market conditions when procuring infrastructure in the coming price path.

Our view was based on a representative sample of the capital projects undertaken by Sydney Water. As part of that review, unit rates agreed in Alliances were considered and compared to comparable rates elsewhere in Australia. We understand that the full value of Alliances cannot be gauged from unit rates alone. We also considered target outturn costs and actual outturn costs, noting that there did not appear to be the balance between "gain share" and "pain share" that we would expect from a well adjusted

Alliance program, which suggested that despite independent review, target outturn costs may have some excess contingency.

While we appreciate that the alliance contract helps align the interests of Sydney Water and its partner, we would expect that overall the balance of carrots and sticks would ensure that the program is delivered to a challenging budget, rather than a budget which contains sufficient contingency to ensure that the "pain share" nature of Alliancing is rarely used. We therefore feel that there is some modest scope for efficiency in capital budgeting.

The process of developing probabilistic cost estimates is useful, but these appear to be systematically higher than target outturn costs. We would expect a true "P_{50}" estimate to be approximately equal to a target outturn cost, so that the alliance has a 50% chance of outperformance and a 50% chance of underperformance. As it is, Target Outturn Costs (TOCs) are rarely exceeded and as a result Sydney Water is paying a "gain share" more often than contractors are suffering a "pain share". While this indicates performance in the right direction, it may also indicate excessive contingency in ToCs, P_{50}s and P_{80}s. In theory, a P_{50} should be exceeded 50% of the time. While cost overruns are undesirable and we do not want to encourage them, P_{50}s are clearly being set with too much contingency.

On the basis of applying the prudence test to sample projects, improvements to the form of contract could have delivered more efficient outcomes in the range of 0.5 to 4%. However, we do not have sufficient information to form a robust view of prudent expenditure in the current price path. We have however set some challenging efficiency targets for future expenditure.

Business Efficiency

We note from our analysis of Sydney Water on-costs that these vary over a range of 3% to 16% with the values for growth projects and reticulation water mains. The average is 8.8%. To what extent these costs are controlled is unclear. We suggest there should be percentage ceilings depending on the type of capital works. Applying the prudency tests and until better data is available, we suggests that on-costs be not greater than 10% of the value of the works.

Maintaining Existing and New Standards

Expenditure to maintain existing standards and new standards for operational assets was based on decisions on the condition and performance of the assets and related strategies which were documented.

Government Programs

The Government Programs were based on principal decisions made outside the Corporation, although the decision on the solutions was with Sydney Water. We found that there was scope to investigate alternative low cost options which were likely to result in lower cost solutions. These projects require a level of expertise which is not normally available within the Corporation.

We have made a modest adjustment to prior capex to allow for the fact that during the optioneering process some options are excluded prematurely on the basis of supposed customer or stakeholder preferences and are not subjected to detailed financial consideration and comparison. We have assumed that 5% of this expenditure is not prudent.

We consider that this approach may give undue weight to the concerned customers and stakeholders at the expense of the wider customer base who are liable for the assets. Noting that concerned stakeholders will often opt for expensive options when they do not bear the cost, we consider that it would be prudent of Sydney Water to maintain less expensive, but less popular options on the table for detailed optioneering analysis.

Information Technology

We found that the decision processes for IT expenditure were unclear and confused and related to a strategy which the Corporation shows as not fit for purpose. The cost estimating and procurement process was not well managed, which resulted in significant cost escalations. We reviewed two large projects representative of the program. We found that the Maximo project increased in cost from $18.4m business case in 2007 to an outturn of $40.1m in 2010. Similarly, the CMS system increased from the 2007 Business Case $30.0m to a forecast outturn in 2013 of $66.1m. We formed the view that some of the IT expenditure was not prudent because of the way that decision had been made and how the investment was carried out. We explain in section 7.8.1 our understanding of the strategy, decision making process and implementation of these projects. For both projects there was a lack of good planning to scope out the work, the impact on other systems and identify and quantify the risks. This has impacted significantly on the cost and timing of the projects. We assume that both projects are required for business reasons and will not be superseded before their design life has expired. There is an increase in expenditure of $90m in the current price path.

On the basis of what we have seen, our view of prudent expenditure is a judgement which takes into account the decision making process and the impact of those decisions. We have assumed that 15% of expenditure above the 2008 Determination was not prudent.

We were given inaccurate and sometimes confusing plans and financial information relating to the IT program in the future price path and the business cases were not sufficiently robust to allow us to determine the efficiency or prudence of the proposed program. Our concern is that in the future an approach may be taken similar to the current price path where significant expenditure could occur which has not progressed through the IPART efficiency process. It is more difficult to take a view of efficiency ex-post than in the current process.

We suggest that any major expenditure of this nature which arises during the future price path is subject to independent assessment before decisions are made.

Property

We formed the view that the lack of an up to date strategy impacts on the robustness of the Company's business planning in this area and probably explains the significant variances both in terms of programs of work and expenditure. There was a significant backlog of work which built up and further explains the high level of activity in 2008-12. We formed the view from the information provided that the decision processes did not meet the prudency definition although procurement and project management was satisfactory. We would expect a rational and strategic approach to bring efficiencies in the order of 3 to 5% of the capital expenditure. We have assumed 4% of the expenditure above the IPART 2008 Determination.

Meter Replacement

We found that some expenditure on meter replacement was not prudent because of the way this was procured and implemented. We estimate this to be 9% of the actual expenditure.

2012 Expenditure

We reviewed the 2012 expenditure to assess whether the outturn for the year would be similar to the SIR. We have found that the total expenditure is similar to previous years with no material increase which might impact on the cost profile so no adjustment has been made.

2012 $M	2009	2010	2011	2012	Total
Total Capex	1084.6	1053.8	710.3	759.1	3607.8
Adjustments related to the prudency test					
IT imprudent expenditure	-4.5	-3.5	-6.5	-3.5	-18.0
Meters imprudent expenditure	0.0	0.0	-1.2	-1.2	-2.4
PSP projects	-2.7	-5.1	-3.3	-3.0	-14.1
Property	-2.4	-1.5	-0.9	-1.2	-6.0
Prudent expenditure	**1075.0**	**1043.7**	**698.4**	**750.2**	**3567.3**

Table 7.5 Assessment of Prudent Expenditure

7.11 Prudence and Efficiency in Future Price Path

We are proposing adjustments to capital expenditure in the SIR submission to reflect our view of prudent and efficient expenditure for the future price path. Our views are based on our review of the Information Return, discussions with Sydney Water, our audit of the Asset Management obligation, the review of sample projects and the assessment of capital expenditure processes. We discuss our methodology below.

Our assessment of the level of capital efficiency able to be achieved by Sydney Water in the future price path is a progression of the methodology which we applied to our 2004 review of the New South Wales metropolitan water companies, Hunter Water in 2008 and State Water in 2010. This approach is based on a methodology developed by Ofwat and applied to water companies in England and Wales for over 15 years. This methodology applies the concepts of continuing and catch-up efficiency.

Continuing efficiency is the scope for a top performing or Frontier Company to continue to improve its efficiency. It reflects the continuing efficiencies being gained across all major sectors through innovation and new technologies. Catch-up efficiency is the scope for all other utilities to reach the performance of a Frontier utility. This concept was developed and applied by the Water Services Regulatory Authority (Ofwat) in England and Wales for the 1999 Periodic Review and also used in the 2004 and 2009 Periodic Reviews. It has been subject to independent scrutiny by the UK Competition Commission. Our assessment of catch-up relates to three capital processes: strategic planning, the method of cost estimating and the procurement processes. We recognise that Sydney Water is close to the frontier with asset management and we have made no catch up adjustment for this factor.

In 2008, Sydney Water was set capital efficiency targets[13] of 0.5% per annum continuing and 1.0% per annum catch up as applied to non-contracted expenditure. Hunter Water (2009) was set capital efficiency targets[14] of 0.5% per annum continuing and catch-up efficiency of 1% to 4.5% over the price control period. For both agencies the cumulative efficiencies increased from, in general, 1.5% per annum in year 1 to 6%/6.5% per annum in year 4. State Water in 2009 was set a continuing efficiency of 0.4% per annum and catch-up efficiency from 1% to 4.5%.

Our methodology takes the proposed expenditure for the period 2103 to 2016 in the SIR and makes adjustments for any inconsistencies. We have not found any inconsistencies in the SIR. We then take a

[13] Review of prices for Sydney Water Corporation's water, sewerage, stormwater and other assets, IPART June 2008
[14] Review of Capital and Operating Expenditure of Hunter Water Corporation (2009 Determination), Atkins Cardno December 2008

view on the phasing of expenditure, where timing is dependent on external factors such as growth. We concluded that there are uncertainties in the timing of growth expenditure as these are dependent on developer plans, which in turn reflect the demand for new housing. While the profile of growth expenditure is consistent with government growth forecasts the NSW Government submission[15] on the price review stated:

> *It is also important to ensure that all the proposed growth-related expenditure is in fact needed over the coming price path. Any reasonable deferral of growth-related capital expenditure into future price periods will lead to a reduction in revenue requirements and this in turn will mitigate impacts on prices.*

We have noted the significant under-expenditure on growth in the current period. We also considered our approach to rephasing of expenditure for the Hunter Water efficiency review in 2008. At Hunter Water we rephased expenditure based on the likelihood of projects progressing. We then applied a probability approach to growth expenditure where we have assumed that the timing of expenditure at the start of the period is more certain than later periods. This results in a reasonable rephasing of expenditure. If it turns out that actual growth expenditure is greater than this revised profile then prudent expenditure can be logged up at the next Determination.

We have then made adjustments to specific programs or projects which we have reviewed. We have commented in Sections 7.4.1 and 7.5.1 on specific projects and relate to the rephasing of the delivery of outputs. These projects were representative of the program as a whole so we have rephased other expenditure on a similar basis. Our adjustments relate generally to a slower rate of increase of expenditure above the current price period.

We then arrived at an adjusted expenditure profile against each driver. To this adjusted expenditure profile we have applied the efficiency target that we assess later in this Section. The derivation of our proposed expenditure for Sydney Water for the future price path following adjustments and application of efficiencies as set out below.

7.11.1 Continuing Efficiency

We have assumed a continuing capital efficiency of 0.4% per annum over the period 2012 to 2016 to reflect the impact of new technology and innovation which all agencies, including a frontier agency, should achieve. This value is based on the efficiency targets set for Sydney Water, Hunter Water and State Water and the efficiency target set by Ofwat in 2009 for continuing efficiency targets for water utilities in England. We suggest that any significant differences between the forecast and outturn continuing efficiency should be considered from a retrospective analysis of prudent expenditure at the next price path review.

7.11.2 Catch-up Efficiency

We applied our judgement to determine the level of catch-up efficiency that could be achieved by Sydney Water from 2012 to 2016 based on our assessments of the capital processes and the review and analysis of sample projects representative of the program as a whole. We have identified five areas where Sydney Water should be able to make material improvement to its processes to frontier level over time and deliver material efficiencies over the price control period: improvements to investment planning, improvements in cost estimating and the management of contingencies, the impact of new procurement processes and the likely savings from more effective program management.

[15] NSW Government submission to IPART, October 2011

Investment Planning

This reflects our view on Sydney Water's ability to do things internally more efficiently and lower the general amount of overheads capitalised to projects. We noted significant variances of overheads capitalised to projects, which to some extent reflects the different procurement methods and complexity of the projects, but also highlights where some projects are accruing considerable overheads. We think that the business efficiency projects implemented by Sydney Water in recent years, particularly investment in information systems such as Maximo and hydraulic modelling software, should translate to more efficient capital investment planning. Growth projects such as the North West and South West Growth Centres may require large overheads in the early planning stages to develop strategy. However, as these strategies are implemented, capital overheads for planning activities should decrease.

Cost estimates

Based on the information Sydney Water has provided, we consider that the cost estimates used to allocate capital to projects and, to a lesser extent, those used for price path submission contain considerable amounts of contingency. We have adjusted capital allowances to take this into account. While we understand Sydney Water's (prudent) practice of using the P_{80} for capital budgeting during the price period, the sum of the capital program should not equal the sum of the P_{80} values. It should, in theory, equal the sum of the P_{50} values, if P_{50} values were equal to outturn costs on average (which they are not). We would there expect Sydney Water to be able to deliver the its planned capital program despite any adjustments made for estimating contingency, because of the levels of contingency in the submission. In theory, high contingency in the submission would not pose a problem if it were: (1) not capitalised and (2) refunded to customers. However, the risk of excess contingency being allowed in the capital programs is that this "loose change" accumulates over the period and facilitates the implementation of capital projects which would not occur in a truly capital constrained environment. Indeed, during 2008-12 the surplus was taken up by the overspend on the Corporate program.

Procurement

We have noted what appear to be generous unit rates applied by Sydney Water in some of the projects reviewed during the audits, which may partly be a result of the recent construction inflation and shortage of skilled labour during the mining boom. The high rates may also go some way to explaining the regular ability of Sydney Water, and its contractors, to delivery projects under budget, although this is partly due to the estimating contingency described above.

We consider that in the coming price path, considerable contracting efficiencies should be possible due to the contraction of construction activity in NSW in recent years. With the construction industry entering a more competitive market, we anticipate Sydney Water being able to negotiate considerable reductions in unit rates and propose that these be reflected in the efficiency targets which we propose.

We have taken a different approach to Data Management investment where we have applied a comparative assessment of expenditure to factor investment proposals. This is subject to continuing efficiency and catch-up is assumed within this assessment. We have applied lower efficiencies to the stormwater service as we recognise the potential for driving efficiencies is likely to be lower. Similarly a lower level of efficiencies is applied to Corporate expenditure.

Our assessment of the level of continuing and catch-up efficiencies achievable in the future price path is shown in Table 7.6 below. As a benchmark, the resulting total efficiency in 2016 is at the outer range of catch-up efficiencies determined for English and Welsh water companies in 2009.

Ref	Efficiency Scope (%)	2013	2014	2015	2016
1	Continuing Efficiency at the Frontier	0.4	0.4	0.4	0.4
2	Cumulative Continuing Efficiency	0.4	0.8	1.2	1.6
3	Catch-up efficiency: Business Planning	0.4	0.8	1.2	1.4
4	Catch-up efficiency: Cost Estimating	0.2	0.8	2.3	4
5	Catch-up efficiency: Procurement	0.3	2	4.9	5
6	Total efficiency	1.3	4.4	9.6	12.0

Table 7.6 Future Price Path – Proposed Capital Efficiencies (Source: SWC SIR and Atkins/Cardno analysis)

Efficient Level of Expenditure

We have derived an efficient level of capital expenditure for each service taking the SIR submission and adjusting for any inconsistencies in investment driver. We have re-profiled some program outputs and hence expenditure for defined programs and projects. We then apply the continuing and catch-up efficiencies to reflect the catch-up potential in investment planning, cost estimating and contingency management and procurement. There is a summary of capital expenditure adjustments included below.

Water Service

We summarise our proposals for prudent and efficient capital expenditure in Table 7.7 below.

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - WATER SERVICE					
($M 2011/12) year ending June	**2013**	**2014**	**2015**	**2016**	**Total**
Existing Mandatory Standards	176.8	179.9	182.7	191.3	730.7
New Mandatory Standards	0.3	0.3	0	0	0.5
Growth	82.4	89.9	74.1	81.8	328.1
Government Programs	0.0	0.0	0.0	0.0	0.0
Business Efficiency	4.5	1.4	1.4	1.3	8.5
Total	263.9	271.4	258.2	274.3	1067.7
Output adjustments for specific programs or projects					
rephase critical water mains	-20.4	-16.3	-13.2	-7.2	-57.1
rephase reticulation water mains	-1.0	-3.4	-3.8	-4.5	-12.6
rephase reservoirs	-4.0	-2.2	0.0	1.4	-4.8
rephase pump stations	-6.3	-3.8	0.3	1.9	-7.9
rephase system reliability	0.0	0.0	-15.4	-22.7	-38.1
rephase growth	-16.5	-10.5	-2.7	-23.1	-52.7
PROPOSED EXPENDITURE BEFORE APPLICATION OF EFFICIENCY TARGETS					
Existing Mandatory Standards	145.1	154.3	150.6	160.2	610.2
New Mandatory Standards	0.3	0.3	0.0	0.0	0.5
Growth	65.9	79.4	71.4	58.7	275.4
Government Programs	0	0	0	0	0.0
Business Efficiency	4.5	1.4	1.4	1.3	8.5
Total	215.7	235.3	223.4	220.1	894.5
Application of capital efficiency targets					
Continuing Efficicency (%)	0.4%	0.8%	1.2%	1.6%	
Catch-up efficiency (%)	0.9%	3.6%	8.4%	10.4%	
EFFICIENT EXPENDITURE					
($M 2011/12) year ending June	**2013**	**2014**	**2015**	**2016**	**Total**
Existing Mandatory Standards	143.2	147.8	137.4	143.0	571.4
New Mandatory Standards	0.2	0.2	0.0	0.0	0.5
Growth	65.1	76.0	65.2	52.4	258.7
Government Programs	0.0	0.0	0.0	0.0	0.0
Business Efficiency	4.4	1.3	1.3	1.1	8.1
Total Efficient Expenditure	**212.9**	**225.4**	**203.8**	**196.6**	**838.7**

Table 7.7 Water Service: Summary of Efficient Capital Expenditure

Wastewater Service

We summarise our proposals for prudent and efficient capital expenditure in Table 7.8 below.

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - WASTEWATER SERVICE					
($M 2011/12) year ending June	**2013**	**2014**	**2015**	**2016**	**Total**
Existing Mandatory Standards	175.7	177.9	200.3	137.9	691.9
New Mandatory Standards	73.6	84.2	30.0	44.7	232.5
Growth	87.1	97.7	123.4	112.3	420.4
Government Programs	71.7	71.2	48.4	23.8	215.1
Business Efficiency	2.7	3.8	0.2	0.2	6.9
Total	410.8	434.7	402.3	318.9	1566.7
Output adjustments for specific programs or projects					
Avoid fail sewers	0.0	-1.1	-2.1	-3.1	-6.4
Dry weather overflows	-0.2	-0.7	-1.2	-1.7	-4.0
Wastewater treatment plant renewals	0.0	-0.7	-1.2	-1.7	-3.6
Wet weather overflow abatement	0.0	-7.0	-10.0	-13.0	-30.0
Growth	-17.4	-11.9	-20.0	-6.8	-56.1
Government Programs	-5.4	-5.3	-3.6	-1.8	-16.1
Total	-23.0	-26.8	-38.2	-28.1	-116.2
PROPOSED EXPENDITURE BEFORE APPLICATION OF EFFICIENCY TARGETS					
Existing Mandatory Standards	175.4	175.3	195.8	131.4	677.9
New Mandatory Standards	73.6	77.2	20.0	31.7	202.5
Growth	69.7	85.8	103.4	105.5	364.3
Government Programs	66.4	65.8	44.7	22.0	198.9
Business Efficiency	2.7	3.8	0.2	0.2	6.9
Total	387.7	407.9	364.1	290.8	1,450.5
Application of capital efficiency targets					
Continuing Efficicency (%)	0.4%	0.8%	1.2%	1.6%	
Catch-up efficiency (%)	0.9%	3.6%	8.4%	10.4%	
EFFICIENT EXPENDITURE					
($M 2011/12) year ending June	**2013**	**2014**	**2015**	**2016**	**Total**
Existing Mandatory Standards	173.2	167.9	178.6	117.3	637.0
New Mandatory Standards	72.7	73.9	18.2	28.3	193.1
Growth	68.8	82.2	94.3	94.2	339.4
Government Programs	65.5	63.1	40.8	19.6	189.0
Business Efficiency	2.7	3.6	0.2	0.2	6.6
Total Efficent Expenditure	**382.8**	**390.7**	**332.2**	**259.6**	**1,365.3**

Table 7.8 Wastewater Service: Summary of Efficient Capital Expenditure

Stormwater Service

We summarise our proposals for prudent and efficient capital expenditure in Table 7.9 below.

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - STORMWATER SERVICE						Notes
($M 2011/12) year ending June	**2013**	**2014**	**2015**	**2016**	**Total**	
Existing Mandatory Standards	9.3	8.7	4.1	2.6	24.6	
New Mandatory Standards	0.0	0.0	0.0	0.0	0.0	
Growth	0.5	1.0	1.0	1.0	3.6	
Government Programs	0.5	1.0	1.0	1.0	3.6	
Business Efficiency	0.0	0.0	0.0	0.0	0.0	
Total	10.3	10.8	6.2	4.6	31.8	
Application of capital efficiency targets						
Continuing Efficicency (%)	0.4%	0.8%	1.2%	1.6%		
Catch-up efficiency (%)	0.9%	1.0%	1.5%	2.0%		1
EFFICIENT EXPENDITURE						
($M 2011/12) year ending June	**2013**	**2014**	**2015**	**2016**	**Total**	
Existing Mandatory Standards	9.1	8.6	4.0	2.5	24.2	
New Mandatory Standards	0.0	0.0	0.0	0.0	0.0	
Growth	0.5	1.0	1.0	1.0	3.5	
Government Programs	0.5	1.0	1.0	1.0	3.5	
Business Efficiency	0.0	0.0	0.0	0.0	0.0	
Total Efficient Expenditure	**10.1**	**10.6**	**6.0**	**4.4**	**31.2**	
1 Lower value of catchup efficency amended to reflect small value work						

Table 7.9 Stormwater Service: Summary of Efficient Capital Expenditure

Corporate Service

We summarise our proposals for prudent and efficient capital expenditure in Table 7.10 below.

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - CORPORATE						Notes
($M 2011/12) year ending June	**2013**	**2014**	**2015**	**2016**	**Total**	
Existing Mandatory Standards	54.6	52.6	51.9	48.9	207.9	
New Mandatory Standards	0.0	0.0	0.0	0.0	0.0	
Growth	5.8	5.4	5.3	5.1	21.5	
Government Programs	0.0	0.0	0.0	0.0	0.0	1
Business Efficiency	27.7	27.7	27.7	27.7	110.7	
Total SIR	88.1	85.6	84.8	81.7	340.1	
Adjustment for specific programs						
IT expenditure (including efficiency)	-4.7	-6.2	-8.0	-11.3	-30.1	
Meter replacement program	-2.6	-3.6	-1.0	-1.0	-8.2	
PROPOSED EXPENDITURE BEFORE APPLICATION OF EFFICIENCY TARGETS						
Existing Mandatory Standards	49.6	45.9	46.9	42.3	184.6	
New Mandatory Standards	0.0	0.0	0.0	0.0	0.0	
Growth	5.8	5.4	5.3	5.1	21.5	
Government Programs	0.0	0.0	0.0	0.0	0.0	
Business Efficiency	25.3	24.6	23.7	22.0	95.6	
Total	80.7	75.8	75.8	69.4	301.8	
4. Application of capital efficiency targets						
Continuing Efficicency (%)	0.4%	0.8%	1.2%	1.6%		
Catch-up efficiency (%)	0.9%	2.0%	3.6%	5.2%		2
EFFICIENT EXPENDITURE						
($M 2011/12) year ending June	**2013**	**2014**	**2015**	**2016**	**Total**	
Existing Mandatory Standards	49.2	45.1	45.6	41.0	181.0	
New Mandatory Standards	0.0	0.0	0.0	0.0	0.0	
Growth	5.7	5.2	5.0	4.8	20.7	
Government Programs	0.0	0.0	0.0	0.0	0.0	
Business Efficiency	25.2	24.4	23.5	22.2	95.4	
Total	**80.2**	**74.8**	**74.1**	**68.0**	**297.0**	
1. We have excluded capital borrowing costs						
2 Continuing efficency at half service level from 2013 and not applied to procurement expenditure						

Table 7.10 Corporate Service: Summary of Efficient Capital Expenditure

7.12 Conclusions

We have reviewed Sydney Water's processes for delivering capital projects and we have examined specific projects to confirm how these processes are applied. We have proposed adjustments to the Submission expenditure to reflect phasing of outputs in specific programs or projects. We have applied continuing efficiencies and catch-up efficiencies to reflect business planning, the cost estimating process and procurement.

We have formed the opinion that Sydney Water has the resources and ability to realise these capital efficiencies through the asset management processes, systems and strategies in place or being developed.

We have quantified the adjustments and efficiencies that we believe Sydney Water will be able to make over the coming price path and we will apply these to our recommendations to derive the efficient expenditure for the future price path.

We show in Table 7.11 below the capital expenditure proposed by Sydney Water, the adjustment we have made and our findings on the level of efficient capital expenditure for the future price path.

PROPOSED CAPITAL EXPENDITURE						Notes
($m 2011/12) year ending June	**2013**	**2014**	**2015**	**2016**	**Total**	
Water	263.9	271.4	258.2	274.3	1067.7	
Wastewater	410.8	434.7	402.3	318.9	1566.7	
Stormwater	10.3	10.8	6.2	4.6	31.9	
Recycled Water	0.0	0.0	0.0	0.0	0.0	
Corporate	88.1	85.6	84.8	81.7	340.1	1
Total requested	773.0	802.5	751.4	679.6	3006.5	
ADJUSTMENTS						
Timing of Outputs	-38.3	-41.9	-67.7	-36.1	-184.0	
Growth reprofiling	-33.9	-22.4	-22.7	-29.9	-108.9	
Corporate	-7.3	-9.8	-9.0	-12.3	-38.3	
Efficiency	-7.5	-27.0	-36.0	-72.7	-143.2	2
EFFICIENT EXPENDITURE						
($m 2011/12) year ending June	**2013**	**2014**	**2015**	**2016**	**Total**	
Water	212.9	225.4	203.8	196.6	838.7	
Wastewater	382.8	390.7	332.2	259.6	1365.3	
Stormwater	10.1	10.6	6.0	4.4	31.2	
Recycled Water	0.0	0.0	0.0	0.0	0.0	
Corporate	80.2	74.8	74.1	68.0	297.0	
Total	686.0	701.5	616.0	528.6	2532.1	
1. Capital borrowing costs are excluded						
2 Catchup efficiency varies across services						

Table 7.11 Efficient Level of Capital Expenditure

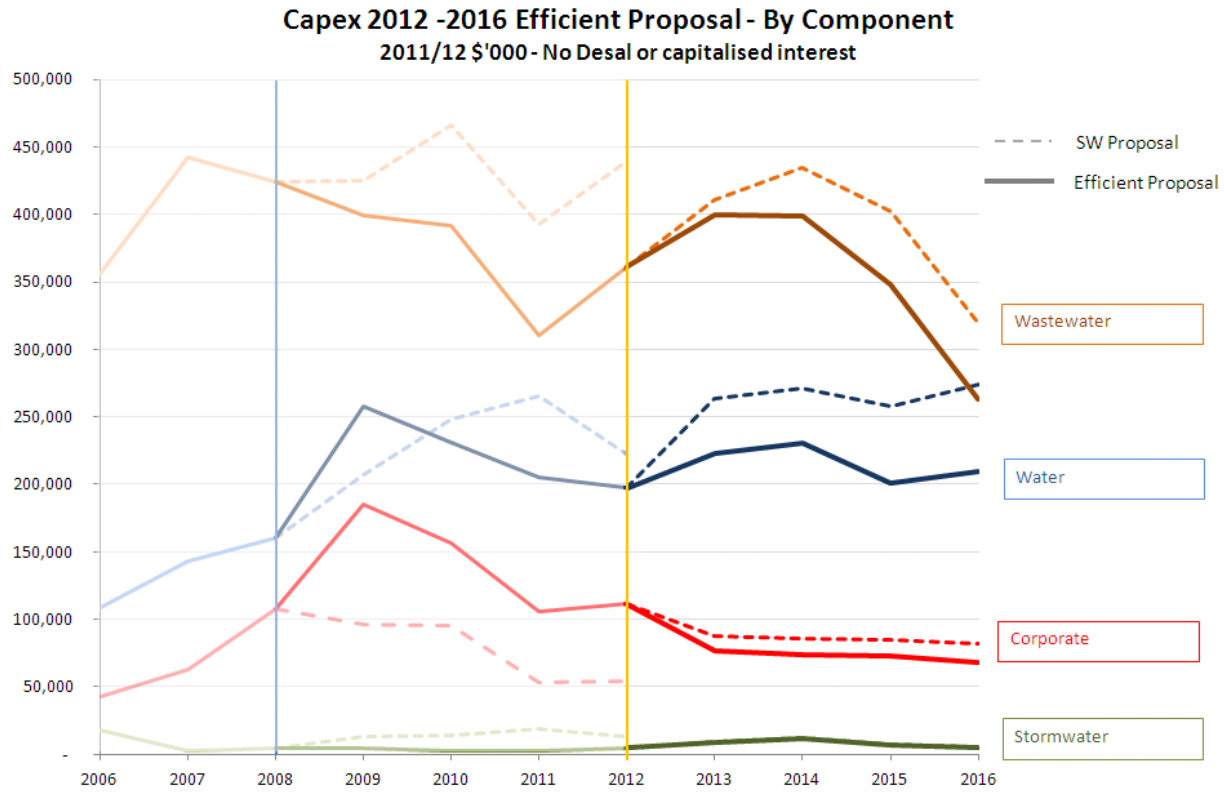


Figure 7.20 Assessment of Efficient Capex versus the SWC Proposed Level by Component Level

Efficient capital expenditure by purpose is shown in Figure 7.21.

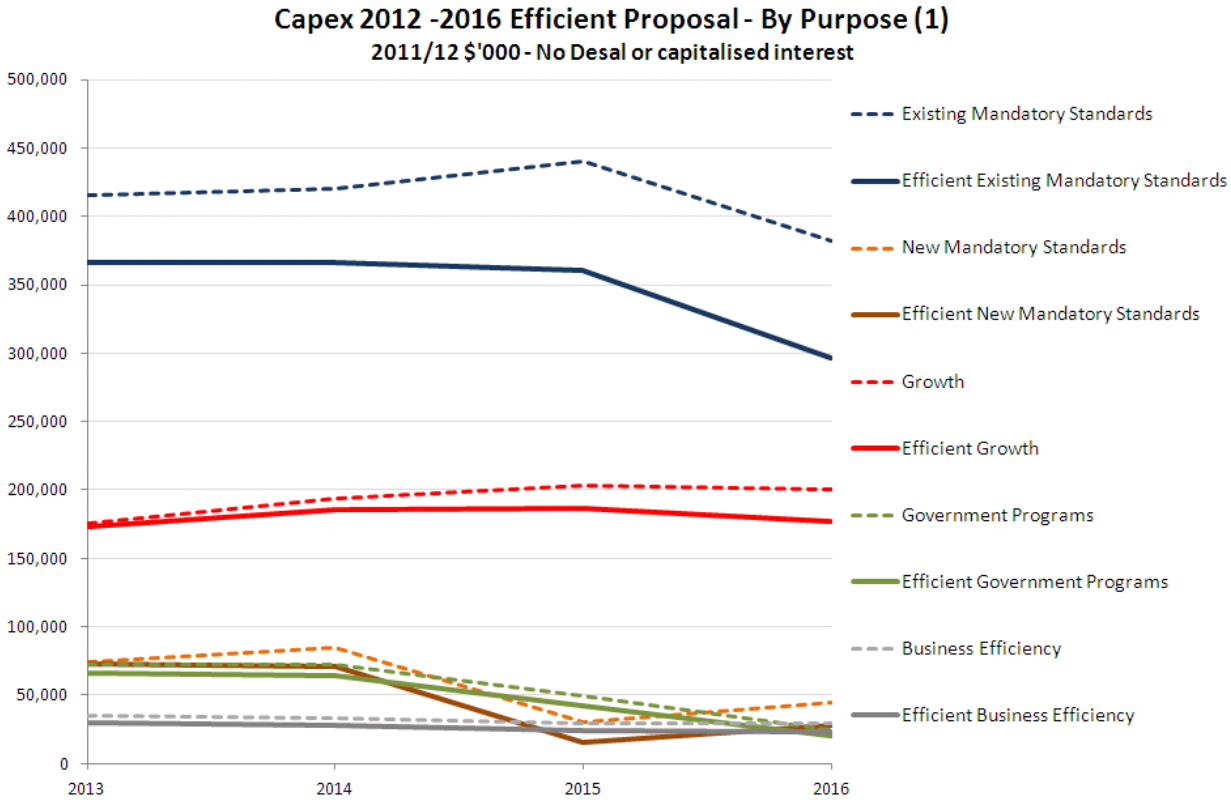


Figure 7.21 Assessment of Efficient Capex versus the SWC Proposed Level by Purpose

8. Asset Classification

8.1 Methodology and Assumptions

IPART requested us to audit and assess the accuracy with which Sydney Water has classified its existing assets and planned capital expenditure into the following asset classification classes: Civil, Electrical, Mechanical, Electronic and Non-depreciating assets (or 'CEMELND').

Our approach to this task focused on a discussion and analysis of the Corporation's methodology and assumptions. We then followed a sample of historical and forecast audit trails (e.g. Water Civil, Wastewater Mechanical, Corporate Electronic) to identify and assess in the various classification classes:

- the value of all existing assets
- the efficient expenditure on new assets
- the average remaining life of existing assets
- the expected life of new assets

It was outside of the scope of this audit to verify and confirm that the values entered against each asset are accurate; it is our understanding that this exercise is carried out internally and subject to audit by the financial auditors.

8.2 Findings and Recommendations

Sydney Water has not formally documented the processes it has in place to derive its asset classification, however, overall the Corporation was able to demonstrate the processes in place and that the classification is applied as described.

The Corporation assigns the CEMELND classification to current and planned expenditure in the capital program for each asset class to a point when a new asset is completed, applying standardised percentages depending on the asset based on technical sheets provided by asset management. Assets with a very high value of investment are reviewed on a case by case basis and their percentage split against CEMELND is customised (e.g. North Head PARR) rather than applying the standard percentage splits. The weightings are unchanged from 2008/09.

When assets are commissioned they are added to the financial asset register where a more detailed analysis of asset lives is carried out.

We requested to review the technical sheets for two categories in order to carry out a sense check of how the percentage allocations are derived. The Corporation subsequently informed us that the supporting documentation could not be located and that it would review the process to verify the percentage breakdowns based on updated information and recent evidence. This issue underlines the importance of documenting all processes and procedures.

Overall, the results of our audit trailing of a sample of historical and forecast capital expenditure by CEMELND classification was satisfactory and did not identify any major issues or anomalies.

Where we identified negative values in the capital expenditure, the Corporation explained that this was due to reversals and post-year adjustments.

We noted Sydney Water's decision to move from six to a ten year asset life for electronic assets. While we concurred that broadly this appears to be reasonable, there did not appear to be any robust evidence to support the new classification. We suggested that analysis of electronic assets could have been weighted on a percentage value/asset life basis to identify the most appropriate age.

We also challenged the Corporation about the inclusion of water meters both as a Corporate and an electronic asset. Sydney Water's current policy is to replace domestic water meters at 15 years. We suggested that it would be more appropriate for water meters to be classified as a Water Mechanical asset. On further investigation, it appears that water meters have been classified as a Mechanical asset for the purposes of forecast expenditure for 2012-2016. However the summary sheet we were provided with does not reflect this change.

The value of all existing assets is held on the financial asset register which is maintained at a disaggregated level. This is used to derive the average remaining life of assets. We have not reviewed this system.

The high level assessment of asset lives for new assets uses assumptions which are generally consistent with other water utilities. Our main comment relates to water meters and we note the longer lives now assigned.

The increasing expenditure on short life assets such as IT equipment has a material impact on depreciation and hence charges to customers. We suggest it is now appropriate to look at these assets in greater detail to test whether a more detailed disaggregation would be appropriate rather than a single life for all short life asset. The impact on the depreciation charge could be tested.

It is essential to clearly document the assumptions and workings to satisfy internal checking processes and external audit.

9. Specific Issues

We were requested by IPART to look at some other areas as part of our review and which are covered below.

9.1 Recycled Water Projects

As part of the audits we examined a number of recycled water projects with a view to considering the following aspects:

- Prudency of investment and procurement where the investment was mandatory (a NSW government requirement under Section 16A) – e.g. St Mary's Recycled Flows plant;
- Appropriate ring-fencing of regulatory and non-regulatory costs; and
- Appropriateness of any claimed avoided costs resulting from non-section 16A recycled water projects which are added to the regulatory asset base.

Replacement Flows Project

We commented on the procurement of the scheme in Section 7 above and generally consider this to have been carried out prudently, resulting in the least cost option to customers. During the audit, Sydney Water was able to demonstrate the tendering process which it was following, including the results of the evaluation report. We noted that Sydney Water obtained independent assistance in evaluating the reports and financial proposals of the tenders.

The annual operating costs are reported to be of the order or $11m, and we estimated a rough cost per m^3 for the plant to be around $1.80/$m^3$, including 60c of operating costs, 84 cents of financing costs (@ 7.5% WACC) and 37 cents of depreciation (assuming a 30 year life). This compares favourably with the current marginal cost for desalinated water (approx $2/$m^3$).

Appropriate Ring-Fencing of Recycled Water Costs

Sydney Water demonstrated methods used to ring-fence recycled water costs at audit. Operating expenditures submitted in the Annual Information Return (AIR) are based on the Sydney Water Regulatory Cost Model. For the Rouse Hill and Wollongong schemes, Sydney Water uses a regulatory cost model with individual calculations separated out for each scheme. The St Mary's and Rosehill schemes have separate operating contracts so these costs can be extracted out of the general ledger directly.

We note that operating costs are calculated "off-line" for non-regulated opex (i.e. in standalone spreadsheets). Sydney Water takes the operating cost information for the site, performs a split in a "model".

We note that currently no corporate costs are allocated to recycled water. These are pro-rata allocated to the main services (Water, Wastewater and Stormwater) but not to Recycled Water. Sydney Water Corporate overheads are expected to reach about $180 million in 2011/12, or about 12% of total operating expenditure ($1.4 billion). As annual recycled operating costs have reached the levels of Stormwater, it may be appropriate to allocate corporate overheads to recycled water. This may, however, affect the viability of future schemes.

We note that future non-regulated recycled water costs are expected to be lower than previously, as plumbing inspections previously undertaken by Sydney Water are now undertaken at the customer's expense.

Overall we were satisfied that Sydney Water is able to ring-fence recycled water costs in an approximate manner but to an acceptable degree of accuracy. We note that a thorough audit of any ring-fencing or price transfer should take place as part of the annual statutory financial audits.

Appropriateness of Avoided Costs

Sydney Water has claimed $21.6m in avoided costs in return for expanding the Rouse Hill Recycled Water scheme. The scheme currently serves around 20,000 properties, with network in place to serve 30,000. Sydney Water has expanded the network to serve a further 6,000 properties for an estimated capital cost of $18.8m and annual operating cost of $0.1m.

The basis for the avoided cost claim is as follows: The Rouse Hill plant capacity is 27MLD, and will reach capacity in 2031 according to Sydney Water projections. The recycled facility can treat 10MLD. The current estimated demand for recycled water (the 30,000 existing dwelling potential) is around 8MLD, and the addition of 6,000 lots to the network will allow Sydney Water to recycled a further 2MLD and avoid discharging this to the environment.

Current flows to the plant at 17MLD. In order for the plant to expand beyond 17MLD, additional nitrogen removal was required (or diversion of recycled flows). By diverting 10ML the plant discharge will drop to 7MLD and therefore the discharge consent life has been extended until 2031 (when total discharge volumes will each 17MLD again) We note at this point the plant will have reached full capacity and may in any case require un upgrade.

We asked Sydney Water what the denitrifcation costs represented. The Corporation responded that:

> *The $15m corresponds to a denitrification filter(s) for 13.5 ML/day or half of the total wastewater treatment facility capacity. It is correct that the extra residual flow into Cattai Creek is 2 ML/day and we desire to remove all of the extra nitrogen introduced by this extra residual flow. It is not technically possible to remove 100% of dissolved nitrogen with denitrification filters. The denitrification filters were sized to reduce (rather than remove) the total nitrogen load discharged by the wastewater treatment facility to the appropriate level.*

One of the options considered by Sydney Water to deal with the continually increasing nutrient load was to install reverse osmosis, as is done at St Mary's, for the marginal 2MLD that the proposed recycled network will absorb. The cost was estimated to be $44m. We note that St Mary's recycled water plant uses reverse osmosis to produce 1mg / TN water, as a replacement for Warragamba flows. The cost of this 50MLD plant was approximately $205m, or $4m per MLD treated (assuming no economies of scale). By this reasoning, a similar plant to reduce N levels at Rouse Hill for 2 MLD would cost $8m.

Operating costs of reverse osmosis were estimated to be $3m per year, while operating costs for St Mary's are variously reported to be $11m to $18m per year (for 50 MLD), which is up to $0.36m per MLD. This suggests an operating cost of $0.72m for the 2MLD to be treated a Rouse Hill (assuming no economies of scale at St Mary's). The NPV of $4m capex + $720k opex for 25 years discounted at 7.5% is $11m.

While the estimated costs for reverse osmosis used in the options appraisal report for avoided costs at Rouse Hill appear to be excessive, we accept that the economies of scale available at St Mary's may not be applicable for a smaller 2MLD plant at Rouse Hill.

The expansion of the recycled water network at Rouse Hill by 6,000 connections does seem to be a cost effective way of delaying nutrient treatment at Rouse Hill until the entire treatment plant is upgraded in 2031. We accept that the value of the avoided wastewater cost would be greater than the $8m we estimated for a pro-rata type St Mary's plant, and as such accept the $14.8m for the dentrification process as being the maximum avoided wastewater cost. Given the approximate (and apparently generous) nature of the cost estimation - especially of the reverse osmosis option - some reduction may be appropriate to take into account possible excess contingency in the de-nitrification cost estimate.

Deferred Water Supply infrastructure avoided costs of $1.9m appear reasonable.

9.2 Sydney Water Desalination Plant

We confirmed that the operating costs associated with the Sydney Desalination Plant are ring fenced from Sydney Water's other operations. A separate company has been set up to operate the plant with the Sydney Water Directors also directors of the SDP. Sydney Water staff which undertake work for the SDP are charged with an on-cost to cover overheads.

9.3 Heritage Assets

IPART requested that the capital and operating expenditure associated with heritage assets, functions and activities and which does not contribute to the direct delivery of services, is identified, segregated and quantified to the extent possible. It is our understanding that the objective of this requirement is to identify the extent that customers are contributing to maintain the heritage aspects associated with certain assets in order to form a view on whether this is reasonable or whether these costs should be met from other sources.

There are 216 heritage listed assets of which 88% are operational. There are Conservation Management Plans in place which provides an overview of the condition assessment of the assets and prioritises maintenance and capital works on a 5 to 10 year horizon. There are also 2.7 FTE Sydney Water employees with responsibility for heritage assets.

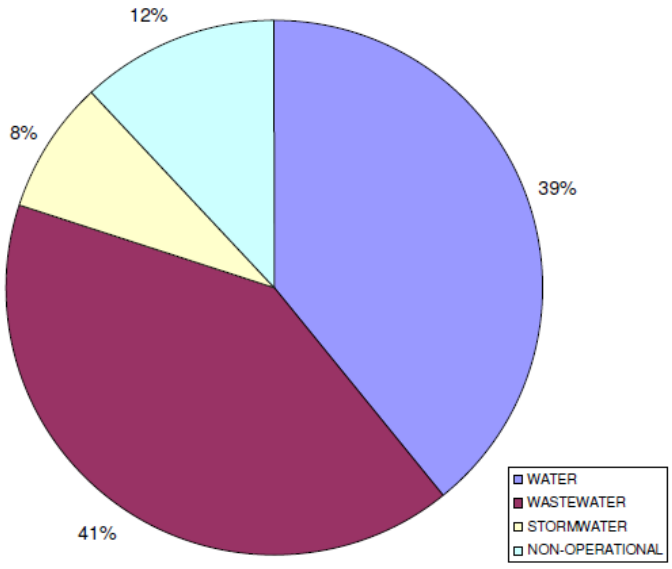


Figure 9.1 Breakdown of 216 Heritage Assets by Activity (Source: Sydney Water)

Sydney Water reported in its submission that total operating and capital expenditure on heritage assets on average represents less than 0.1% of the Corporation's total costs and that the 'heritage' component is only a small proportion of this amount. We were able to follow audit trails and to confirm the reasonableness and accuracy of the value of capital and operating expenditure associated with heritage assets in Sydney Water's submission. We concur with Sydney Water that if anything it could be argued that the heritage costs are over-stated as the Corporation does not disaggregate the heritage component from the whole cost associated with these assets. This is because it would involve making a number of assumptions and introduce a layer of complexity which we agree is not justified due to the low level of expenditure associated with heritage assets. Overall, it is reasonable to surmise that as the expenditure associated with heritage assets is not material, the current arrangements are appropriate.

9.4 Priority Sewerage Program

As part of the review process, we were asked to pay particular attention to the Priority Sewerage Program. We have commented in Section 7 above in relation to the capital expenditure program and elaborate on our findings here.

The PSP program is a government mandated program and Sydney Water is obliged to serve the areas specified as part of its operating license condition. The purpose of the audit is therefore primarily to consider how Sydney Water met its licensing obligation rather than the need for the schemes in the first place.

Notwithstanding this, we note that we were not able to obtain any cost-benefit studies justifying the implementation of sewerage schemes on wider environmental or public health grounds. In future we would recommend that Sydney Water attempt to obtain such documentation as part of its responsibility to its wider customer base. This supporting evidence when combined with baseline studies and environmental and public health monitoring would also facilitate future cost-benefit studies where PSP is concerned.

Regarding the PSP scheme audited for the 2008-12 price period (Glossodia, Freeman's Reach, Wilberforce), we made the following observations:

- Sydney Water appears to have implemented an innovative, non-intrusive and elegant solution, connecting the three villages to a nearby treatment plant with excess capacity using a pressure sewer system.
- The costs of the project per lot were considerable ($123m for around 1,560 lots) and were born by the entire rate base with no local participation.
- While extensive optioneering was carried out, including some consideration for local treatment and effluent disposal, the optioneering process appears to give considerable weight to "stakeholder views" (70%) as compared to economic criteria (30%). In addition to this, some options appear to be excluded early on in the process, prior to cost estimation, based on stakeholder preferences. In the case of the Glossodia scheme, this concerned the local treatment and re-use options, with the detailed multi-criteria analysis being carried out for transfer options only. While the conclusion may have been that the option constructed was the best option, we would argue that if some options are excluded based on stalkeholder views prior to any cost estimates being developed, this gives an additional weight to stakeholder views and less weight to economic criteria (which is already low). It is debatable that stakeholders may express a preference for the most expensive solution if they are not bound to bear any of the costs. Under

these circumstances, a prudent company in our opinion would consider its entire customer base's interests and would increase the weighting given to economic criteria as well as ensuring some costing analysis is carried out for all stages of the optioneering process. It would not be unreasonable for a prudent company to propose that beneficiaries or the Government participate in the capital costs if the beneficiaries reject an acceptable service which has a lower cost.

- Sydney Water informed us that in future local effluent re-use options would be considered as transfer costs were excessive. Effluent infiltration/evaporation fields were mentioned as a options. We did not see evidence that this option was considered for the Glossodia scheme despite the ready availability of agricultural land nearby.
- The unit rates used for the cost estimation in the Evans and Peck report appear high when compared to similar unit rates we obtained from S.E Queensland.

As a result, we considered that not all of the expenditure for the PSP scheme at the Glossodia, Freeman's Reach, Wilberforce scheme could be considered prudent from the wider customer base perspective. A small adjustment has been proposed.

In the next price path, Sydney Water has capped the capital investment budget per plot to $65k, which represents a reduction on the levels of investment seen in 2008-12. This can be considered an efficiency proposal. Given this efficiency, we have not proposed further estimating efficiencies for the upcoming program. We do however anticipate substantial procurement efficiencies as unit rates with contractors can be negotiated down and some business efficiencies, which result from the very high investment in business efficiency programs over recent years.

Appendices

Appendix A - Capital Projects Reviewed

Projects or Programs from SIR Capex 2	2008-12 Total	2012-16 Total
1. Critical Water Main Renewals	106,803	324,259
2. Reticulation Water Main Renewals	159,969	306,629
3. Reservoir reliability program	27,162	71,033
4. Water Pumping Station Renewals Program	21,645	45,613
5. Water Pressure Management Program	52,477	0
6. North West Growth Centre	108,190	186,237
7. South West Growth Centre	57,037	119,173
8. Avoid Fail Sewer Rehabilitation Program	242,791	240,516
9. Dry Weather Overflow Reduction	93,107	78,413
10. Wastewater Treatment Plant Renewals Program	90,621	116,850
11. Wet Weather Overflow Abatement	166,735	147,600
12. System Reliability	2,523	73,022
13. PSP Stage 2 (2008-11)	116,166	1,538
14. Future Priority Sewerage Program	0	188,000
15. Stormwater Renewals 2008-2012	13,626	0
16. Stormwater Renewals 2012-2016	0	29,350
17. St Mary's Replacement Flows scheme (Replacement Flows)	176,146	0
18. Recycled Water	83,118	69,907
19. Customer Management System	52,152	7,050
20. Meter Investment Program	34,913	43,023
21. Access Replacement Program	0	18,290
22. Maximo Consolidation Program	38,983	0
Total	**1,644,164**	**2,001,609**

Appendix B - Summary Sheets for Capital Projects

1. Critical Water Main Renewals

PROJECT DETAILS

Project Name	Critical Water Main Renewals		
Project Number	WEM006	**Status**	Current & Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

The program covers larger diameter mains (>=300mm) and other diameters which have a higher consequence of failure (e.g. sole source of supply, located under railways etc). Sydney Water has nominated 4,800 km of mains as being critical which equates to 22% of its mains. The length of critical mains in the previous price path was 3000 km (15% of network). An "Avoid-fail' maintenance strategy is adopted for these mains. A risk-based approach is taken to identify and prioritis renewals. An economic model ranks all critical water mains by risk. An initial desktop risk estimate of probability is derived from CSIRO's theoretical formula and a 1 to 4 likelihood of failure assigned with 4 being >20% probability of failure and 3 being 10-20% probability of failure. The consequence rating is a quantified assessment of the impact to both Sydney Water and the community. Risk ratings are assigned, with 'Very High' rating initially programmed for renewal in 2 years and a 'High A' rating programmed for renewal within 5 years if the probability of failure is confirmed through condition assessment. The remaining risk ratings are identified for investment if the risk cost is greater than the renewals cost. These mains are then prioritised for condition assessment to determine the extent of renewals required. Typically it is found that around 12% of a main length condition assessed requires renewal with the remaining lengths having a longer remaining life. At least 50 to 100 m of main is renewed in one section to provide economies of scale.

All 'Very High' risk critical water mains have been inspected while 66% and 39% of 'High A' and 'High B' risks respectively have been inspected.

An hydraulic modelling report is then prepared which assesses with the following scenarios:

- Decommissioning
- Downsizing
- Size for size
- Amplification
- No asset solution
- Change system configuration
- Reliability issues

Mains renewals are then prioritised based on risk and packaged into projects. The lowest lifecycle option (incorporating customer and community impact in the assessment) is adopted.

40 km of mains were programmed for renewal under the 2008-12 price path.

The proposed program for 2012-16 price path includes:

Project	SM (Nominal)
Investigation, design, construction and contract management of critical water mains	$240.6
Condition Assessment	$5.5
Valve Renewal (including PRV in distribution system)	$22.3
System Operation manual preparation project (valve shut-off procedures)	$5.8
Total	**$274.2**

The SIR has the total for the 2012-16 price path as being $257.1 M ($2011/12)

Currently the rate of mains breaks or leaks for critical mains is in the order of 7 to 8 breaks or leaks /100

km/yr in comparison with the network rate of 28 breaks or leaks /100km/yr. Sydney Water estimates that if the proposed 2012-16 renewals program is not adopted then the rate of main breaks will increase by around 15 breaks/year

The average proposed annual expenditure on critical water mains renewals in 2012-16 is 1.0% of current replacement cost compared to the average spend in the current price path of 0.67% of current replacement cost. The proposed renewal program in 2012-16 has assumed a progressively more proactive approach of critical water main renewal to address the deteriorated mains before failure in line with the avoid fail strategy. The current program had a small number of mains identified for renewal prior to failure and the remainder based on failure history. (This reflects the maturity of the strategy at that time).

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$190.6 M (08-12 business case) $77.3 m (2008 Determination)	**Initial Delivery Date**	Ongoing
Outturn cost / Forecast outturn cost in Submission	$ 111.1 M (08-12) $143 M (08-12) if Bankstown Trunk Main Renewal and balancing item included	**Actual / Forecast Delivery Date**	Ongoing

KEY DATA

Investment Driver	Existing mandatory standards
Output Measure	Length of mains renewed
Stage in Planning Process	Planning and delivery
Procurement Process	Alliance

2011/12 base	**08/09**	**09/10**	**10/11**	**11/12**	**12/13**	**13/14**	**14/15**	**15/16**
Planned ($k) 2008 Business Case + 2011 SIR	23,923	31,641	68,046	67,000	60,373	64,268	65,241	67,189
Planned ($k) 2008 Determination	13,786	21,135	18,569	27,778				
Actual ($k)	22,214	31,900	46,287	32,083				
Actual critical main renewal if Bankstown Trunk Main and balancing item included								
Actual ($k)	32,324	32,640	46,287	32,083				

PROJECT DELIVERY PROCESS – OBSERVATIONS

Condition assessment is via a 3 year contract with a specialist pipeline condition assessment company.
Sydney Water is seeking additional providers to improve competitiveness.
Delivery of the program is via the Networks Alliance.

PROGRAM

Under this program 32 km of critical water mains were renewed in the 2008-12 price path. Another 8 km of mains under individual business cases were renewed (e.g. Bankstown Trunk Main) which meets the output target of 40 km. However Sydney Water's submission states that 36 km was renewed and 4 km has been included in the program since the submission. There was a significant under-spend on this program. Reasons provided included:

- Sydney Water focused on smaller diameter mains;
- Renewals were mainly in medium to low complexity sites,
- Optimised solutions, and
- The levels of larger diameter critical water main renewals identified from risk and condition and assessment was less than planned

CONTRIBUTION TO OUTCOMES AND DRIVER

Maintenance of service levels;
Minimise disruption and other impacts on customers and the community (e.g. traffic disruption)
Minimise lifecycle costs of assets

KEY DOCUMENTS REVIEWED

- Interview presentation
- Decision Framework – Critical Water Main Renewal
- Water Main Asset Management Plan 2011-12
- Business Case - 2008/09 – 2011/12
- Critical Water Main Renewal Program Business Case Variation, April 2009
- Business Case Critical Water Main Program 2012/13 to 2015/16 including attachments
- Procedure – Condition Assessment of Critical Water Mains
- Procedure – Critical Water Main Renewal
- Procedure - Water Main Pipe Inspection
- Main Break Report - Narraweena
- Condition Assessment Report – Penrith WMPNo2 Main, Tyco Pipeline Condition Assessment

2. Reticulation Water Main Renewals

PROJECT DETAILS

Project Name	Reticulation Water Main Renewals		
Project Number	WEM007	**Status**	Current & Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

Sydney Water has 16,200 km of reticulation water mains (78% of the network). Main breaks have reduced from a peak of 50 Breaks or leaks /100m/yr in 2001/02 to 28.5 breaks or leaks /100m/yr in 2009/10. Sydney Water develops a high level estimate of likely renewals expenditure based on Kanew modelling. Intervention is initiated based on failure history with particular emphasis on customers experiencing multiple unplanned interruptions. For example one trigger is level is mains with failure frequencies exceeding 3 failures over a 2 year period, another trigger is shutdown blocks that have had three unplanned interruptions in a 12 month period. Mains identified are further investigated, evaluated and prioritised for renewal based on failure rate and criticality. Renewals are progressed if the NPV of maintenance costs exceeds the cost of renewal. This process is detailed in the reticulation watermain decision framework.

Prior to renewal an hydraulic modelling report is prepared which assesses the following scenarios:

- Decommissioning
- Downsizing
- Size for size
- Amplification
- No asset solution
- Change system configuration
- Reliability issues

The proposed average annual expenditure in the 2012-16 price path is 1.2% of current replacement cost which is similar to the percentage in the 2008-12 price path when the PMR 8 & 9 and balance item projects are included.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$183.9M (2008-09) Determination $247.9M (2008-12) Business case	**Initial Delivery Date**	Ongoing
Outturn cost / Forecast outturn cost in Submission	$165.1M (2008-12) $245.8 (2008-12) with PMR 8&9 and balancing items added, including capitalisation of main breaks	**Actual / Forecast Delivery Date**	Ongoing

KEY DATA

Investment Driver	Renewals
Output Measure	km of main
Stage in Planning Process	Planning, design, delivery
Procurement Process	Alliance

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k) - Determination	32,630	30,042	49,583	71,665				
Planned ($k) Business Case	59,808	61,173	62,891	64,000	60,485	61,623	61,613	61,408
Actual ($k)	12,585	46,425	56,890	49,200				
Actual including PMR 8&9 and balance item								
Actual ($k)	67,113	65,406	64,046	49,200				

PROJECT DELIVERY PROCESS – OBSERVATIONS

During the current price path 348 km of mains were renewed against a planned renewal of 420 km. Additional 8 km was initiated at beginning of 2011/12. It was explained that the variance was due to the effects of the pressure reduction program and refinements in the decision making process resulting in reduced lengths of mains identified for renewal. It is planned to renew 300 km of mains during the 2012-16 Determination period. Based on the cost/ rate information presented at the interview the main renewal cost rate in the 2009-12 period is estimated to be $680/m compared to a rate of $817/m for the forecast renewals program. Sydney Water explained that it would be targeting smaller lengths of mains in more complex environments during the next Determination period. Sydney Water provided cost information that suggested that an average rate for renewals with 25% of projects being in high complex areas was $1236/m and $649/m for low/medium complex areas.

The program is delivered through the Networks Alliance. A workshop was held in May 2011 which identified 59 actions for reducing costs under a number of categories. Accumulated cost savings of 25% since the beginning of the Network Alliance by June 2013 were anticipated.

PROGRAM

During the current price path 356 km of mains will be renewed against a planned renewal of 420 km. It is planned to renew 300 km of mains during the 2012-16 price path. The 2008-12 price path expenditure is $243M ($11/12) against a planned expenditure of $248M ($11/12). Sydney Water indicated that the reduced lengths of mains renewal were due to the effects of the pressure management program and refinements in the decision making processes. The increased expenditure per km main was due to working on smaller lengths in a more complex environment

CONTRIBUTION TO OUTCOMES AND DRIVER

The mains renewal program maintains customer service levels, reduces the levels of repeat unplanned interruptions and minimizes lifecycle costs.

KEY DOCUMENTS REVIEWED

- Interview presentation
- Decision Framework – Reticulation Water Main Renewal
- Water Main Asset Management Plan 2011-12
- Business Case Reticulation Water Main Renewals 201/13 to 2015/16
- Business Case Reticulation Water Main Renewals 2008-12 Variation No 1
- Business Case Reticulation Renewals Program 2008/09 to 2011/12

3. Reservoir Reliability Program

PROJECT DETAILS

Project Name	Reservoir Reliability Program		
Project Number	WEM009	**Status**	Current & Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

Sydney Water has 265 service reservoirs as per AMP, BC and State of the Assets Report in its water supply network. The majority of these reservoirs are constructed of steel. These reservoirs have a current replacement cost of $2.1 billion (written down value of $1.2 billion).

Most of the reservoirs were roofed in the late 1960s/early70s to ensure the maintenance of drinking water quality in the network. A number of these roofs are now reaching the end of their remaining life.

35 steel reservoirs have bitumen linings in a poor state while some mechanical/electrical equipment including re-chlorination facilities require renewal.

14% of civil assets are rated as being in a poor condition (intervention required within 2 years) while a further 1 % of assets are rated as very poor condition.

The process involves level 1 condition assessment undertaken by divers every 5 years. Where appropriate this is supplemented by more detailed level 2 inspections. Renewals are based on factors such as asset condition, business efficiency and poor performance. The assessment process includes an analysis of the current and future operating context, potential efficiency improvements. Sydney Water is looking at alternative designs and materials to reduce lifecycle costs. The selection of candidate renewal projects is based on NPV analysis.

The renewals include re-lining of the reservoir and roof replacements as well as renewal of mechanical and electrical equipment.

The scope of works in both price paths is shown below:

Renewal	**Number of (2008-12 Price Path)**		**Number of (2012-16 Price Path)**
	Planned	**Delivered**	**Planned**
Roof	10	9	15
Relining	15	17	25
Valves	41	15	21
Re-chlorination	41	31	41
Safety			All facilities

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$29.90M (2008-12) – Bus Case $42.67 (2008-12) - Determination	**Initial Delivery Date**	Ongoing
Outturn cost / Forecast outturn cost in Submission	$28.15M (2008-12)	**Actual / Forecast Delivery Date**	Ongoing

KEY DATA

Investment Driver	Existing Mandatory Standards
Output Measure	Number of reservoir roof replacement Number of reservoirs re-lined
Stage in Planning Process	Planning, design and delivery
Procurement Process	Alliance

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k) Determination	6,300	7,013	15,449	13,993				
Planned ($k) Business Case	2,653	5,780	14,094	7,370	15,990	14,965	13,633	13,120
Actual ($k)	3,202	8,074	10,217	6,652				

PROJECT DELIVERY PROCESS – OBSERVATIONS

Roof replacement projects are delivered through the Networks Alliance which acts as a program/ project manager. Relining projects are delivered through Maintenance Division. Roof renewal is through an open tender process while reservoir relining is through a schedule of rates contract through one contractor, managed by Civil Delivery.
Where feasible Sydney Water is seeking to undertake relining and roof renewals work in tandem, This will be coordinated by Networks Alliance
Assets such as valves, re-chlorination facilities etc are renewed through the Mechanical and Electrical Maintenance and Renewal Program (MEMRP)

PROGRAM

The proposed expenditure over the next price path ($57.7M) is double the expenditure over the 2008-12 Price Path ($28.1M)
The 2012 - 16 annual renewal expenditure equates to 0.68% of current replacement cost
Sydney Water should be able to deliver the proposed program given that it is outsourced.

CONTRIBUTION TO OUTCOMES AND DRIVER

The program's benefits include reduced breakdowns, worker safety, increased asset lifespan and minimise water quality contamination.

KEY DOCUMENTS REVIEWED

- Interview presentation
- Reservoirs Asset Management Plan 2011-12
- Business Case Water Services Reservoirs Renewals and Improvements Program 2009/10 to 2011/12 and Variation Business Cases
- A New Solution for Reservoir Roof Renewals – Kurnell Reservoir (WS0199) – Options Report, Aug 2011 (draft)
- Cost estimate spreadsheets - Automatic Valves and Electrical Upgrades and Reservoir Roof and Reline Cost Estimates

4. Water Pumping Station Renewals

PROJECT DETAILS

Project Name	Water Pumping Station Renewals		
Project Number	WEM012	**Status**	Current & Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

Sydney Water owns 150 water pumping stations. 118 are conventional pumping stations supplying reservoirs while another 32 are booster stations supplying areas that need additional water pressure.

The program aims to maintain assets to meet the required condition, performance, efficiency standards. Benefits of the program include:

- Maintains continuity of supply;
- Reduced safety risk for workers;
- Reduced lifecycle costs;

The Asset Management Plan indicates the number of assets currently rated as being in poor and very poor condition. This is summarised in the following table.

	% of assets	
Asset Category	**Poor Condition**	**Very Poor Condition**
Civil	1%	0%
Mechanical	5%	0%
Electrical	6%	1%
Electronics	6%	1%

Renewal needs are identified through the Facilities Decision Framework including level 1 condition assessment and development of 5 year plans.. This is then followed by the development of 1 year plans that identify assets for renewal based on condition, performance, business efficiency, safety risk and obsolescence using processes such as FMECA and HAZOP.

The assessment process considers options such as operational modifications, need for changes in capacity (increase/ decrease) etc.

Assets are programmed for renewal if the future cost of maintenance exceeds the cost of renewal and then prioritised based on risk. The approach to the risk assessment process is based on the likelihood of a consequence occurring, but no weightings are applied to any of the consequence categories.

The scope of the proposed 2012-16 investment includes the renewal of mechanical and electrical equipment and ageing HV equipment (40% of costs).

Cost estimates in the latter years in the 2012-16 price path are 'order of costs'.

The average renewals expenditure as a percentage of current replacement cost is 0.4%. This will increase to 0.7% in the 2012-16 price path.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$21.85M (2008-12) Determination $24.78M (2008-12) Business cases	**Initial Delivery Date**	Ongoing
Outturn cost / Forecast outturn cost in Submission	$22.6M (2008-12)	**Actual / Forecast Delivery Date**	Ongoing

KEY DATA

Investment Driver	Existing mandatory standards
Output Measure	Number of pumping station renewals
Stage in Planning Process	Planning, design and delivery
Procurement Process	External program manager

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k) Determination	2,874	3,329	6,694	8,958				
Planned ($k) Business cases	3,915	7,172	9,176	4,520	13,325	11,275	7,688	6,643
Actual ($k)	7,836	4,823	3,647	6,329				

PROJECT DELIVERY PROCESS – OBSERVATIONS

The Mechanical and Electrical Maintenance & Renewals Program (MEMRP) contractor manages the program and competitive tenders are called for all projects. KPIs and incentive mechanisms exists within the current MEMRP contract.

The MEMRP expires in June 2013

A review of the contract model underway. Focus areas include:

- Review of management arrangements to minimise overheads.
- Investigation into alternative risk management arrangements.
- Increased competitive tensions for scope & solutions development & delivery routes.
- Procurement of goods and materials directly by Sydney Water to generate greater economies of scale.

PROGRAM

This is an ongoing program. A significant increase in renewals expenditure is proposed for the 2012-16 price path. Sydney Water has the capacity to deliver the proposed renewals expenditure

	2008-12 Price Path		2012-16 Price Path
	Planned (number of)	**Actual (number of)**	**Planned (number of)**
Renewal of M&E equipment	13	8 (plus 9 in progress)	25
Install on-site generators	4	3	
Purchase mobile generators	6	5	
Install generator connection points	10	10	

CONTRIBUTION TO OUTCOMES AND DRIVER

The renewals program ensures that equipment availability meets the 97% target and contributes to maintaining continuity of supply. The program also reduces safety risks to operation and maintenance staff.

KEY DOCUMENTS REVIEWED

- Interview presentation
- Water Pumping Station Asset Management Plan 2011-12
- Projects proposed to be funded from 2012/13 to 2015/16 Water Pump Stations R&R Program Business Case
- Bid Proposal Workbook – WP0157 Pennant Hills, March 2010
- Business Case Water Pumping Stations Renewals and Contingency Improvements 2008/09 to 2011/12

5. Water Pressure Management Program

PROJECT DETAILS

Project Name	Water Pressure Management Program		
Project Number	WNM001	**Status**	Current & Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

The Water Pressure Management Program is part of the leakage management strategy to maintain leakage to 105ML/d as required by the Operating Licence. The Program objectives are to:

- Reduce leakage
- Reduce customer demand
- Reduce occurrence of breaks and leaks
- Improve customer service levels in high pressure areas by lowering pressure to more acceptable levels

The program commenced with a few pilot areas. It has been ramped up in the last few years. Pressure reduction is staged and it can take up to a year before full reduction is achieved in an area. The program required significant customer consultation. In the past, 20% of the serviced area had pressures in excess of 80m.

The program targeted areas with high levels of pressure, leakage, high night flows and main breaks history.

The result of the program will be to reduce average pressure of Sydney from 57 m to 50 m.

Each pressure area was economically justified.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$64.32M (2008-09) Determination $59.4M (2008-12) Business Case	**Initial Delivery Date**	June 2012
Outturn cost / Forecast outturn cost in Submission	$54.99M (2008-12)	**Actual / Forecast Delivery Date**	June 2013

KEY DATA

Investment Driver	New mandatory standards
Output Measure	Number of pressure control areas established
Stage in Planning Process	Project delivery and finalisation
Procurement Process	Alliance

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k) Determination	9,484	15,188	19,942	19,907				
Planned ($k) Business Case	18.268	15.188	16.496	9.400	1,900			
Actual ($k)	15,858	16,135	13,395	9,604				

PROJECT DELIVERY PROCESS – OBSERVATIONS

The project is delivered through the Networks Alliance which provides program management.

PROGRAM

It was planned to implement 102 pressure control zones during the 2008-12 price path. 153 pressure control zones will be established by 2012. These tend to be smaller areas with higher pressure reduction that cover the same geographical area as initially planned.

The program will be virtually complete by the end of the current price path with $1.9 M required for finalising a few areas and customer consultation.

The original O&M costs were estimated to be 7% of the project cost pa. Recent analysis indicates that the O&M costs are in the order of 4% of project costs per annum.

CONTRIBUTION TO OUTCOMES AND DRIVER

The program appears to have generally achieved the desired project outcomes as indicated in the following table:

Benefit	Planned	Actual/ Likely
Total	30 ML/d	27 ML/d
Leakage reduction	19 ML/d	23 Ml/d
Customer usage	11 ML/d	4 ML/d
Main breaks	450 pa ~2 breaks/100km/yr	800 pa ~4 breaks/100km/yr

The program has also reduced the extent of failures of customers service lines (owned by customer but maintained by Sydney Water).

KEY DOCUMENTS REVIEWED

- Interview presentation
- Leakage Management Plan 2010-15 (draft)
- Business Case Water Supply – Water Pressure Management Program Stage 4, Nov 2008
- Benefit-cost spreadsheet - Bantry

6. North West Growth Centre

PROJECT DETAILS

Project Name	North West Growth Centre		
Project Number	WGO001	**Status**	Current and Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

The need for the project stems from the Metropolitan Development Plan (MDP), which are the updated annual plans of the Metropolitan Development Strategy, produced by the NSW Govt. Department of Planning. We obtained a copy of the 2008/09 MDP from the DPI website.

The MDPs provide projections of new dwellings over the coming 5 years, with a balance figure for the 5-10 year horizon. Options appraisal done by GHD (080514_NWGC Area Plan - GHD Final - 14 May 2008.pdf).

Development of "Long-list" and "Short-list" of options. All the options on the short list assume recycled water networks attached to STPs. Selected option (Wastewater treatment option chosen was to expand Riverstone STP only). Options appraisal includes Multi criteria analysis. Could not reconcile the NPV analysis done by GHD (option 1returned the most favourable NPV and MCA score – however option 4 had the lowest capital cost).

Optioneering

General approach is: Lowest life cycle costs with consideration of risk.

Other factors are: Environment, Social / customer issues, O&M issues – CHAIR workshops (safety – requirement by workcover). Construction Hazard assessment identification review. Technical issues

Capital Investment Program

There is a prioritisation tool – There are annual capital expenditure caps and so a prioritisation tool is required to inform and assist the executive to determine which projects are constructed. Prioritisation process: IDST investment decision standardisation tool. 15 sheets are filled in and this is put into a database. This database contains a large model.

Funding Approval – Business Case Process

There is a standard format for business cases (3 standard formats depending on value). – all checked in the financial review ("Pink slip") process.

Cost Estimates

Cost estimates and budgets = P50 and P80. A separate cost estimating group (independent) engaged to come in and estimate the costs. P80 estimate generally used in the delivery business case for funding approval.

Differences due to moving more major infrastructure to developers; this moved money from the "greenfields" line to the developer operation lines.

Infoworks allows deferral of capex.

Package 1 (completed). Drinking water, recycled water and wastewater trunk infrastructure to North Kellyville, Riverstone and Alex Avenue.

Package 2 (in next price period): Business case only details planning activities and requests $5.2m. Details in Annexe (not viewed). Updated Business Case still in progress.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$202m	**Initial Delivery Date**	Package 1 complete
Outturn cost / Forecast outturn cost in Submission	Total $108. Package 1 $100.7 incl SW costs	**Actual / Forecast Delivery Date**	

KEY DATA

Investment Driver	Growth
Output Measure	Number of new connections
Stage in Planning Process	Package 1 Complete. Package 2 in planning
Procurement Process	Package 1: D&C (managed by "Australian Water"). Future packages not decided

2011/12 base	**08/09**	**09/10**	**10/11**	**11/12**	**12/13**	**13/14**	**14/15**	**15/16**
Planned ($k) (Package 1 in $0607)	5,000	11,000	32,000	45,000				
2012 SIR ($k) (Water)	9,602	46,100	17,991	3,075	10,127	31,365	22,263	1,025
2012 SIR ($k) (Sewerage)	5,577	9,046	11,161	5,638	17,246	21,013	41,174	42,025
2012 Totals SIR ($k)	15,180	55,145	29,152	8,713	27,373	52,378	63,437	43,050

Notes
Projections include all current/future packages and exclude costs related to property, stormwater and recycled water

(See table below)

		2008-09	2009-10	2010-11	2011-12	
SW data from - Package 1	Capex Summary AN 13 Oct_Master.xlsx $m, 06-07	5.0	11.0	32.0	45.0	
	SW inflation factors	1.062952	1.095904	1.121109	1.149137	Total
- Package 1	$m, 11-12	5.3	12.1	35.9	51.7	105.0
	Atkins inflation factors	1.155751	1.155751	1.155751	1.155751	Total
	$m, 11-12	5.78	12.71	36.98	52.01	107.5
						Total
SW data from	2012 SIR Actuals $m, 11-12	15.2	55.1	29.2	8.7	108.2

PROJECT DELIVERY PROCESS – OBSERVATIONS

Major underspend compared with 08 projections ($214m). This is due to:

- WPS 200 + rising main project deferred (based on recommendation of System Performance assessment).

- Riverstone STP upgrade deferred, existing plant capacity to be fully utilised.

Essentially, lower than anticipated growth forecasted by DPI allowed deferrals. Sydney Water's approach to build due to demonstrated demand.

Other reasons:

- Rouse Hill upgrade savings achieved during delivery

- Package 1, delivered under approved budget

Package 1 has been completed – total spend of $100.7m (forecast final cost).

D&C contract. There is an organisation there (project managers "Australian water"). Appointed by SWC – deed of appointment with SW. NOT a WSC (not required as this was not a developer project). There is a long-standing agreement between SW and AW as project managers. AW awarded the construction contract. One D&C contract broken into packages. Reed construction won the job for one package, awarded value $68.2m. AW costs are $15m. Other costs are SW costs. Variations to project as discussed during audit = $5.9m.

Note this reconciles roughly with the figures provided in the Capex Summary AN 13 Oct_Master.xlsx spreadsheet ($74.1m for delivery plus $15.1m to managing contractor = $89.5 + $11.2m SW costs = $100.7m). *Cannot reconcile difference between $74.1 reported in Capex Summary AN 13 Oct_Master.xlsx and $68m reported during the audit. $68.2m + $5.9m = $74.1m*

P50 reported in Capex Summary AN 13 Oct_Master.xlsx to be $122m, P80 reported to be $121m. We commented on this discrepancy (*P80 would normally be higher than P50?)* and Sydney Water responded: *"Misprint in the spreadsheet P80 = $131m"*

Non-trunk infrastructure (or non-lead in infrastructure is delivered by developers). If a developer wishes to proceed out of sequence with the MDP – the developer can enter into a commercial agreement with SWC, they can fund and construct the works and SWC will pay them back on a per lot basis until 33%, then a balloon payment for the residual cost. For less than 5 years. For developments taking > 5 years, the balloon payment is made at 66%.

SW is on the selection panel for developer tendering. They have to follow the same procurement guidelines etc. Note that infrastructure built by developers could be any size. Developers are delivering about $15-20m per year of infrastructure.

Actual costs are reimbursed, but checked by Sydney Water. Developers have incentives to lower costs as they pay the initial costs and also wear the risk that the development won't be filled (if the 33% / 66% is not reached SW will not adopt it).

Developers manage to deliver for around the same prices as Sydney Water.

Developers are audited / process is audited / then assets pre and post connection. That's done by the civil delivery team (sub team is the developer works team). This team also does renewals so they know what to look for. Pre and post connecting tests mandatory.

Capital Projects are managed through the CRIS system. Capital reporting information system. FMIS Financial system. Contracts are entered into FMIS and payments to contractor are made through FMIS – payments are made to AW and AW then pays the contractor.

CRIS is used for forecasting monthly. Used for budgeting and reporting costs – drags costs out of FMIS.

PMOS is another project management tool but more for the planning activities. Projects move from PMOS to CRIS once the project is approved and moves to the delivery phase.

Planning costs are logged (and capitalised against the project). Project numbers are created when a project is created and captures planning costs – at the end of "area planning" (defined business case). Area and strategic planning is an "opex" spend. Only after that point are costs allocated to capex. You need to demonstrate that the planning is going to lead to a capital solution within 5 years.

PMOS is only 18 months old.

CRIS links a series of projects.

SW has a list of agreed contractors. There are 30 contractors with whom SW has a contract and these can be used by developers for project management ("Water Servicing Coordinator"). There are up to 300 on the list for minor works / major works (they have "tickets"). There are also accredited designers / constructors / field testers who are accredited.

SWC does not construct any small infrastructure; only mains above 375mm. SWC does not pay for reticulation networks – these are booked as revenue and tax is paid on it. Given a standard value (not the actual value?). Where upsizing is required SW will fund the upsizing beyond Australian standards. SWC pays for lead ins.

Area planning process – which results in a SWC document. Note this document is not an intra-agency / govt / utility document, it is specific to SW. These are developed - stakeholder consultation is done with other utilities and govt agencies / councils/ dept of planning. NOT the developer (as they have particular vested interested).

SWC attempting to deliver "just in time" infrastructure. $30m investment in Infoworks to carry out hydraulic modelling. This is to allow a better understanding of true headroom, and to facilitate "just in time" construction.

PROGRAM

Package 1 has been completed – Reed was given a completion certification in April. Significant underspend in both the water and wastewater growth drivers due to the financial crisis, which made finance for developers difficult to obtain.

SW is also looking at Interim Solutions which allow for phased growth – if SW can delay major infrastructure they will do it. SW will also facilitate early delivery using interim solutions e.g. Alex Avenue. Development called "the ponds" driven by Landcom, for first home buyers. There was some land which wasn't going to receive serviced until package 3 (second 5 year tranche). Level of demand was so high that they sought an interim solution to allow them to develop the east side of Alex Avenue.

Systematic approach to analyzing supply demand balance and possible "steps" towards final supply levels, as a way of delaying capital expenditure.
Future challenges are: abandoning recycled networks (means upsizing of water mains may be required for peak demand), lower dry weather flows creating opportunities for prolonging asset lives / headroom, reducing infiltration to the same effect, considering decentralized sewers.

CONTRIBUTION TO OUTCOMES AND DRIVER

The NWGC program is required to meet SW's obligations for servicing growth under the MDP.

KEY DOCUMENTS REVIEWED

- Chapter 5.6 Sydney Water Price Review Submission
- NWGC package 2_BC and PS with signatures_20 June 2011.pd
- NWGC Initial Releases Delivery BC_31 Oct 2007.pdf

- 2008_09_MDP_Report.pdf
- Capex Summary AN 13 Oct_Master.xlsx
- IPART Presentation_Efficiency - NWGC_lz.pdf
- IPART Efficiency Review Presentation_Growth Oct 11 ver 2.pdf

7. South West Growth Centre

PROJECT DETAILS

Project Name	South West Growth Centre (SWGC)		
Project Number	WGO002	**Status**	Current and Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

Scheme is driven by growth under the MDP.

Options appraisal carried out by GHD in Oct 2007. Optioneering process takes many factors into account, including customer acceptability – however this appears to be "assumed" rather than tested (through surveys, focus groups etc). Sydney Water says this is because the customers in new areas do not yet exist and there is therefore no "community" to consult (as such), Local council representatives were invited along to workshops to assist in providing a level of customer acceptability.

In total, the SWGC will have 18 precincts, 17,000 Ha, 110,000 new dwellings = 300,000 people. Development on "multiple fronts".

Based on the Metropolitan Water Plan. It was initially planned to install dual reticulation schemes within the SWGC. However recycled water schemes were subsequently deemed not financially viable and not proceed with within the area except for – a few which are planned to be constructed due to section 73 certificate pre-commitment. While recycled water systems were still being considered, Sydney Water had developers build a small amount of a recycled water network to the extent of servicing about 15 streets of "purple pipe" have been put in. The developer is happy to walk away from the rest. Under BASIX, Sydney Water are to provide an alternative non-potable source where they had committed to.

Sydney Water thought the shortfall in cost for recycled water assets would be recovered by Developer Charges. Due to high cost of schemes over the cost for alternate supplies, Sydney Water sought advice from IPART and the Sydney Water minister for cost recovery. As cost could not be recovered the Sydney Water Board decided not to invest in recycled water schemes where not financially viable.

Duplication of networks is what makes recycled water uncompetitive with desalination, (now recycled water must meet an economic criteria – marginal cost of desalination will make recycled water uncompetitive).

The Area Plan developed by Sydney Water for the SWGC has 2 levels of detail – trunk assets and then down to lot level.

Strategic options were considered. At the time it was envisaged that the growth centres could be served by third parties (private operators) via the introduction of the Water Industry Competitions Act (WICA). This resulted in a high level of uncertainty about what Sydney Water should do and potentially if not appointed as the service provider what Sydney Water would get compensated for.

Wastewater treatment options considered were: 1 x regional, 3 x sub-regional and 15 x precinct centralised treatment facilities. . Consideration was given also to fully decentralised (lot by lot) servicing, however, it was excluded from the long list of options as it was considered impracticable for the proposed development, due to the expected cost anticipated to be high, reliability low for the levels of treatment required and surplus wastewater management would be impracticable for local disposal given the soil conditions within the proposed medium density residential area. Further, fully decentralised servicing would be characterised by a high risk of operation, maintenance and monitoring issues given some 110,000 localised sewage treatment systems.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$47.4m	**Initial Delivery Date**	Ongoing
Outturn cost / Forecast outturn cost in Submission	$57m (2012 SIR data)	**Actual / Forecast Delivery Date**	Ongoing

KEY DATA

Investment Driver	Growth
Output Measure	No. of connections / lots serviced
Stage in Planning Process	Delivery
Procurement Process	2008-2012 Alliance and internal resources "Civil Projects"

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k)	4,994	8,251	11,580	22,593				
SIR ($k)								
Actual ($k) SIR	850	2,220	15,564	38,403				
Current forecast ($k) SIR					31,225	19,068	22,243	46,638

PROJECT DELIVERY PROCESS – OBSERVATIONS

Delivery methods to date have been:

Alliance for the trunk mains and Civil Projects for the sewer pumping station upgrades.

Oran Park and Turner Road: P50 = $87.9m, P80 = $98.7m, Outturn cost = $74.6m (excluding SW costs, $84m with SW costs). Note: Outturn cost estimated – final TOCs not completed at time of audit.

Spring Farm water main (sub project): Delivered through Alliance: P80 $11.7m, ToC $11.2m, Outturn $9.7 excluding SW, $10.8m with SW.

Some infrastructure is developer constructed under commercial agreement. When developer charges were removed the commercial agreements had to be modified.

In Oran Park, Sydney Water agreed to pay for the lead in water and wastewater infrastructure as soon as it was built (NOT the 33% / 66% scheme),. In the future Sydney Water would develop this sort of project directly (trunk components) rather than sub contract to a developer, because it is not "out of sequence".

Sydney Water has made use of "interim solutions" to delay final servicing strategy infrastructure and to overcome operational difficulties during very low initial demand (e.g. pump-out of decentralised sewer collection wells).

Detailed notes on the delivery of the water mains sub-project of the SWGC

This project has been partially delivered (allowance for 4,000 lots has gone in (Spring farm) – of which there is about 900 in place. There are about 500 dwellings there. The existing properties were being served off limited capacity within the existing system while the trunk infrastructure was being developed.

The water trunk project was split into three stages. South West Growth Centre Trunk Project. Project no 20025042 (CRIS project number). A planning project (the South West Growth Centre project) still exists and other project numbers are still being created as required– both CRIS and PMOS

Document chain:

A strategic plan was completed by GHD which detailed the overall servicing strategy. Options analysis was done at a strategic level – light on detail. Cost estimates / whole life costs. Stakeholder workshops. The

servicing strategy developed within the Area plan has been signed off by the board. (Oct 2007document).

The water strategy determined early that drinking water would be sourced from existing systems in the "fatal flaw" analysis, taking into account external stakeholder recommendations and advice concerning the quality of drinking water from other sources for the purpose of human consumption and potential product end-use

The capex put into the 2008 IPART submission was based on unit rate estimates, indicative staging for first lot development and anticipated development growth over time assumed from information supplied by the Growth Centre's Commission (now part of the Department of Planning and Infrastructure- DPI).

In 2009 some precincts were released and Sydney Water proceeded with more detailed planning including a more detailed options analysis, which lead to the next document

The "Scheme Development" document (Jan 2010). This document details integrated water related trunk networks based on hydraulic modeling, with indicative staging based on a predicted release of precincts obtained from DPI.

This document was done internally. Cost estimation was based on unit rates (using the internal cost estimating system – which is checked regularly against delivered projects).

The initial capital cost estimate is developed and projected out in 5 year allocations. This can be an input to the SIR at this early stage of the project. The costs for the work on the trunk mains were estimated to be $66m, all phased for in 2011-16 period.

What was the $30m phased for the 08-11 period? This is not in the scheme development document (but must be somewhere else where the costs are brought forward). Advanced asset delivery due to acceleration of development. Asset identified in scheme document, just change in timeframe.

The next document in the project cycle is the "Asset Options Report". This is for a smaller area that the Scheme Development document (which is still for the whole area). As soon as an area is released, Sydney Water obtains the master plan and develops a "scheme plan" for each precinct. (because the development was so large they also did the "trunk scheme plan" above)

A more-defined cost estimation was developed. SKM did the cost estimation over a 30 year period for the two water options for comparison purposes only - $16m to $18m (raw construction costs – no overheads or contingency). Opex was also included. Opex was estimated using "% of construction costs" assumptions.

A scoring matrix for benefits is calculated. The scores are divided by costs to get a "cost benefit ratio".

The result is an option – the selected option was $39.1m – allowance for the whole scheme including pipes and reservoirs (using same costs basis, excluding overheads, contingency and land acquisition)

The next document in the project cycle is the Need Specification, then the "Environmental Assessment", followed by the "Business case"

The cost estimate in the business case is based on a risk-based estimate, undertaken by an external consultant, with input from internal stakeholders. This is a probabilistic cost estimate which determines the P50 (estimated cost; i.e. the cost which has an equal chance of being above or below the actual outturn cost), and the P80 (a cost higher than the P50 which is 80% likely to be higher than the outturn cost).

In the risk based estimate report, the costs for the project are now $76m (p50) to $78m (P80) based on the assumption the works will be delivered by a Design and Construct contract. Of this, one pipe, worth P50 $7.5 to P80 $8m was taken out in the final input to the business case, which reduced the costs to 68.8 / 72.8.

Procurement Strategy: Sydney Water has developed a methodology for selecting procurement methods, and this strategy was followed. The final two favoured options were taken to management with the option of engaging an existing delivery Alliance recommended.

The Business Case was prepared and then transferred to the "pink slip" (Form (2) independent review of

business case) for review by the investment program management team and the financial / regulatory team. The approved business case was $83m, which included $9m / 11.66m of SW costs for the Spring Farm watermain. This gave a 78 / 85 P50/80. This was based on an assumed D&C cost (which is normally higher than Alliance costs).

Of the completed works to date, the alliance developed a TOC for Stage 1 (*The Spring Farm Water main).* TOC was $9.5m. The ToCs are submitted to independent evaluation. The Stage 1 ToC was reviewed by Evans and Peck. The ToC is then submitted to the Asset Solutions General Manager for final approval.

PROGRAM

Higher expenditure than anticipated during the period for the SWGC because of accelerated development. In addition to the accelerated development, planning activities worth $14m were also implemented in the 2008-12 period, which were not anticipated at the 2008 price review.

CONTRIBUTION TO OUTCOMES AND DRIVER

The SWGC is required to meet Sydney Waters obligations to service urban growth, under the driver "smart growth".

KEY DOCUMENTS REVIEWED

- IPART Presentation_Efficiency – SWGC.pdf
- 071015_SWGC Area Plan - GHD Final - 15.10.07.pdf
- IPART Efficiency Review Presentation_Growth Oct 11 ver 2.pdf
- 3. Special Information Return - SWC 2010-11.xls
- 2008_09_MDP_Report.pdf

8. Avoid Fail Sewer Rehabilitation Program

PROJECT DETAILS

Project Name	Avoid Fail Sewer Rehabilitation Program		
Project umber	SEM003	**Status**	Current and future price path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

This program renews high risk sewers before they reach the end of their service life. Sewers have been classified as either "Avoid Fail" or "Run to Fail" based on the consequence of failure. The "Avoid Fail" strategy applies to high risk sewers which have an unacceptable consequence of failure. Sydney Water has 2700km of sewers (including 350 km of pressure mains) classified as Avoid Fail. This accounts for 11% of the network. Sydney Water aims to reduce the lifecycle costs through identifying sewers at risk before further structural deterioration necessitates structural repair. Structural rehabilitation can be around four times the costs of non-structural rehabilitation.

The work is mainly related to rehabilitation of concrete sewers. Since the early 1990's a significant increase in concrete corrosion has been observed with some sewers reported to be corroding at 5mm per annum. Increased concrete corrosion has been due to:

- Implementation of a trade waste policy in the 1980s which reduced the discharge of hydrogen sulphide inhibiting chemicals into the sewerage system;
- Sealing of some sewer vents in response to odour complaints in the 1990s.

Sydney Water takes a risk-based approach to the program with sewers ranked by estimated remaining life and cost of renewal. A summary of mains status at 2011 is included in the following table. Remaining life relates to period to when structural rehabilitation is required. The length of each identified main that requires renewal is highly variable.

Risk Rating	Remaining Life (yrs)	Length of Mains (km)
Very high	0	28.1
High	0-2	18.1
Medium	1-7	41.2

Options being implemented include:

- Installation of pre-treatment facilities by major trade waste generators. Six of the eight generators have installed pre-treatment facilities over the past few years and another two generators will shortly be installing pre-treatment facilities
- Use of a sacrificial alkali gel onto the sewer walls. This is anticipated to provide an extension of asset service life by at least 2 years.

Other options include deferring the renewal program but this may result in higher lifecycle costs.

The scope of works proposed for 2012 to 2016 includes:

- Condition assessment of 270 km of gravity sewers and 20km of pressure mains per annum
- Renewal of 16.5 km of sewers per annum

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$291.1M (2008-12)	**Initial Delivery Date**	Ongoing
Outturn cost / Forecast outturn cost in Submission	$242.8M (2008–12)	**Actual / Forecast Delivery Date**	Ongoing

KEY DATA

Investment Driver	Existing Mandatory Standards
Output Measure	km of sewers renewed
Stage in Planning Process	Ongoing
Procurement Process	Refer below

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k)	55,119	58,620	77,558	68,000	60,129	60,129	60,129	60,129
Actual ($k)	58,944	75,485	59,162	49,200				

PROJECT DELIVERY PROCESS – OBSERVATIONS

The process involves prioritising sewers based on condition assessments which provide an estimate of remaining service lives

Renewals of sewers less than 900mm diameter are undertaken using a pre-qualified panel of specialist contractors. Projects are bundled into larger work packages and tenders are issued at 6 monthly intervals

Renewals of the larger diameter sewers is undertaken through bundled develop, design and construct (DD&C) contracts. The projects are advertised through open tender but only five to six contractors are considered to have the required experience and capability.

PROGRAM

In the 2008-12 price path Sydney Water were programmed to renew 55km of critical sewers at a cost of $291M and will actually renew 57 km of these sewers at a cost of $243M. Sydney Water stated that this was because more work was done on the smaller diameter sewers. Some work on the larger sewers was deferred through the spraying of a sacrificial alkali gel onto the sewer walls.

For the 2012-2016 price path Sydney Water proposes to renew 66km of sewers .at a cost of $240.5M which is equivalent to the expenditure level in the current determination.

CONTRIBUTION TO OUTCOMES AND DRIVER

Implementation of this program will ensure that existing service standards are maintained and that lifecycle costs are minimized through intervention prior to assets deteriorating to a stage where structural renewal is required.

KEY DOCUMENTS REVIEWED

- Interview presentations
- Avoid fail Sewer Decision Framework, AMQ 0015, Sept 2011
- Variation Avoid Fail Sewers Renewal Program 2008-12 Business Case
- Avoid Fail Sewer Renewal Program 2012-13 to 2015-16 Business case ((draft)
- Sewer Mains Asset Management Plan 2011-12, AMQ0032, June 2011

9. Dry Weather Overflow Reduction Program

PROJECT DETAILS

Project Name	Dry Weather Overflow Reduction Program		
Project Number	SEM002 (06-09) SEM006 (09-16)	**Status**	Current & Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

This program addresses renewal of " to Fail" sewers which accounts for 89% of the sewerage network. The strategy aims to:

- Minimise the number of customers experiencing repeat sewer blockages;
- Minimise overflows to waterways; and
- Renew sewers where breakdown maintenance is no longer cost-effective (3 or more blockages in 5 years).

The process involves:

- Identifying sewers which meet certain criteria (blockages (3 in 5years), flooding of homes, overflows to watercourses etc);
- Undertaking investigation and condition assessment;
- Determining appropriate action using the lifecycle costing and prioritision tool. Options range from breakdown maintenance, root cutting, dig and repair or re-lining;
- Prioritising and packaging projects; and
- Implementation

The strategies adopted to individual sewers are based on service and structural grades and these strategies range from breakdown maintenance, root cutting, dig and repair through to re-lining.

Other options being progressed by Sydney Water includes education regarding tree planting and the voluntary private sewer blockage reduction program (30% of blockages are due to private sewers)

The current rolling 5-year choke frequency is 72 chokes per 100 km (the operating licence limit is 81 chokes per 100 km.) The investment in this project was reported to have reduced the number of blockages by 1800 per annum.

The program has been effective in meeting Operating Licence targets as shown in the Table below. Significant reductions in the number of properties affected, repeat chokes and overflows to waterways have occurred since 2005.

Sewerage	**Licence standard**	**Performance 2010/11**
Properties experiencing an uncontrolled sewage overflow in dry weather	14,000	9,158
Properties experiencing 3 or more uncontolled sewage overflows in dry weather	175	30

Approximately $4M pa of CCTV inspections are capitalised.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$93. 0M	**Initial Delivery Date**	Ongoing
Outturn cost / Forecast outturn cost in Submission	$93.1M	**Actual / Forecast Delivery Date**	Ongoing

KEY DATA

Investment Driver	Existing mandatory standards
Output Measure	Km of sewers renewed sewers subject to dry weather overflows
Stage in Planning Process	Ongoing monitoring, planning and implementation
Procurement Process	External contractors

2011/12 base	**08/09**	**09/10**	**10/11**	**11/12**	**12/13**	**13/14**	**14/15**	**15/16**
Planned ($k)	20,407	19,188	28,462	24,952	17,041	17,041	17,041	17,041
Actual ($k)	24,933	22,357	26,342	19,475				

PROJECT DELIVERY PROCESS – OBSERVATIONS

The service is procured through open tender with two contractors currently on the panel. Payment is based on a schedule of rates. The market is reported to be mature with adequate capabilities. The contract is scheduled for re-tender in July 2012.

PROGRAM

The output specified in the 2008-12 price path was 290 km of sewers rehabilitated. The actual length rehabilitated was 223 km. The quantity of renewals required based on condition and risk assessment was less than originally planned. This is because the extent of capitalisation of the CCTV investigation that is used to detect the need for renewal increased reducing the program funds available for renewal. It was reported that the backlog of problem sewers has now been overcome.

The program is ongoing and it is likely to reduce as much of the backlog high risk sewers is complete. It is difficult to predict the level of sewer blockages as it can be climate dependent and random (70% of tree root blockages are not repeated).

CONTRIBUTION TO OUTCOMES AND DRIVER

The program has contributed to the improvement of service levels and compliance with the Operating Licence.

KEY DOCUMENTS REVIEWED

Interview presentation
Sewer Mains Asset Management Plan 2011-12, AMQ0032, June 2011
Decision Framework- Dry Weather Overflow Management, AMQ0139, March 2010
Wastewater Systems Maintenance Prioritisation and Maximo Application, WWNO0036, June 2011
Business Case 2008-12
Business Case 2012-16

10. Wastewater Treatment Plant Renewals Program

PROJECT DETAILS

Project Name	Wastewater Treatment Plant Renewals Program		
Project Number	SEM010	**Status**	Current & Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

Sydney Water owns 13 wastewater treatment plants (WWTP), 13 water recycling plants (WRP) and 3 storm flow plants with a current replacement cost (MEERA) of $3.8 billion.($1.2 billion is for mechanical & electrical assets)

In the past, wastewater treatment plant (WWTP) renewals projects were identified by operators. Many of these projects did not stand up to scrutiny and were removed from the 2008-12 program which was based on projects delivered and expenditure in the previous price path. In 2009 the Maintenance Engineering Group established to implement a more rigorous approach to WWTP renewals.

In recent years buffer zones around WWTPs have reduced resulting in the need to cover process units to reduce odour complaints. As a result there has been an increase in corrosion rates of structures which has only recently become evident. In the past there was a focus on renewals of mechanical and electrical equipment but civil assets and other previously overlooked assets are now being given a higher priority.

Renewal needs are initially identified through 5 year plans and level 1 condition assessment. This is then followed by the development of one year plans that identifies assets for renewal based on condition, performance, business efficiency, safety risk and obsolescence using processes such as FMECA and HAZOP. Assets are programmed for renewal if the future cost of maintenance exceeds the cost of renewal.

Cost estimates in the latter years are 'order of costs'

The 2008-12 price path expenditure was significantly exceeded as a number of additional assets (particularly civil assets) were identified for renewal. Sydney Water has proposed an expenditure of $116.8M in the 2012-2016 price path but anticipate that the actual expenditure could be over $160M as few civil assets have been assessed. The Wastewater Treatment and water Recycling Plant Asset Management Plan estimates the renewal expenditure for the 2012-16 period to be $170.8 (nominal). Assets such as High Voltage, civil assets and "forgotten" assets such as ventilation, odour treatment systems and biosolids facilities have been included in the program in the 2011-12 to 2015-16 business case, but costs of specific projects have not been identified.

The average annual 2008-12 renewals program expenditure equates to 0.6% of current replacement cost (MEERA).

The average annual 20012-16 renewals program equates to 0.76% of current replacement cost (MEERA).

Major components of the 2012-16 program include:

	$M
Cronulla WWTP	$28.50
North Head WWTP	$7.70
Malabar WWTP	$3.00
HV replacement	$27.00
Other WWTP/ WRP renewals & reliability Projects	$81.00

Biosolids & odour reliability projects	$34.50
CDU and OCU renewals and reliability	$9.60
SWC costs	$8.70
Total	**$200.00**

The 2008-12 output measures for this program was:

- works at Cronulla WWTP including the replacement of the digester lid, extensive electrical mechanical works
- purchase and installation of new centrifuges at a number of plants

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$62.33M (2008-12) Determination $53.60M (2008-12) Business case	**Initial Delivery Date**	Ongoing
Outturn cost / Forecast outturn cost in Submission	$93.97M (2012-16)	**Actual / Forecast Delivery Date**	Ongoing

KEY DATA

Investment Driver	Existing mandatory standards
Output Measure	Renewal works at Cronulla WWTP
Stage in Planning Process	Currently $29.7M in delivery stage and $60M in scoping stage
Procurement Process	Mainly through Mechanical and Electrical Maintenance Program (MEMRP)

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k) Determination	11,855	10,410	21,346	18,714				
Planned ($k) Business case	11,635	11,496	15,465	15,000	29,200	29,200	29,200	29,200
Actual ($k)	22,293	12,972	29,495	29,213				

PROJECT DELIVERY PROCESS – OBSERVATIONS

Renewals projects are 100% delivered through external providers:
MEMRP – 67%
Operations – 8%
Asset solutions – 18%

The MEMRP expires in June 2013

A review of the contract model underway. Focus areas include:

- Review of management arrangements to minimise overheads.
- Investigation into alternative risk management arrangements.
- increased competitive tensions for scope & solutions development & delivery routes.
- procurement of goods and materials directly by Sydney Water to generate greater economies of scale.

PROGRAM

This is an ongoing program. A significant increase in renewals expenditure has occurred in the 2008-12 Determination period. Sydney Water has the capacity to deliver the proposed renewals expenditure.

CONTRIBUTION TO OUTCOMES AND DRIVER

The renewals program ensures that equipment availability meets the 97% target and contributes to WWTPs achieving their environmental licence conditions.

The program also reduces safety risks to operation and maintenance staff.

KEY DOCUMENTS REVIEWED

- Interview presentations
- Wastewater Treatment and Water Recycling Plant Asset Management Plan 2011-2012
- Program Business case – Wastewater Treatment Facilities, Renewals and Reliability CAPEX Program 2011-12 to 2015-16
- Business Case - Sewage Treatment Plants, Renewals & Reliability Capex Program, 2008/09 to 2011 to 2011/12
- Decision Framework, Facility Assets – Asset Renewals, Reliability & Business Efficiency Programs
- Spreadsheets of one and 5 year renewals expenditures at wastewater treatment plants

11. Wet Weather Overflow Abatement

PROJECT DETAILS

Project Name	Wet Weather Overflow Abatement		
Project Number	*SNM003*	**Status**	Current & Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

The program is designed to abate repeat wet weather overflows to properties and those impacting on swimming and environmental sensitive environments.

The environmental licences for each wastewater treatment plant catchment states that:

The objective of the wet weather overflow pollution reduction program is to require improvements to progress toward the weather goals expressed in the document titled "Licencing Sewerage Overflows – Environmental Impact statement, June 1998"

In 2005 Sydney Water, in response to the environmental regulator, proposed affordable (based on customer willingness to pay) options to reduce the frequency of wet weather overflows. Projects were included in the 2005 environmental licence. Further projects were added in 2007 based on the levels of *Enterococci* and beach usage.

The program is based on three elements:

1. No deterioration in performance where the system already meets the 'long term' or interim targets
2. Protecting public health and amenity through addressing repeat discharges inside individual customer properties
3. Improving system performance in other systems

The output measures for wet weather overflow reduction in the 2008-12 price path specified that overflows were scheduled for completion in these seven catchments. Overflow reduction will be completed in six catchments. Further investigations showed that overflow reduction work was not required in Bombo and West Hornsby.

For the 2012-16 the major expenditure items are Northern Beaches ($50M), Illawarra ($27M) and Quakers Hill ($17M). There is also an allocation of $36M for 2012-16 for "no deterioration" catchments which have yet to be identified.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$199.0M (2008-12)	**Initial Delivery Date**	Ongoing
Outturn cost / Forecast outturn cost in Submission	$172.9M (2008-12)	**Actual / Forecast Delivery Date**	Ongoing

KEY DATA

Investment Driver	New Mandatory Standards
Output Measure	Reduce wet weather overflows
Stage in Planning Process	Delivery phase
Procurement Process	Alliance

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k)	29,360	37,970	56,705	75,000	72,570	80,463	15,375	15,375
Actual ($k)	31,211	42,638	49,062	50,000				

PROJECT DELIVERY PROCESS – OBSERVATIONS

The program was delivered through the SewerFix Wet Weather Alliance. This Alliance was selected from a process including EOI, capability assessments and short-listing. Selection was based on price and other non-financial indicators The Alliance was reported to meet time and program objectives and achieved cost and non-cost KPIs.

PROGRAM

Due to the need for Sydney Water to undertake a $2 billion investment on the desalination plant the Wet Weather Overflow Abatement program was re-evaluated and expenditure significantly reduced. Agreement was reached with the environmental regulator for the program to be revised. Essentially the North Beaches delivery was moved from 2010 to 2012. The Lane Cove and Illawarra projects were moved to 2015.
The Variation Business Case 2008-12 states that:

To inform discussions on further overflow abatement, it is proposed for 2012-2014 to revisit the benefits and costs of the wet weather overflow abatement program. This will then enable a discussion with DECCW and Government on the future program. This will take three to four years and needs to be available for the 2015-2020 licence negotiations.

CONTRIBUTION TO OUTCOMES AND DRIVER

The program has reduced levels of faecal coliforms in watercourses and beaches but levels are still above recommended guideline values after rainfall events due to the impact of stormwater.

KEY DOCUMENTS REVIEWED

- Wet Weather Sewerage Overflows, 2010-2015 Program, May 2010
- Wet Weather Overflow Abatement Program, May 2008
- Variation Business Case Wet Weather Overflow Abatement Program 2008-12
- Board Paper Northern Beaches Storage Project – Preferred Option Selection
- Environmental Licences for Malabar, North Head Wollongong
- Program cost estimates 2011/12 to 2015/16
- Sewerfix Alliance: Delivery Package 4 – North Richmond Independent TOC Review North Richmond

12. System Reliability

PROJECT DETAILS

Project Name	System Reliability		
Project Number		**Status**	Current & Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

The objective of this program is to identify elements of the water and wastewater system where it is economical to develop/implement solutions to mitigate against risks in accordance with the reliability decision framework. This will assist with decisions on whether to take action on reliability issues and to determine what cost-effective option could be implemented.

The process involves:

- Determine projects to investigate via initial ranking
- Detailed investigation and re-ranking – then choosing projects
- Business cases

The economic evaluation follows the NSW Treasury Circular NSW TC 10/12.

Risks include power failure, single supply mains and lack of redundancy.

This is a new initiative and Sydney Water is seeking management approval to proceed.

Sydney Water staff have collated over a 1000 risks from resilience plans, vulnerability assessments, climate change assessments, risk registers from operators etc. An initial review of reliability issues has identified 24 projects with an estimated cost of $170 M which have been assessed as having a benefit/cost ratio >1. Sydney Water is seeking funding of $73 M in the 2012-16 price path to implement a number of projects which will be the highest ranked projects from the initially identified projects.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination		**Initial Delivery Date**	Beyond 2016
Outturn cost / Forecast outturn cost in Submission	$2.25 M (2009-12)	**Actual / Forecast Delivery Date**	Beyond 2016

KEY DATA

Investment Driver	Reliability
Output Measure	Number of risk reduction projects implemented
Stage in Planning Process	Initial planning
Procurement Process	To be determined

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k)					2,563	8,200	23,575	38,684
Actual ($k) 11/12 is the original forecast	74	71	263	2,142				

PROJECT DELIVERY PROCESS – OBSERVATIONS

The project is still in the initial planning stage.

PROGRAM

The program will extend beyond 2015/16.

Potential projects have been identified and ranked.

Costs are 'order of cost' estimates only and no detailed options analysis has been undertaken.

Likelihood and consequence are currently high level estimates (first step in the decision framework). The next step is to conduct a detailed analysis and option review.

CONTRIBUTION TO OUTCOMES AND DRIVER

Improved system reliability and availability.

Reduced risk exposure to Sydney Water.

Maintenance of continuity of supply.

KEY DOCUMENTS REVIEWED

- Interview presentation,
- NSW Treasury Circular NSW TC/12, Economic Appraisal Guidelines – Guidance on climate change for asset and infrastructure assessment
- Ranked spreadsheet of potential projects
- Decision framework for reliability (AMQF0029) (draft)

13. PSP Stage 2 (2008-11)

PROJECT DETAILS

Project Name	PSP Stage 2 (2008-11), also referred to as Freemans Reach, Glossodia and Wilberforce Sewerage Scheme.		
Project Number		**Status**	Current and Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

a) The Priority Sewer Program, or PSP, was previously referred to as "backlog sewer schemes"

b) Stage 1 included 16 villages with 5375 lots.

c) Stage 2 – total of 8 villages, 2755 lots of which 1935 lots have been done. 7 villages have been done – only 1 village has no connections yet (Appin). Freemans Reach, Glossodia and Wilberforce was one of the projects completed under Stage 2.

d) The government instructed DEC / EPA to study the on-site systems (circa 1997). The EPA was given a list of villages to study and to prioritise into As B and Cs. SWC is still working through the As.

e) We were not made aware of SWC's participation in the development of the priority list, or contributing to any cost estimates. Nor were we able to obtain any cost/benefit or feasibility studies for the PSP schemes. The basis for "A" classification is therefore unknown.

f) SWC found it difficult to determine "who should be served" as many customers wanted to join the scheme and there was a diversity of zonings and size of land holdings in the area. A process to agree who was "in" was developed, which to some extent included lots within a previous EIS developed by Council. Council cooperation was required because the council can force people to connect to the scheme under the local government act.

g) SWC decided that the spare treatment capacity at Richmond STP should be used rather than build another treatment plant. Operations staff were not keen on an additional treatment plant and the option of a new STP was ranked much lower and with higher costs than transfer options. Note that the Richmond RAAF Base can also join the scheme discharging to Richmond STP. Entire cost passed across the whole ratepayer base. For the Brooklyn-Dangar Island scheme, those customers in Cheero Point and Mooney Mooney who were outside of SWC's area of operations in Gosford City Council area, were afforded the opportunity to jojn the scheme, and customers there had to contribute approximately $13,000 per property to GCC's cost of the scheme, for which IPART only allowed a small (say 5%) subsidy across the GCC rate base as a contribution towards their costs..

h) The options analysis allowed a 30% weighting to economic criteria. Weightings are decided in internal workshops. Generally the highest scored multi-criteria schemes are also those with the lowest NPV. We note that in the detailed options analysis, a local treatment plant or local effluent re-use options were not considered, these having being ruled out in the early stages of optioneering. All options considered in the detailed analysis were to transfer to existing plants. We understand that in future local effluent re-use (infiltration / evaporation) would be given greater consideration due to the expected lower cost. At the time of the Freeman's Reach scheme, this technical option was not considered.

i) The option selected was a Pressure Sewer scheme, which is used extensively in the US but only recently (since 2002) in Australia. This option requires each customer to have a small pump and collection tank installed, and allows sewer mains to rise, rather than following a fixed gradient (as gravity sewers require). The option was the best as selected under the Multi-Criteria Analysis and also lowest NPV.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	IPART Final Determination report: $95m.	**Initial Delivery Date**	Dec 2011
Outturn cost / Forecast outturn cost in Submission	$123m (2011 SIR).	**Actual / Forecast Delivery Date**	

KEY DATA

Investment Driver	Clean beaches, rivers and harbours
Output Measure	No. of connections
Stage in Planning Process	Completed
Procurement Process	Alliance

2011/12 base	**08/09**	**09/10**	**10/11**	**11/12**	**12/13**	**13/14**	**14/15**	**15/16**
Planned ($k)	11,240	24,369	42,835	16,843				
Current forecast ($k)	17,701	56,289	36,727	10,896	1,538			

Note: All marked up values in table are 2011-12 Real (i.e. 2012-13 are not escalated).

Note that various costs / budgets are quoted in different documents for this scheme. A list is below:

Document	**Units**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**Total**
2008 AIR / SIR ($k) PSP Stage 2	$k 2011/12	33,258	90,775	80,276	62,701		267,010
2011 AIR / SIR Freemans Reach, Glossodia and Wilberforce Sewerage Scheme ($k)	$k 2011/12	17,701	56,289	36,727	10,896	1,576	123,190
2008 IPART Determination Report ($k)	$k 2011/12	8,699	35,966	27,528	39,900		112,093
Capex Summary AN 13 Oct_Master.xls	$k 2006/07	10,400	25,400	30,100	13,500		79,400
Capex Summary AN 13 Oct_Master.xls	$k 2011/12 (SW calcs)	11,055	27,836	33,745	15,513		88,149
Capex Summary AN 13 Oct_Master.xls	$k 2011/12 (Atkins calcs)	12,020	29,356	34,788	15,603		91,767
Capex Summary AN 13 Oct_Master.xls IPART Determination	$k 0809						91,800
Capex Summary AN 13 Oct_Master.xls IPART Determination	$ 1112 (Atkins conversion)						99,824

Capex Summary AN 13 Oct_Master.xls P50	$k 0809					135,000
Capex Summary AN 13 Oct_Master.xls P50	$ 1112 (Atkins conversion)					146,800
Capex Summary AN 13 Oct_Master.xls P80	$k 0809					138,000
Capex Summary AN 13 Oct_Master.xls P80	$ 1112 (Atkins conversion)					150,062
Capex Summary AN 13 Oct_Master.xls TOC	$k 0809					115,000
Capex Summary AN 13 Oct_Master.xls TOC	$ 1112 (Atkins conversion)					125,052
Capex Summary AN 13 Oct_Master.xls Outturn Cost	$k 0809					116,500
Capex Summary AN 13 Oct_Master.xls Outturn Cost	$ 1112 (Atkins conversion)					126,683
G, FR & W Business Case - V5_21 Jan 2009.pdf	$m 0809 but including escalation allowance	$12.0M	$37.0M	$47.9M	$45.6M	142.5

PROJECT DELIVERY PROCESS – OBSERVATIONS

The determination of a target outturn cost (TOC) is a negotiation between SWC and the Alliance contractor. Evans and Peck reviewed the TOC on SWC's behalf and reduced the agreed price by $12-13m.

For this scheme, the total Alliance costs were $111m (as reported during the audit), and approved budget cost was $138m (P80). The P80 included program overheads, capitalised planning costs, including land purchases etc. The P50 was $134m. Note that the spreadsheet Capex Summary AN 13 Oct_Master.xls states that the TOC was $115m (including $8.5m SW costs plus a $4m variation to cover Richmond STP Inlet works upgrade) and actual outturn costs were $116.5m

There are 14% overheads allowed as Limb 2 (the profit and corporate overheads component of the traditional alliance structure). Note that contingency and inflation allowance and time delay allowances are included in the P50. Note the business case document allowed $1.7m for internal resources to be capitalised to the project, and $1.5m planning. Outturn SW costs were $8.5m according to the document Capex Summary AN 13 Oct_Master.xls

The total number of connections was for about 5,000 people (EP). Innovative techniques used (no wet wells – pressure activated booster pumps) and either large diameter or long inclined "gravity mains" to pumping stations. There have been no operational problems since commissioning.

Chemical dosing was installed for pH correction to prevent H_2S – opex cost - where there are air vents there is activated carbon filters to scrubbing.

The grinder pumps are SWC responsibility and ownership. There are about 5,000 units already in operation across SWC's area of operations. Developed as a method for getting capital costs down and less intrusive. They contributed to the development of a WSAA Pressure Sewer Code. First PSS scheme

was installed in 2003 – now a fairly mature alternative technology.

Pumps are EOne from a US manufacturer, but now Mono (Australian) also make PSS equipment. Pumps run about 15 times per day, have about 15 L in the bottom of the fibreglass holding tank, and the EOne pumps are submersible.

Cost of servicing 1,600 lots = approx $71k per lot. Unit rates look high in the cost estimating report, but in this case "gravity mains" relates to inclined pipe storage upstream of pumping stations, and hence these rates are not comparable to simple non pressure rated gravity sewers elsewhere, and are an intrinsic and unique part of a wholly pressurised transfer system. For instance gravity sewers, in the PSP report the rate = Gravity sewers < 1.5m $900 - $1200/m

1.5 – 3.0 m $1300 - $1700/m

Regarding these rates, Sydney Water comments that:

"Whilst I cannot find those exact rates in the Evans and Peck report, my comment on this is that these are HDD bored inclined pressure pipes which act as wet wells for the three pumping stations and operate to provide a combined service as highly pressurized transfer mains or variable grade gravity sewers, using anti vacuum and air release points. These rates are based on PSP rates for previous backlog work, Sydney Water cost estimating manual and recent estimates from competitive tenders for SW work."

We note that the same report (the Evans and Peck Report) mentions these rates as Gravity Rates (page 3 of the report). On the same page rates are given for pressure sewer systems as:

PSS Reticulation $800/m $500/m Includes all fittings and restoration. (Table 3.1)

Sydney Water suggested that the sewer rates quoted in the Evans and Peck report are not the same as the rates we quote below, from South East Queensland, presumably because they understand the rates we quoted from the Evans and Peck Report to be Pressure Sewer Rates. However the Evans and Peck report refers to these rates as "gravity sewer" and gives (lower) rates for pressure sewer systems in the same table.

In SE Qld rates for sewers in a typical residential street would be around

<1.5m Typical residential street in good soil - $260 - $300/m

Residential street in rock – around $450 - $550/m

CBD in good soil $650 - $700 /m

1.5 – 3.0m Typical residential street in good soil - $350 - $450/m

Residential street in rock – around $700 - $850/m

CBD in good soil $550 - $700 /m

SW did not consider local discharge (via sub-surface irrigation) when this scheme was developed – the plan was just to pump it to Richmond STP. The transfer costs are exceptionally expensive. The Board requested the Treasurer to stop these schemes before Stage 3, however this was rejected (in fact PSP were accelerated).

PROGRAM

SW is mandated to carry out PSP schemes when certain areas are included in SW's operating license. Customers do not appear to be (systematically) required to contribute to the costs, which are borne by the wider customer base. We did not see evidence of a cost/benefit study to justify the investment.

CONTRIBUTION TO OUTCOMES AND DRIVER

The driver is "Clean beaches, rivers and harbours", however it is not certain that the existing systems had a detrimental effect on river quality (as we have not seen the environmental concerns which justified the scheme). The contribution to this driver, if there is any, is uncertain.

Corporate drivers are "growth" (15%) and "government programs" (85%).

KEY DOCUMENTS REVIEWED

- Capex Summary AN 13 Oct_Master.xls
- IPART Presentation_Effiency - PSP_FINALDRAFT 051011.pdf
- Basis of cost estimate.pdf
- Extracts of MCA Scoring.pdf
- G, FR & W Business Case - V5_21 Jan 2009.pdf

14. Future Priority Sewerage Program

PROJECT DETAILS

Project Name	Future PSP		
Project Number		**Status**	Current and Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

The SW PSP Stage 3 scheme currently consists of eight villages. The plan is to construct six new schemes by 2014 and two by 2015. For Stage 3, Sydney Water is trying to reduce the cost per lot by using decentralised or small neighbourhood TPs. Systems under consideration include STEP (take clarified effluent from septic tank and treat it), STEDs (common effluent drain), MBR (membrane bio-rector)., sub-soil irrigation.

The key is what to do with effluent. There is a view that transfer is not an option going forward - it needs to be managed locally. This is a view Sydney Waterhas come to in the last three months.

Total no. of lots is 2,864. The schemes are in the early phases of planning and four schemes are coming to preferred option.

Preliminary costs have been developed (but without options appraisal). SWC is working to a target cost per lot of $65k (75% of what it has been costing). Total is $186.2 for 2864 lots (2854 x $65k = $186.2m). Local re-use is the preferred solution most likely by sub-surface irrigation. In Wilton there is an option to connect to a small, locally operated STP (run by Veolia).

Next to Wilton there is a development called Bingara Gorge, which is not on the MDP. To include Bingara Gorge into the MDP, the property developer promised to fund and operate a wastewater scheme under a WICA licence. Bingara Gorge will have 1,100 lots. They would like SWC to take over the plant, but this is under negotiation (as the developer may want to be paid for the plant). Once the developer finds out that SWC is mandated to do Wilton (next door to B.Gorge) negotiating a price will be difficult! (as connection to a future potential Bingara Treatment Plant will be the lowest cost solution for SW).

Austral is a village with 55 lots, the centre being residential. Surrounding areas are rural but "released" and likely to be rezoned in 2012. Austral is in the operating license already. Austral is part of the SW growth centre. The Operating Licence requires that if SW provides waste water services to a "significant development" adjacent to Austral (or a few other listed areas) then they must deliver the PSP to Austral within 24 months.

What is the definition of "adjoining", as understood by the requirement for SWC to connect "villages adjoining significant growth"

There are no capex costs for Austral in the SW price submission document (or AIR/SIR), but there are some planning $ in there. (Menangle and Menangle Park same as Austral). Menangle is out on its own (2km away) from Menange park (which does adjoin part of the SW growth area) but has been included in the license (despite being on the other side of the Nepean, 2km away).

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	n/a	**Initial Delivery Date**	n/a
Outturn cost / Forecast outturn cost in Submission	$186m (presentation) $188m (SIR)	**Actual / Forecast Delivery Date**	

KEY DATA

Investment Driver	Government Programs
Output Measure	No. of sewerage connections
Stage in Planning Process	Planning
Procurement Process	Not yet defined

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k)								
Actual to date ($k) (planning)				2,434				
Current forecast ($k) (planning)					2,434	974		
Current forecast ($k) (delivery)					50,244	59,964	48,377	23,780

Note: All marked up values in table are 2011-12 Real (ie 2012-13 onwards are not escalated).

PROJECT DELIVERY PROCESS – OBSERVATIONS

Stage 3 PSP is still in development / planning. Likely servicing strategies have been identified for the 8 villages to be serviced in 2012-16. Budgets have all been based on $65k per lot serviced. Procurement Strategy yet to be determined.

See unit rate comments in PSP 2008-11 Project Summary Sheet.

PROGRAM

As with previous PSP schemes, no cost/benefit study available. SW attempting to cap costs by setting a per-lot budget, and investigating innovative treatment methods. We note that localized treatment is unfavorably treated in the SW Multi-Criteria Analysis as being disliked by residents. The MCA favours distant effluent solutions.

CONTRIBUTION TO OUTCOMES AND DRIVER

Driver is government programs / "Clean beaches, rivers and harbours", although there is no evidence that this project will contribute to "Clean beaches, rivers and harbours". Even if it can be demonstrated that the expenditure does contribute to clean rivers, it may not be the most cost effective way of cleaning rivers (which may suffer more from diffuse pollution etc.)

KEY DOCUMENTS REVIEWED

- Basis of cost estimate.pdf
- IPART Presentation_Efficiency - PSP_FINALDRAFT 051011.pdf
- Annual Information Return - SWC 2010-11
- Special Information Return - SWC 2010-11

15. Stormwater renewals 08-11

PROJECT DETAILS

Project Name	Stormwater renewals 08-11		
Project Number		**Status**	Current Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

There was a business case in 08 to determine what needed to be done.

SWC identified that some of the projects included in the business case did not require a capital renewal at that time, but were better addressed through maintenance. This was deferred and put into the maintenance scheme.

SWC determines the need for Stormwater asset renewals based entirely on an inspection program and condition assessment. While some assets are "run to fail", and others are "avoid fail", reactive maintenance data is not used to prioritise renewals. This is because there are very few reactive stormwater work orders (SWC extracted four between 2009-2011 from Maximo for the purpose of the audit). Given this, condition based assessment and prioritisation seems the most appropriate method.

Inspections: around 40km are completed per year, by CCTV and person entry. 20km per year on average on CCTV which can only do under 1500m. Anything above 900mm can be done by person entry.

The total length of stormwater assets reported during the audit was 447km. SWC is inspecting about 10% per year, to develop a 10 year program. About 75% have been visited. Some have not been inspected for various reasons. Inspection programs stagnated. Some assets are subject to tidal influences so can't be completed inspected. Some are blocked. These are then referred to maintenance for blockage clearance. Some parts of the system are problematic to inspect (e.g. City CBD) due to lack of manholes, other utility access etc.

In the 2008 AIR submission, 11km of channels were forecast for renewals. The document Stormwater Renewals 2005-06 Bus Case Apr 2006.pdf forecast around 5.5km of renewals to be done under that business case.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$35.1m	**Initial Delivery Date**	
Outturn cost / Forecast outturn cost in Submission	$14.2m	**Actual / Forecast Delivery Date**	

KEY DATA

Investment Driver	Asset renewals
Output Measure	km renewed
Stage in Planning Process	Completed
Procurement Process	Unknown

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k)	1,992	11,082	6,431	5,601				
Actual ($k)	4,810	2,614	2,835	3,974				

PROJECT DELIVERY PROCESS – OBSERVATIONS

The Cooks river was part of the renewals but is now a standalone item. It was in 2005-6 stormwater asset renewals, but was taken out and put into cooks river bank renewals. This was established when it came through gateway 2. The program has therefore shrunk as big projects were separated out.

Part of the 2011 IPART Stormwater capex submission is "trunk drainage land at Rouse Hill"; but in terms of expenditure this is property expenditure. SWC is the trunk drainage authority in Rouse Hill.

Normally these costs would have been paid for through developer charges. However these have been abolished.

PROGRAM

The stormwater renewals program was significantly underspent in the 2008-11 period. Part of the reason for this was lack of capacity within SWC for "design services with stormwater expertise" (the 0506 business case stated). Investment also follows the cycle of inspections, with an approx. 2 year lag. 6km of renewals per 4 years = 1.5km per year = 0.3% of the asset base, which assumes a 300 year life (approximately). Given the 100 year design life, and life of current assets, apparent lack of failures, the level of renewals may be appropriate.

CONTRIBUTION TO OUTCOMES AND DRIVER

There are no specific license measurable performance outcomes. Driver is asset renewals.

KEY DOCUMENTS REVIEWED

- Stormwater Renewals 2005-06 Bus Case Apr 2006
- 2008 SWC Information Return and Special Information return AIR and SIR.xls
- 2. Annual Information Return - SWC 2010-11.xls
- IPART Determination 2008
- Reactive Stormwater Works_Maximo.xls
- Dobroyd Canal Bus Case Jan 2008.pdf
- List of Stormwater and Recycled Water Projects.xls

16. Stormwater Renewals: 2012-2016

PROJECT DETAILS

Project Name	Stormwater Renewals: 2012-2016		
Project Number		**Status**	Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

SWC determined that an approach for identifying renewals work was required. The future Stormwater renewals program is 2013-2019. An attempt has been made to bring approach in line with other asset management practices, using asset solutions for procurement / delivery.

Inspections: around 40km per year. CCTV and person entry. 20km per year on average on CCTV which can only do under 1500m. Diameters above 900mm can be done by person entry.

Total length of stormwater assets…. 447km. Inspecting about 10% per year, to develop a 10 year program. About 75% have been visited. Some have not been inspected for various reasons. Inspection programs stagnated. Some assets are subject to tidal influences so can't be completed inspected. Some are blocked. These are then referred to maintenance for blockage clearance. Some parts of the system are problematic to inspect (e.g. City CBD) due to lack of manholes, other utility access etc.

Around 5% of assets are condition grade 4 or 5 when surveyed (this does not mean that 5% are now, as some of these will have been renewed). In the 2011 program there are 6km scheduled for renewals for valuation they use 100 year life (an average over all of the stormwater assets).

There is a lag in work which follows inspections, if SWC inspects a "bad" area, this results in renewals two years later. We questioned the performance of stormwater systems… the performance criteria is "absence of blockage". The performance (licence) requirement is to "maintain system capacity". Open systems are visually inspected for blockages every quarter. For reactive jobs, SWC maintains a database for stormwater blockages. Stormwater overflows are reported through the main switch board (recorded on the customer management system), some level of filtering is done there to identify if it is a stormwater asset.

Modelling of stormwater systems: There is not a comprehensive set of flood risk assessment for Sydney, The council systems are the upstream parts of the SW system. Sydney Water actively works with local councils and is implementing a prioritised flood risk investigation program to initiate new studies within the framework of the NSW Floodplain Development Manual.

SWC system is defined by historical responsibility. Built during depression by dept of public works. Generally they are trunk drains > 900mm. Generally early 1900s. Only in some parts of Sydney (inner south and inner west). The system covers 2.5% of SW's operating area. Some parts of the system are "run to fail" (e.g. open channels in parks), others are avoid fail (e.g. underground pipes in CBD).

SWC has developed a comprehensive Asset Management Strategy for 2011 for Stormwater. We note that the level of investment going forward is also projected out over 30 years, and remains roughly constant at 0.3% to 0.4% of asset value. Asset book lives are 100 years and given the large investment in 1930-40, a large number may require renewal (and upsizing of capacity) during this period.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	n/a	**Initial Delivery Date**	
Outturn cost / Forecast outturn cost in Submission	$26.8m (from SIR) $26.7m from List of Stormwater and Recycled Water Projects.xls (excl. overheads)	**Actual / Forecast Delivery Date**	

KEY DATA

Investment Driver	Asset renewals
Output Measure	km renewed
Stage in Planning Process	Planning
Procurement Process	Various

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k)								
Current forecast ($k) (SIR)					8,329	9,747	5,125	3,588

PROJECT DELIVERY PROCESS – OBSERVATIONS

There are a number of projects identified in the last price period which were not delivered. For example the. Cooks River ($8m) which is a large project for stormwater. It is complex because SWC needs to work with eight councils. Cooks river business case identifies a number of procurement options and contains basic optioneering.

Procurement: for each project, depending on the nature, work is done through asset solutions / open tender / internal civil delivery. The internal civil delivery team is the reactive teams when they are idle. If there is too much reactive work and the teams are too busy, the build up of work will be outsourced.

PROGRAM

The stormwater program investment has increased from an average of $6m per year during 08-11 to almost $10m per year during 12-16 (including overheads). Without overheads the amounts appear to be $3.4m in 08-11 to $6.7m between 2012-16.

Asset ages indicate that investment should be increased and previous levels are not sustainable in the long term. Innovative solutions such as naturalization appears to delivery multiple services (conveyance, partial treatment, recreational space) and SWC estimates that naturalization asset lives are 100+ years (compared with 50 years for lined channels).

CONTRIBUTION TO OUTCOMES AND DRIVER

Driver is asset renewals. The projects will contribute to 6km of renewals.

KEY DOCUMENTS REVIEWED

- Stormwater Asset Mgt Plan Dec 2010.pdf
- 2008 SWC Information Return and Special Information return AIR and SIR.xls
- 2. Annual Information Return - SWC 2010-11.xls
- Reactive Stormwater Works_Maximo.xls
- Cooks River Initiation Bus Case Sep 2009.pdf

- List of Stormwater and Recycled Water Projects.xls
- Stormwater Renewal presentation_IPART Efficiency Audit.pdf

17. St Mary's Water Recycling Plant (Replacement Flows 2008-11)

PROJECT DETAILS

Project Name	St Marys Water Recycling Plant (Replacement Flows 2008-11)		
Project Number	20022414	**Status**	Current Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

The project now known as the St Mary's Water Recycling Plant was originally referred to as the Western Sydney Recycled Water Initiative (Replacement Flows). The plant capacity is 50 MLD and produces up to 18 GL of recycled water per year to release into the river. Treatment is reverse osmosis; 65 ML of effluent is required to produce 50ML of recycled water. The concept of "Replacement flows" allows less water to be released from Warragamba Dam (50 MLD less) and conserving this drinking water in the dam.

St Marys Water Recycling Plant treats wastewater from three wastewater plants. In general, treated effluent from the three plants is re-used in order of priority: process water for each plant (first priority), irrigation like golf courses and sports fields, discharge to South Creek and Eastern Creek (which is later picked up by irrigators) as per MoU with NOW that requires specific daily releases to creeks. Final priority for treated effluent is sending it to St Marys Water Recycling Plant for reverse osmosis treatment and discharge of recycled water to the river above Penrith weir.

The concept behind recycling and replacing flows was to produce low nutrient water with levels similar to water from Warragamba Dam. For example, nitrogen in normal treated effluent is around 15mg. Warragamba water is less than 1mg. This created a requirement for reverse osmosis.

In 2004 there was a recycled water market assessment of Sydney and Illawarra done, identifying all the potential recycled water schemes – Western Sydney was identified because the existing wastewater plants were already producing high quality effluent (as compared to the ocean plants, which are only primary treatment).

There was a government plan to get 12% of Sydney water needs by 2015 from recycled water; this is equivalent 70GL per year (total from potential water projects). Under this plan, the Government directed SWC to implement the St Marys Water Recycling Project. It was a major component of the 2006 Metropolitan Water Plan (to secure Sydney's water supply). (Note: There is now a 2010 metro water plan). There was a 31 July 2006 scoping study (done by SKM) completed which looked at the options so that concept designs and performance parameters were defined.

SKM also did the recycled water marketing report for NSW Office of Water which was the original case for the St Marys recycled water plant. This report went to Cabinet in October 2005. Cabinet Standing Committee on Energy and Metropolitan Water gave approval to proceed with the project in a Decision Paper dated 17th Oct 2005.

After an Expression of Interest, 4 consortia were shortlisted for the project tender to design and construct the project and to operate and maintain the water recycling plant

On the 17 August 2007 the Minister for Water Utilities instructed SWC to carry out the Western Sydney Recycled Initiative Replacement Flows and in a separate letter to IPART instructed them to take the costs into account.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$176m (nominal) $198m ($11/12)	**Initial Delivery Date**	
Outturn cost / Forecast outturn cost in Submission	See below	**Actual / Forecast Delivery Date**	

Various outturn cost figures:

Document	Descriptions	2007	2008	2009	2010	2011	2012	total 08/09-11/12
IPART Determination - Western Sydney Recycled Water Initiative	Forecast	-	-	100,042	98,194	-	-	198,235
2. Annual Information Return - SWC 2010-11	Actual	7,049	25,009	103,068	74,644	6,280	4,500	188,492
List of Stormwater and Recycled Water Projects.xls	?							198,215
AN 27_Capex Summary AN 13 Oct_Master.xls	Actuals $0607			89,900	73,500	-	-	163,400
	Actuals $1112	-	-	103,902	84,948	-	-	188,850
	P50 forecast							223,400
	P80 forecast							252,000
	Actual Tender Price							154,400
	Tender Outturn Cost							191,200
	SW Costs							14,000
	Total Outturn Cost							205,200

KEY DATA

Investment Driver	Government Programs
Output Measure	MLD recycled water
Stage in Planning Process	Completed
Procurement Process	DBOM Open Tender

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k) (IPART det.)	109,242	88,670						
SIR ($k) 2011	103,068	74,644	6,280	4,500				
Current forecast ($k)					n/a			

PROJECT DELIVERY PROCESS – OBSERVATIONS

The project was procured through an open tender DBOM contract for the project following an expression of interest process. Two contracts were awarded: a D&C and an O&M. The O&M contract were modelled on availability and usage charges arrangements.

The financial criteria of tender assessment was "whole life" based on the "NPV for "D&C and O&M . Burnvoir Corporate Finance provide financial analysis to the tender committee. The procurement process was approved in the business case of 6/6/2006. Pink slip was issued based on the business case.

The business case for procurement of the project had a total project estimate of $230M included a scheme for relocation of discharge from Wallacia WWTP which was later withdrawn worth $15m. The total estimated cost was therefore $215M. Outturn cost was $206m (value given at audit).

Note the preferred tender was also the tender with the lowest price.

PROGRAM

This project is not part of a program of replacement flows. It is a one-off project. The monitoring program should demonstrate that water quality has been improved in the river. Check compared to baseline. River had to be "no worse off" than if the flows had been released.

CONTRIBUTION TO OUTCOMES AND DRIVER

Driver is 100% Government requirement. Monitoring results not known yet – will be published in Jan 2012. Initial results shown in the file AN011_Environmental changes.pdf indicate substantial reductions in TN, TP and coliforms, and changes to the wildlife populations resulting from lower conductivity / nutrients.

KEY DOCUMENTS REVIEWED

- SW Business case 6/6/2006
- Letters from Premier to SW / Ipart.
- Letter from Minister for water Utilities 17/8/2007
- Metropolitan Water Plan 2006
- Cabinet minutes 17/10/2005 – direction to go to EoI
- Cabinet minutes 5/4/2006 – direction to include in price review
- Replacement flows_Business case_18 June 2007.pdf
- 2. Annual Information Return - SWC 2010-11.xls
- AN011_Replacement Flows Project Monitoring - overview.pdf
- AN012_Replacement Flows Project - Scoping Study Report - Final.pdf
- AN011_Environmental changes.pdf
- AN 10 - St Marys WRP - Efficiency Review.pdf

18. Recycled Water

PROJECT DETAILS

Project Name	Recycled Water		
Project Number	10011483 and 10011758a	**Status**	Current and Future Price Paths

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

The Sydney Metropolitan Water Plan is the context for recycled water projects. There is a target in the 2010 plan to reach 12% of total supply from recycled water by 2015.

The 2010-2015 Sydney Water Operating License states that: "Sydney Water is not required to undertake any scheme where it is not financially viable". Sydney Water has no fixed target for recycled water, only the NSW Government has a target of 70GL/year by 2015.

Funding for recycled schemes can be met from recycled water revenues, regulated revenue from "avoided costs", developer charges (currently about $4,000 per Equivalent Tenement for Rouse Hill), other: external grant funding, customer capital contributions, etc. Note that developer charges are applied only at Rouse Hill and Hoxton Park. Developers can be made to construct the recycled network if this is a condition of consent.

According to the Sydney Water Price submission, the Rouse Hill recycled water scheme results in avoided water and waste water costs of about $ 18.1 million, (in $2010-11). Sydney Water has not claimed avoided costs in the price submission related to Hoxton Park. Traditionally development of recycled water schemes has been opportunistic; for example golf courses near wastewater treatment plants. In the mid 90s Sydney Water had a commercial arm Australian Water Utilities, who tried to market it. A lot of customer interest came during the drought of 2000s. Now Sydney Water produces about 47.5 GL/year (including replacement flows) and plans to increase recycled water production to about 56 GL (out of the total for Sydney of 70 GL) by 2015.

Penrith Council are doing their own recycled water network because Sydney Water costed it and it was not viable, so the council is buying treated effluent "at the fence" and distributing itself.

The existing contract with Bluescope steel is "take or pay" so risk is assured for the investment. Sewer mining applies upstream or downstream of a treatment plant. Caltex in Kurnell are planning to mine the sewer after treatment and are therefore paying nothing for the treated effluent (cheaper to treat than sewer mining upstream of the sewer). Sydney Water noted that their policy position is "no financial gain from sewer mining" to encourage access / third parties to get involved.

Hoxton Park / Rouse Hill

Both schemes were planned and approved pre-2006 in the Metropolitan Water Plan (pre desalination).

Hoxton Park (project 10011483) scheme will ultimately provide recycled water to about 16,000 residential dwellings. 7000 dwellings are part of the South West Growth Centre. . Effluent from Glenfield wastewater secondary treatment plant will be recycled to feed the scheme.

Rouse Hill (10011758a) Stage 1 delivery started in the mid 1990s. Planning started in late 80s. About 20,800 properties are supplied with recycled water. Eventually the scheme will serve 36,000 homes.

The driver at the time was ensuring no increase in pollutant loads to the downstream waterway. The recycled water scheme was a key part of that goal. Sydney Water has ring-fenced costs and revenues. Revenues are derived from the ACCESS billing system, based on scheme. Meters are used to pick up the revenues.

Ring fencing methods

Operating expenditures (opex) in the Annual Information Return (AIR) is based on a regulatory cost model. For Rouse Hill and Wollongong – they use a individual calculations separated for each scheme. St Mary's and Rosehill have contracts so these costs can be extracted out of the general ledger.

Opex costs calculated "off line" for non-regulated opex. Sydney Water has information on total opex for the site, and they do the split in a "model". Sydney Water checked this and found energy was being over-estimated (as there were sub meters there which could be used to cross reference).

No corporate costs are allocated to recycled water. These are pro-rata allocated to the main services (Water, Wastewater and Stormwater) but not to Recycled Water. Sydney Water corporate overheads are expected to reach in 2011/12 about $180 million, so about 12% of total operating expenditure ($1.4 billion).

Maximo does not post to the financial system. Sydney Water can get the hours information out of Maximo only. Maximo is not currently used as the asset register, nor is it integrated with Financial Management Information System (FMIS). Instead, Sydney Water pulls the hours out and uses this to estimate and allocate costs off-line.

CRIS (project management software) pulls data out of FMIS (which is a Peoplesoft product). FMIS has a consolidated asset register which is not linked to the Maximo asset register.

Note that non-regulated costs going forward are lower than previously. This applied in particular to Rouse Hill where Sydney Water expended high "up front costs" for plumbing inspections and customer education. Plumbing inspectors are now in the Office of Fair Trading. Customers pay directly for inspections.

Potable water costs have been subtracted from regulated opex in the 2011 AIR (as these are also Sydney Water revenue). However potable water costs are not then added into the non-regulated opex. (Note that this would have to be done in order to calculate total non-regulated costs).

Avoided costs

These go into the regulated asset base and are therefore paid for by all customer base. Sydney Water has proposed $21.6 million ($ 2011-12) to be added into the Regulatory Asset Base for Rouse Hill avoided costs. The justification for this is detailed in Appendix 11 of Sydney Water 2011 IPART Submission. We note that the document "Rouse Hill Avoided Wastewater Cost Options report" determined $14.8m ($2009/10) of avoided costs for wastewater alone. A further $1.9m ($2010/11) has been claimed for contributing to the deferral of the expansion of the Sydney Desal Plant.

After indexation and adjustment for cost of capital (7.5%) the total claimed is $21.6m as described in the Sydney Water IPART submission (Page 251).

There are two components to the avoided costs: additional avoided wastewater treatment costs & avoided potable water costs. The latter are assumed to rise primarily from delaying the second module of the desalination plant.

The time value of the money (the delay) has been allocated to each of the recycled schemes. They are only claiming the potable water savings above what BASIX will achieve.

Sydney Water assumes that Rouse Hill recycled water demand will increase from 1,657ML in 2010-11 to 2,765ML in 2016-17 (as per the AIR 2011). Tertiary treated effluent is further chlorinated and treated with UV lamps. The total throughput of the plant is 3,500 Ml*; around 60% therefore is reused. Around 500 ML is also used onsite.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	Regulated $32.2 million ($2008-09) over the 2008-09 – 2011-12 period, (excluding Replacement Flows – subject of separate project summary)	**Initial Delivery Date**	
Outturn cost / Forecast outturn cost in Submission [Not confirmed]	$84m actual 2008-12 Forecast $72m (from List of Stormwater and Recycled Water Projects.xls) and $92 from AIR / SIR data)	**Actual / Forecast Delivery Date**	

KEY DATA

Investment Driver	Growth
Output Measure	ML recycled water supply available
Stage in Planning Process	In delivery
Procurement Process	Water Mains: Alliance. Pumping Stations / Treatment Plants / reservoirs = D&C contracts

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Actual ($k) (AIR)	19,758	13,651	21,009	28,700				
Current forecast ($k) (AIR)					25,352	17,301	18,249	11,275

PROJECT DELIVERY PROCESS – OBSERVATIONS

Delivery via network alliance. Pumping stations delivery via D&C tendering. Stage 1 cost $100m+ (including pre-2008 investment).

PROGRAM

Note that all costs here are unregulated RW. The only regulated costs are the claimed avoided costs of $for Rouse Hill

Completion of Stage 1 Hoxton Park = $19.5m ($2011-12), and Stage 2 = $6.2m ($2011-12) in the 2012-16 period.

Completion of Rouse Hill – uncertain cost. $in avoided costs claimed around $1,600 per lot served with the extended recycled water network.

The Rouse Hill plant capacity is 27 MLD, and will reach capacity in 2031 according to SW projections. The recycled facility can treat 10MLD. Current flows to the plant at 17MLD. In order for the plant to expand beyond 17MLD, additional nitrogen removal was required (or diversion of recycled flows). By diverting 10ML the plant discharge will drop to 7MLD and therefore the discharge consent life has been extended until 2031 (when total discharge volumes will each 17MLD again) We note at this point the plant will have reached full capacity and may in any case require un upgrade.

We asked Sydney Water what the denitrifcation costs represented. Their response was that

"The $15m corresponds to a denitrification filter(s) for 13.5 ML/day or half of the total wastewater treatment

facility capacity. It is correct that the extra residual flow into Cattai Creek is 2 ML/day and we desire to remove all of the extra nitrogen introduced by this extra residual flow. It is not technically possible to remove 100% of dissolved nitrogen with denitrification filters. The denitrification filters were sized to reduce (rather than remove) the total nitrogen load discharged by the wastewater treatment facility to the appropriate level"

One of the options considered by Sydney Water to deal with the continually increasing nutrient load was to install reverse osmosis, as is done at St Mary's, for the marginal 2MLD that the proposed recycled network will absorb. The cost was estimated to be $44m. We note that St Mary's recycled water plant uses reverse osmosis to produce 1mg / TN water, as a replacement for Warragamba flows. The cost of this 50MLD plant was approximately $205m, or $4m per MLD treated (assuming no economies of scale). By this reasoning, a similar plant to reduce N levels at Rouse Hill for 2 MLD would cost $8m.

Operating costs of reverse osmosis were estimated to be $3m per year, while operating costs for St Mary's are variously reported to be $11-$18m per year (for 50 MLD), which is $0.36m per MLD. This suggests an operating cost of $0.72m for the 2MLD to be treated a Rouse Hill (assuming no economies of scale at St Mary's). The NPV of $4m capex + $720k opex for 25 years discounted at 7.5% is $11m.

CONTRIBUTION TO OUTCOMES AND DRIVER

Growth Servicing. Note that Sydney Water is not required to supply recycled water unless it is financially viable (i.e. can be delivered for below the revenues + developer charges + avoided costs).

KEY DOCUMENTS REVIEWED

- AN 24 Recycled water full presentation ver 1.pdf
- AN 43_Rouse Hill Wastewater Avoided Cost Options Report .pdf
- List of Stormwater and Recycled Water Projects.xls

19. Customer Management System

PROJECT DETAILS

Project Name	Customer Management System		
Project Number	20020425, 20020506, 20025030	**Status**	Current and Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

In 2002, Sydney Water terminated its project for a combined billing and contact management system when the supplier failed to deliver on project commitments. In 2003, the Sydney Water Board became concerned about the sustainability of the billing system, ACCESS, and commissioned a review by Accenture which was then updated in 2005. Accenture supported Sydney Water's decision to build functionality alongside ACCESS rather than within ACCESS for customer management.

The need was driven by:

- the state of current system as C-View system was *"...a short term tactical solution, built in-house on an old platform and not easily supported...."* [C-View utilised between 2005 to 2011]
- promoting faster and more effective response to customer issues by developing an enterprise-wide solution [rolled out to 1,200 people across the business]
- creating a platform for future online services

The original business case put forward in February 2007 estimated a cost of $25 million together with the additional $5 million (20%) contingency assumed for the selection of a top tier, best of breed package. The original benefit cost ratio was 0.07. The key drivers for the business case were: Business Risk, Environmental Sustainability, Customer Service and Asset Renewal. The FPRC's view was the business case did not well enough articulate the full suite of benefits nor the real impacts of not proceeding. The Committee requested that these issues be addressed when the business case was re-submitted at the next approval gateway. $1.9 million was approved to proceed with the planning phase.

Capgemini was engaged to develop a blueprint and solutions options. They investigated four options: Do nothing (continue current process of tactical upgrades); Commercial "Off The Shelf" (COTS) CMS package; Enhance the existing CView system; and Develop a custom built solution. Options 1, 3 and 4 were eliminated on cost and risk. Capgemini's worst case scenario costs were $24.1m capex for Tier 1 CMS package.

The scope of works covered three Releases:

1. Foundation - range of functions that are primarily targeted at enabling Contact Centre to provide more effective and efficient customer service, including complaint handling. It will also provide the database structure for holding customer data;
2. Self-Service modules - enable customers to access a range of products and services via new Sydney Water website and/or through automated telephony systems;
3. Customer Analytics & Campaign Management - enable much improved analysis of customer information to improve the effectiveness and efficiency of campaigns and other customer communications.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$26.2M [1] [2]	**Initial Delivery Date**	June 2010
Outturn cost / Forecast outturn cost in Submission	$51.9M [2] [3]	**Actual / Forecast Delivery Date**	March 2011

[1] Real dollars – Not identified separately in 2008 SIR so we are unable to calculate at 2011/12 prices.

[2] Additional $3.2M was also spent pre-2008 Determination on planning including Capgemini consultancy.

[3] $0.84M identified as actual spend year to date against Release 2 but unclear if this is included in forecast in Submission.

KEY DATA

Investment Driver	Existing Mandatory Standards
Output Measure	N/A
Stage in Planning Process	Release 1 Completed
Procurement Process	Open tender for Release 1 Closed proposal from existing suppliers for Release 2

2011/12 base	**08/09**	**09/10**	**10/11**	**11/12**	**12/13**	**13/14**	**14/15**	**15/16**
Planned ($k)	13,972[1]	13,871[1]		6158[2]	7,050 [2]			
Actual ($k)	5,530	18,984	24,886	2,752				

[1] Not identified separately in 2008 SIR so it was not possible to identify planned spend by year. Sydney Water subsequently provided figures.

[2] CMS Release 2 Business Case = $13.2M however as IT program for 2012-16 has not been delineated by Sydney Water in the 2011 SIR, this expenditure does not appear in the Customer Management System line entry. Note only part of the planned expenditure extends to 2012/2016 price path and part is in 2011/12.

PROJECT DELIVERY PROCESS – OBSERVATIONS

Five major Tenders:

1. Blueprint /Requirements gathering,
2. Software procurement (30% assessed cost weighting)
3. QA services
4. System integration services - Deployment and integration of software (35% assessed cost weighting)
5. System Support

The project budget was revised after the systems integrator procurement process, as a result of the quotes provided by the potential service providers, most significantly due to the costs of system integration. Additional costs were also incurred for extending the design phase and for extensive review cycles. Extended procurement phases also contributed to the variation in schedule prior to commencing the delivery phase.

Oracle Corporation software was selected and IBM Australia appointed as the Systems integrator for Release 1. Consultants (Capgemini) underestimated significantly the implementation costs.

For Release 2 a proposals from existing suppliers (IBM and Wipro) were used to select the most competitive supplier to provide key development and test resources to supplement the Sydney Water team. Wipro has been selected as the preferred supplier for this release.

PROGRAM

Original program:

Concept phase from June 2006

IBM commenced September 2009

Design Completed end of May 2010

Build June – August 2010

Test September – February 2010

Train February, March 2011

Go-Live March: 2011

The resource structure was different for the various stages of the project, e.g. earlier stages focused on scope, requirements definition and supplier selection; the design and construction stages required various technical and development resources. Sydney Water selected the software and prepared a tender for a systems integrator based upon advice from CapGemini. The Systems integrator project managed the initiative, wrote functional and non-functional requirements as well as managing the system build and deployment.

The revised business case in November 2007 stated that the entire CMS project required funding of $35.8million of which $2.27million has already been approved and committed. Benefit cost ratio of CMS improved to 0.41 with operational cost savings of c. $2M/year, other financial benefits mainly in the form of improved productivity will be delivered from the project (however it was stated that these costs were not likely to be lost from the business) and a significant number of benefits arising from CMS that do not have a direct, or easily quantifiable, financial benefit for the business. This business case covered releases 1, 2 and 3.

The next variation took place in June 2009 which reduced the scope though the high level deliverables remained the same. Consultants (Capgemini) underestimated implementation costs. Board approved budget variation ($34.3 million) in 2009 with removal of Release 3 from scope and revised cost for Release 2 of $13.6 million and future Board approval required for funding of Release 2. Thus total project funding requirement for Release1and 2 stood at $68.9M of which there was a 30% contingency built into this variation. Revised benefit cost analysis for release 1 and 2 was 0.76.

Only Release 1 has been delivered in 2008-2012 within the revised budget. Release 2 is planned for delivery in 2012-2016 (delivery date November 2012). The business case for Release 2 has not yet been approved ($13.2M). The benefit cost ratio is 1.08 (financial) and 1.56 (economic including customer benefits).

We understand that Release 3 of the original scope has been shelved.

CONTRIBUTION TO OUTCOMES AND DRIVER

The Customer Management System (CMS) program delivers a fully-integrated, enterprise-wide customer management system. The CMS is now the central system for storing customer data and recording interactions with customers, including routine enquiries as well as complaints. It contributes to Customer Service Strategy including making it easy for customers to deal with SWC and getting things right, reducing unnecessary contact and offering convenient, low cost service channels that customers choose to use.

Benefits cited by the Corporation to be realised from Release 1:

- Direct cost reductions ($880k per annum)

- 5% productivity gain
- Satisfaction with telephone service (improvement in score from 7.8 → 8.0)
- Ease of getting through to agent (7.4 → 8.0)
- Speed of answer (7.2 → 8.0)
- First call resolution (97% → 99%)
- Faster resolution of issues and complaints (4.4 → 7.0)
- Reduced number of outstanding complaints (280 → >200)

KEY DOCUMENTS REVIEWED

- 2006 IT Strategy
- 2010 IT Strategy
- CMS Presentation 5th October 2011
- C-View Capital Expenditure
- CMS R1 Tender Criteria
- CMS Systems Integrator Tender Criteria
- Accenture Review 2005
- CMS Opex Costs
- CMS Architectural Solution Design
- ACCESS Sustainability Exec Rpt 2005
- Accenture Review 2005 (Summary)
- ACCESS Sustainability Updated Report 2005"
- CMS Initiation documents including Capgemini reports
- Business cases x 4

20. Meter Replacement Program

PROJECT DETAILS

Project Name	Meter Replacement Program		
Project Number	N/A	**Status**	Current & Future Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

An active meter replacement program commenced in 1997. Meter replacement is seen as business as usual thus there is no specific business case produced for this program; replacement of damaged, faulty and broken meters is an essential activity in order for Sydney Water to correctly bill customers for usage charges and maximise revenue. The accuracy of billing including usage charges is the biggest source of customer complaint. Sydney Water has an obligation to comply with the National Measurement Act (accuracy of +/-4% required).

The Corporation installs 20mm mechanical meters for most domestic dwellings and larger meters (25mm to 300mm) for other customers. The Corporation has also piloted two types of automated meters though the benefit cost case cannot be justified for a rollout to all customers.

The criteria for the 20mm replacement program moved from 3000 Kls or 10 years in the current price path to 3,600 Kill or 15 years combined criteria. Larger meters are moving from 15 years in the current path to 10 years in the next price path. In relation to the replacement 20mm meters, there is still however some uncertainty about the age to replace meters in the future price period as the Corporation has been involved in a meter accuracy testing program which has indicated that the economic level of replacement may be extended significantly. There is an issue on backflow prevention which requires more detailed investigation and thus the results are unlikely to be known until Spring 2012. It is possible that this could materially change the profile of 20mm meter replacement in the future price path as the replacement program could be slowed if age is extended significantly.

Sydney Water reports that 3% of customers currently receive estimated bills. Over 5,000 properties have not been read for greater than 24 months. It is therefore proposing to install remote meters for circa 25,000 customers identified as chronically "hard to reach" in order to drive down these numbers by investing $6M over 3 years (Year 4 of current price path and Years 1 and 2 of new price path). Our understanding is that the business case is yet to be approved.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	$35.73M	**Initial Delivery Date**	On-going
Outturn cost / Forecast outturn cost in Submission	$36.27	**Actual / Forecast Delivery Date**	On-going

KEY DATA

Investment Driver	Existing Mandatory Standards
Output Measure	Units installed: • 426,000 meters in current price path • 442,650 meters in future price path
Stage in Planning Process	Tendered in current price path; to be re-tendered for future price path
Procurement Process	Open tendering

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k)	8,789	9,624	8,902	8,417	11,749	11,312	10,181	9,781
Actual ($k)	8,524	8,654	7,522	11,573				

PROJECT DELIVERY PROCESS – OBSERVATIONS

The Meter Maintenance and Supply Contracts were awarded following an open tender process. In relation to the Supply Contract, 50% was based on price with the other 50% against weighted criteria. In contrast the Meter Maintenance Contract, 60% was based on price with the other 40% against weighted criteria.

All contracts associated with supply and also replacement of meters are due for renewal in mid-2012. The market is viewed as mature and there are no significant upward or downward impact on costs identified in the future price path thus the planned 2012-2016 figures are a best central estimate based on historical expenditure.

The supply contract will cover 11 meter sizes (20mm - 300mm) with two portions of work: meters from 20mm to 50mm light (95%) and meters from 50mm to 300mm (5%). The warranty on the meters is 8 years.

Delivery of meter stock is direct to maintenance contractor's site.

The $6M budgeted for remote meter installation is based on historic costs of a recent trial. The meters will be purchased under a directly negotiated contract. A competitive tender process will be used for the installation of units if the main meter maintenance contractor does not have the capability to install the devices.

PROGRAM

The program is on-going. Sydney Water will not meet its output for meter replacement in the current price path. The forecast variance of 153,843 (-36%) under output target is as a result of the changes in criteria used for replacing 20mm meters in late 2007 (moving from 10 years to 15 years), a significant increase in the number of large meters (25mm to 300mm) replaced and delays from electrical work safety procedures, which led to a significant reduction in the amount of planned replacements as opposed to exchanged (faulty) and installed (new) meters, which appears to have been broadly as anticipated.

The value of the original maintenance contract was $13.2M for a contract term of 8 years (2008-2016). Approved variations (total $5.8M) for additional site-specific costs and the significantly increased number of large meter replacements completed in the first two years of the contract and planned for the next two years.

Following a review by Sydney Water, a contract variation was negotiated to shorten the term of the contract from 8 years to 4 years (2 + 2). The contract variation allowed performance risks to be better shared between the parties than had been in the original contract. This was achieved by requiring the contractor to quote on the basis of labour and materials for each different meter size with 95% of each job type completed for a set price.

There was no overall price variation as part of the extension, only conditions negotiated as contract variations. The revised approach to sharing performance risk will be included in the new contract expected to be advertised early 2012. The new contract will operate from October 2012.

The General Manager CCRD has also approved a variation of $226,184 in July 2011 to cover the additional safety requirements requested by Sydney Water's Electrical Safety Committee.

CONTRIBUTION TO OUTCOMES AND DRIVER

The investment driver is meeting existing mandatory standards. The meter replacement program contributes to the effective functioning of the Corporation's quarterly customer billing cycle and generates over $900m/annum in usage revenue and promotes correct billing of customers.

It is also linked to meeting various indicators in the Corporation's Operating License and meter replacement can impact either directly or indirectly on the volume of customer complaints.

KEY DOCUMENTS REVIEWED

- Meter investment presentation Oct11
- SWC Responses to questions (3 documents)
- AMR Final Business Case

21. Access Replacement (New Billing System)

PROJECT DETAILS

Project Name	Access Replacement		
Project Number	N/A	**Status**	Future Price Plan

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

In 2002, Sydney Water terminated its project for a combined billing and contact management system when the supplier failed to deliver on project commitments. In 2003, the Sydney Water Board became concerned about the sustainability of the billing system, ACCESS, and commissioned a review by Accenture which was then updated in 2005. Accenture supported Sydney Water's decision to build functionality alongside ACCESS rather than within ACCESS for customer management and to later replace ACCESS with a new billing system.

Accenture put forward other options that could be considered, ie CRM standalone or CRM integrated into billing though it did not make a clear statement of preference for which approach would be more suitable. In Sydney Water's own words *"…Ultimately the organisation's appetite for a big bang CRM and billing replacement simultaneously could not be justified in light of previous failed attempts at doing so. A clear finding from the Auditor General's report on CIBS was to incrementally implement a replacement program in smaller and more manageable chunks".*

The billing system did not have to be replaced immediately for technical reasons:

- Accenture's 2003 report highlighted up to 10 years additional useful life for ACCESS
- Accenture's 2005 report again supported the strategy of progressively migrating off the mainframe over the next 5 to 10 years
- the Sustainability Assessments for ACCESS in 2009 indicated that Sydney Water faces unacceptable operational risk by 2019 if no action is taken

In November 2009, the Board endorsed the recommendation to replace ACCESS. The first step in replacing ACCESS commenced in January 2011 with the Strategic Planning Project with the objectives of Project objectives: to develop the design, business case and implementation schedule for the replacement of ACCESS and satellite systems.

No other additional information has been provided about scope of works or options appraisal. There is no business case for this project at this stage.

Sydney Water is currently exploring the viability and cost of other options that would allow them to defer the full replacement of the billing system.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	N/A	**Initial Delivery Date**	No date set
Outturn cost / Forecast outturn cost in Submission	N/A	**Actual / Forecast Delivery Date**	N/A

KEY DATA

Investment Driver	Existing Mandatory Standards
Output Measure	N/A
Stage in Planning Process	Planning
Procurement Process	Unknown

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k)					488	952	3,714	13,136
Actual ($k)								

PROJECT DELIVERY PROCESS – OBSERVATIONS

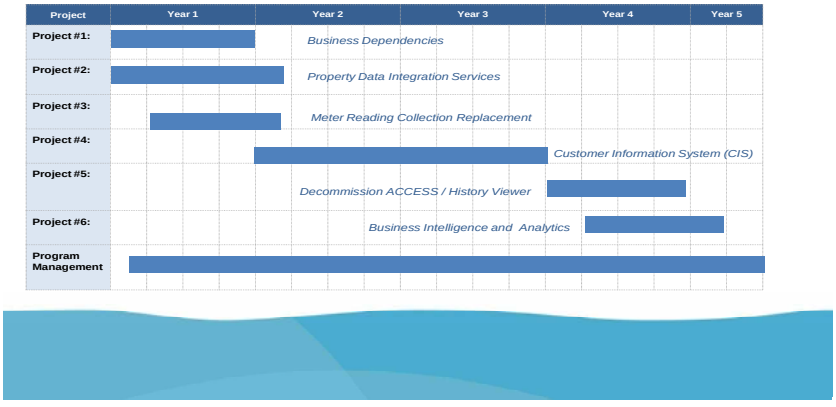
We do not have any information about the proposed procurement route.

We have not been provided with any detailed breakdown on the expenditure planned in 2012-2016. The expenditure has been described as a nominal or placeholder amount. This appears to be reinforced by the Corporation's 2010 IT Strategy which cites that large programs, such as the ACCESS replacement, will sit above the $40-50M average annual IT capex level:

- Large programs of work requiring significant IT capital investment will not be able to be funded within the $40-50M average – these will result in 'spikes' of investment relative to the breadth and complexity of the replacement program.
- During the 2010-2015 cycle, programs that sit above this level are the ACCESS replacement and the GIS renewal.

PROGRAM

The new billing system is part of ARP, a 5 year program that will establish the foundation for new business processes and replace the ACCESS & satellite suite of applications. The proposed program is set out below:



Source: Sydney Water Access Replacement Presentation

CONTRIBUTION TO OUTCOMES AND DRIVER

No business case or benefit cost case has yet been made. The Corporation states the following objectives from the strategic planning phase; reduce operational risk (primary), deliver new capabilities, establish platform for the future. The project will seek business processes to be simplified, standardised, automated, operational discipline enforced and promote end-to-end business integration. In reducing operational risk Sydney Water's Target State will also seek to enable:

- Standardised and automated business processes for a fast and more efficient meter to bill cycle
- Lower operating costs by simplifying property creation & management, metering, billing, credit and collections
- Consolidated view of property and customer to improve customer services
- Empowering process ownership and Quality Assurance by providing an end-to-end view of the value chain
- Centralised data store – 1 central data base with information in it
- Proactive exception management facilitated by workflow and operational reporting
- A solid, reliable platform supported by packaged software
- A platform for faster and flexible operational adaptation to market or customer opportunities/ changes

KEY DOCUMENTS REVIEWED

- 2006 IT Strategy
- 2010 IT Strategy
- CMS Presentation 5th October 2011
- Accenture Review 2003
- ACCESS Sustainability Updated Report 2005
- ACCESS Sustainability Exec Rpt 2005
- Accenture Review 2005 (Summary)
- Access Replacement Presentation
- J55 IT Program – Additional Information
- JJ_0033_Questions 13 & 14 Response
- Letter from Managing Director, October 2011

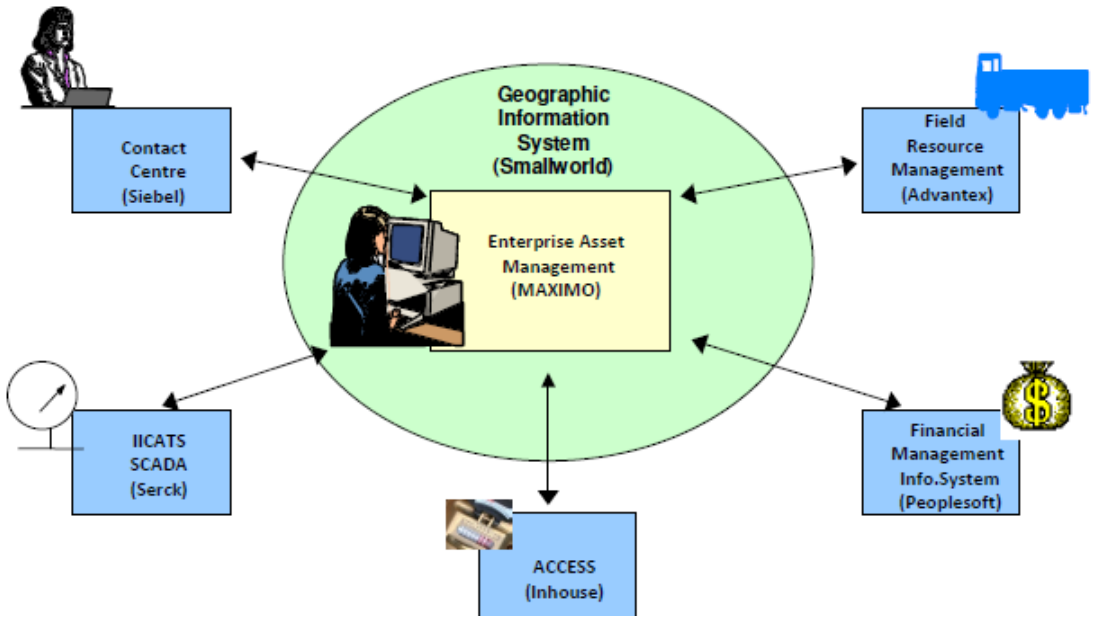
22. Maximo Consolidation Program

PROJECT DETAILS

Project Name	Maximo Consolidation Program		
Project Number	N/A	**Status**	Current Price Path

NEED FOR SCHEME / SCOPE OF WORKS / OPTIONS APPRAISAL

Sydney Water uses Maximo (IBM) as its enterprise asset management system. This diagram summaries the key role that Maximo plays at Sydney Water. WAMS was originally installed in 2000 and is used in conjunction with the corporate Geographic Information System (Hydra) to manage the pipe assets. It is also integral to SWC customer contact systems, providing a means to capture and transmit work requests to field crews. FMX, installed in 1998, uses a separate version of Maximo to manage facility assets (including the pumping stations, treatment plants and reservoirs).



This project was to consolidate the separate instances of Maximo (FMX and WAMS) into a single instance Enterprise Asset Management (EAM) system. The version to be implemented was to be the latest supported product, named Maximo Enterprise Suite (MXES). The risk assessment made by the Corporation when the initial business case was made highlighted the risk as "severe" with a "certain" likelihood of failure if not implemented by 2010. The following case was made:

- Increased risk to service levels
- No single source of data possible – Asset numbers not mastered
- Higher total cost of ownership – Business processes and Technical infrastructure
- Limited capacity to adopt vendor roadmap
- Latent demand filled by alternative solutions

- Proliferation of point-to-point integration

Six options were considered which included variations on: Do Nothing; individual upgrades with no consolidation; upgrade and consolidate; and using a non-Maximo solution. The last option was considered when the initial options paper and Project Initiation Document (PID) was developed. As the Maximo consolidation is a re-implementation of Maximo, the effort required for another product would be the same. It has been assessed that such a project would be no cheaper than that proposed for Maximo and in Sydney Water's opinion would arguably have been more as the changeover cost for the business with regard to training and business processes impacts would be far greater. This option was not included in any further analysis nor included in the cash flow.

Scope

- Consolidate the two Maximo systems into a single system based upon the latest version
- Migrate and consolidate all data
- Replace 12 legacy systems with Maximo functionality
- Remediate remaining satellite systems
- Provide asset/work order data into the Enterprise Data Warehouse
- Organisational change management for the user communities impacted

In November 2006, the ITSC endorsed the project initiation of a Maximo upgrade and consolidation project based on an estimated total project cost between $6-8M (Real $). The original business case in August 2007 was after completion of stage 1 (see below for explanation of different stages) and was based on a cost of $18.4M including $3M contingency (Real $). The benefit cost ratio was 0.99. It was unclear why this project was not included as a line item in the Corporation's submission. There was however about $3.1m (total) included over 08-09 & 09-10 in the Determination.

FINANCIALS AND PROGRAM (costs to 2011/12)

Budget in 2008 Determination	3,390*	**Initial Delivery Date**	August 2009
Outturn cost / Forecast outturn cost in Submission	41,067	**Actual / Forecast Delivery Date**	September 2011

* No line item but funding included under balancing items in 2008

KEY DATA

Investment Driver	Existing Mandatory Standards
Output Measure	N/A
Stage in Planning Process	Completed
Procurement Process	Stage 1 - Selective tender Stage 2 - Open tender

2011/12 base	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Planned ($k)	1,701	1,689	0	0				
Actual ($k)	11,581	13,980	14,246	1,260				

PROJECT DELIVERY PROCESS – OBSERVATIONS

The project was planned as two separate stages. Separate tenders for each stage were sought.

Stage 1 was a fixed price Define phase via an approved selective tender including preparing the Request For Tender requirements for the Stage 2 tender. There was a 30% price weighting. The consultant worked in partnership with Sydney Water to identify the scope and estimate the original budget estimate for a closed tender which was subsequently modified to an open tender as it was found that there were more companies with the capability than originally estimated (seven companies on the original list) and there was an issue of probity as a result of links already established.

Stage 2 involved the selection of a Maximo experienced System Integrator (SI) via an open tender process. This SI was to be engaged to develop a detailed Design from the Define phase requirements and an ultimate Fixed Price contract for the deployment and commissioning of the consolidated Maximo system. It was planned that the successful Define Phase Tenderer from Stage 1 was to be re-engaged via a subsequent negotiated contract to continue during the remaining project phases to assist SWC.

Six tenders were received for Stage 2. The costs were significantly higher than anticipated as they reflected the market view of the complexity of integrating 30-40 systems plus the magnitude of the data migration required.

The Define Phase Tenderer from Stage 1 was not re-engaged as originally planned. Sydney Water terminated working with the original consultant as it was unhappy with the sizeable variance that it faced. A new consultant was appointed to advise on the project implementation after the termination of the previous consultant's contract.

PROGRAM

Business Case Variation 1 was for a cost of $31.3M including a contingency of $4.8M (70% increase on original business case) and was approved in July 2008. Seven options were considered including terminating the project and implementing a full-scale Enterprise Resource Platform. It was decided to proceed as planned.

The original cost estimates understated the project timeframe, scope and resource requirements:

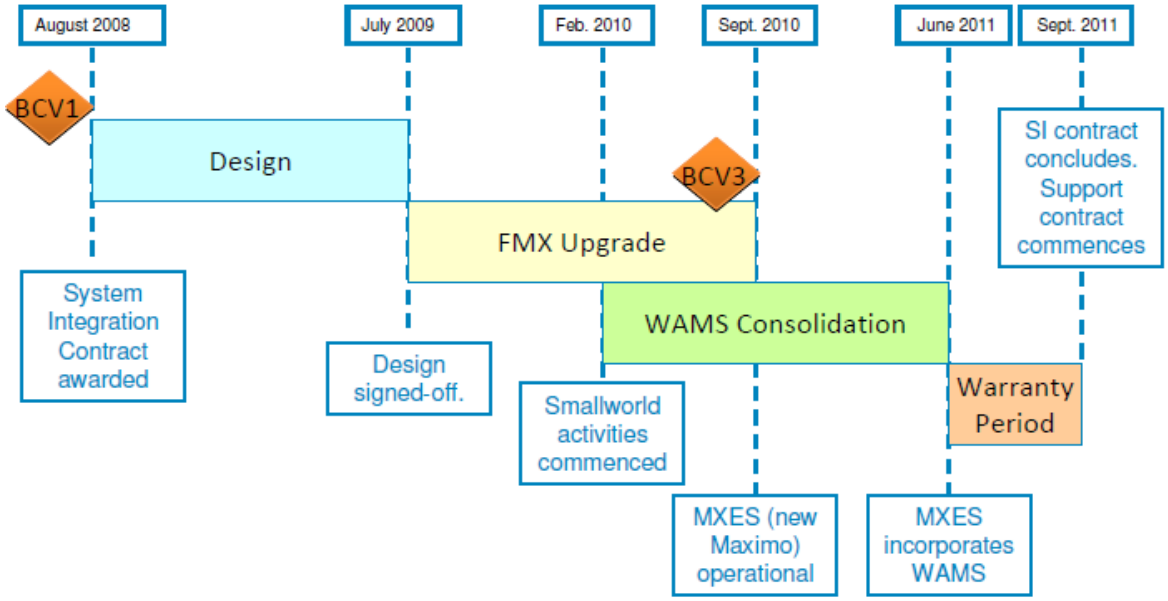
- System Integration contract ready to be awarded – final cost estimates provided and agreed – increase of $7.2M caused by gap in understanding of project scope and complexity
- Additional Sydney Water IT resources assigned ($4.4M)
- Complexity of requirements and full solution better understood, especially regarding integration and data
- Proposed timeframe extended
- Other ancillary costs not previously included in estimates
- Legal, infrastructure, software licences
- Parramatta relocation

Business case variation 2 in April 2009 focused on the removal of benefits relating to support and maintenance however this did not substantially alter the business case which was centred on risk and did not change the fundamentals of the program. The assumption made was proven to be incorrect and external expertise was still to be required hence the support costs were to remain the same for work request processing and day-to-day operational support. There is some uncertainty about the level of benefits removed. Variation 2 cites a value of $375,000 benefits over three years being removed however Variation 3 cites a much higher figure, stating that the removal of benefits related to support and maintenance savings of $590,000/year was approved.

Business case variation 3 set a total cost of $40.1M including a contingency of $2.9M and was approved in August 2010. It was driven by integration issues/conflicts:

- Project delays encountered at each of the 3 major milestones: Design – 3 months delay, FMX Commission – 3½ months delay, WAMS Commission – 5 months
- FMX Commissioning in September 2010 diverted resources from scheduled WAMS activities
- Smallworld design rework necessary once coding commenced
- Scale of Operational Acceptance Testing underestimated
- Complexities managing parallel Maximo developments (FMX and WAMS)

Timeframe:



CONTRIBUTION TO OUTCOMES AND DRIVER

Outcomes

- Risk mitigated
- Standardised work processes with asset planning, work planning and work management performed using one system
- Maximo is primary source of asset data – Master data management now possible and asset analytical data now available
- Able to take advantage of standard product features and the vendor roadmap
- Support and infrastructure constraints removed
- Integration and technical environment simplified

KEY DOCUMENTS REVIEWED

- 2006 and 2010 IT Strategy
- IT presentation
- Four business cases and associated documentation including Maximo Budget
- Tender Evaluation Submission

Appendix C - Terms of Reference

1. BACKGROUND

IPART seeks the services of suitably qualified consultants to jointly undertake:

- a detailed review of the Sydney Water Corporation's operating expenditure and capital expenditure.
- an audit of Sydney Water Corporation's performance against the asset management obligation in its 2010-2015 Operating Licence.

IPART is conducting a price path review of the maximum charges for water, sewerage, drainage and recycled water to apply from 1 July 2012 for Sydney Water Corporation (Sydney Water). The maximum charges determined by IPART for the upcoming determination period will cover a period of up to five years (the duration of which will be determined by IPART during the course of the review). The last price path for Sydney Water commenced on 1 July 2008 and is due to expire on 30 June 2012 (the 2008 Determination).

In the context of monopoly businesses, IPART's role is to protect customers from paying for inefficient or unnecessary expenditure, while ensuring these businesses raise adequate revenue to deliver the required services. To this end IPART seeks to set prices which do not reward inefficient investment and asset management decisions, or inefficient operations and practices.

2. OBJECTIVES

As part of the price review process it is necessary for IPART to ensure that Sydney Water has sufficient revenue to maintain and expand its operations to ensure adequate service delivery. IPART sets prices based, in part, on its estimates of Sydney Water's revenue requirement over the regulatory period. This in turn is based on projections of efficient operating and capital expenditure.

Recently, IPART has reviewed its processes, tests and information used for the assessment of capital expenditure.[16] A key decision was to enhance the `strategic' review of assessing capital expenditure by:

- requesting longer term capital investment plans (i.e. beyond the price determination period) along with the reasoning that underlies these plans.
- including asset management plans in our information requirements for a regulated business.
- requiring regulated businesses to obtain external assurance that the forecasts and supporting information provided for capital expenditure assessments accurately reflect their underlying information base, before they submit this information.
- improving documentation and audit trail by requiring consultants undertaking the assessment to provide a short summary of their findings on each capital project they review in detail.
- continuing to develop suitable output measures, in consultation with each business concerned.

Recently IPART has engaged technical experts to review the performance indicators in Sydney Water's Operating Licence and the output measures from the 2008 price determination report.[17]

On 1 July 2010 the Minister for Water granted Sydney Water a new five-year Operating Licence. This licence now has a new asset management obligation at clause 3.1 of the licence. This obligation seeks to ensure that the principles of whole life cycle planning, risk management, cost/benefit, customer focus and sustainability are actually delivered within the day-to-day activities of capital project implementation, operations and maintenance.

[16] IPART, Regulatory tests of past and forecast capital expenditure: Review of approach used in determining allowances for return on assets and regulatory depreciation, December 2010.
[17] IPART, Review of prices for Sydney Water Corporation's water, sewerage, stormwater and other service, Final Report, June 2008, see Appendix F on Sydney Water's output measures and capital expenditure program.

3. DESCRIPTION OF SERVICES

IPART requires the Panel Member to provide the following services:

3.1 Detailed review of operating and capital expenditure

IPART examines operating and capital expenditure from two perspectives – since the last determination and for the next determination period.

To assist IPART in this task the consultants are required to assess the adequacy, appropriateness and efficiency of Sydney Water's past and proposed levels of operating and capital expenditure. In conducting this assessment the consultants must undertake a strategic management overview of Sydney Water's planning and asset management; and examine the total level of expenditure, in addition to assessing expenditure on an individual activity/project basis. IPART expects that a broader, high-level assessment of expenditure will have regard to the impact on Sydney Water's business, its customers and its prices.

The consultants must assess:

a. the *efficiency* of operating expenditure for the period from 1 July 2008 to 30 June 2012, to the extent necessary to assess the efficiency of the proposed operating expenditure

b. the *efficiency* of proposed operating expenditure for the period from 1 July 2012 to 30 June 2017

c. the *efficiency and prudence* of capital expenditure for the period from 1 July 2008 to 30 June 2011

d. the *efficiency and prudence* of proposed capital expenditure for the period from 1 July 2011 to 30 June 2017 – in order to ensure that planned capital expenditure is directed to the most appropriate projects at an efficient cost.

e. Sydney Water's past performance against its current output measures and review and recommend output measures for the next determination period, taking into account:

   - any proposals made by Sydney Water in its submission to IPART
   - the outcomes of the consultancy to review performance indicators and output measures.

Explanations of the efficiency and prudence tests that the consultants are required to undertake are provided below.

Efficiency test

In reviewing forecast expenditure, the *efficiency test* is used to determine how much of Sydney Water's proposed operating and capital expenditure for the upcoming determination period will go into IPART's determination of Sydney Water's revenue requirement. The efficiency test should examine whether Sydney Water's proposed expenditure represents the best and most cost effective way of meeting the community's need for the relevant services.

Prudence test

The *prudence test* is used to determine how much of Sydney Water's:

- actual capital expenditure in the current determination period (1 July 2008 to 30 June 2012) should be rolled into Sydney Water's regulatory asset base for the start of the upcoming determination period, for the purposes of calculating allowances for return on and return of capital.

- forecast capital expenditure in the upcoming determination period (1 July 2008 to 30 June 2017) should be rolled into Sydney Water's regulatory asset base over the course of the upcoming determination period, for the purposes of calculating allowances for return on and return of capital.

The prudence test assesses whether, in the circumstances existing at the time, the decision to invest in an asset is one that Sydney Water, acting prudently, would be expected to make. In assessing prudence, the consultant should assess both *how the decision was made*, and *how the investment was executed* where the asset has been built (ie, the construction or delivery and operation of the asset), having regard to information available at the time. In examining forecast expenditure, the prudency test examines the consistency of this expenditure with Sydney Water's longer term capital expenditure program.

In undertaking this review the consultant must also consider:

- Sydney Water's planning and asset management process including asset management frameworks, plans and practices
- relevant legislation, regulatory requirements and Government policies and initiatives
- current and projected capacity
- growth in customer numbers
- current asset condition and renewal requirements
- existing operational requirements
- current and likely future environmental, health and safety standards
- current and likely future service obligations
- ring fencing of and cost transfers between regulated and unregulated activities
- specific regional and demographic circumstances of Sydney Water
- implications for expenditure of demand management initiatives
- efficient costs of providing the relevant water, sewerage, stormwater and recycled water services
- potential for contestability in the provision of water, sewerage, stormwater and recycled water services

Detailed lists of the tasks that the consultants are required to undertake to review Sydney Water's operating and capital expenditure are outlined below.

3.1.1 Operating expenditure

For this aspect of the review, the consultant will be specifically required to:

a. review the operating expenditure from 2008/09 to 2016/17, to the extent necessary to undertake (b) to (n) below.

b. review Sydney Water's costs of operations, including**:**

   - operations and support activities
   - maintenance and servicing activities
   - administration and overheads (both direct and corporate allocations).

   (Note: The Annual Information Return provides a breakdown of cost information by function and by item).

c. review the appropriateness and performance of these costs against industry best practice.

d. review the cost effectiveness and efficiency of Sydney Water's provision of services or systems.

e. review the variation in operating expenditure from what was proposed in the 2008 determination.

f. identify reasons for any costs higher than normal commercial levels, for example government ownership, awards and conditions, operating environment, staffing levels, assets, technology, or other factors.

g. identify and analyse Sydney Water's potential for cost reductions and make reasoned recommendations about efficiency gains that the Tribunal can consider when determining efficient operating expenditure levels for price setting. If current expenditure in an area of operations is assessed as inadequate, specification and quantification of the recommended additional expenditure is required.

h. provide the consultant's opinion as to the efficiency of Sydney Water's proposed level of operating expenditure for each year between 2011/12 to 2016/17 and provide for each year reasoned estimates of the level of operating expenditure that is required to efficiently undertake Sydney Water's regulated business.

i. identify the potential for efficiency savings to be achieved within the operating expenditure budget over the period 2011/12 to 2016/17 and provide evidence and reasoning to support the proposals.

j. identify the potential for and quantify possible operating efficiencies arising from capital projects (including avoided costs through the implementation of recycled water projects).

k. review the efficiency of historic and forecast operating expenditure of Sydney Water's stormwater drainage activities at the Rouse Hill Development Area.

l. identify and segregate the operating costs associated with the Sydney Desalination Plant and ensure that operating costs for the Desalination Plant are ring-fenced from Sydney Water's other operations.

m. identify and segregate the operating costs associated with recycled water services and ensure that operating costs for recycled water are ring-fenced from Sydney Water's other operations.

n. identify and analyse the transfer of costs between regulated and unregulated parts of Sydney Water's business, subsidiary or parent agency or businesses. Comment on any such transfers which in the opinion of the consultant are inappropriate.

o. identify and segregate the operating expenditure associated with heritage assets and activities, and quantify the operating expenditure on heritage assets and functions that does not contribute to the delivery of services, to the extent possible.

3.1.2 Capital Expenditure

For this aspect of the review, the consultant will be specifically required to:

a. assess the reasonableness of Sydney Water's capital program as a whole, within the context of its long term plans and the assumptions underlying them, including the scale, scope and planning of the entire capital expenditure program.

b. identify, describe and assess Sydney Water's capital works programs and projects from 2008/09 to 2016/2017, separately identifying projects satisfying a materiality threshold of $5 million for Sydney Water.

c. undertake a detailed investigation into the project planning and actual outcomes for at least 10 per cent of Sydney Water's capital projects above the $5 million threshold (the 10 per cent is to be achieved by number and by total value of Sydney water's capital program). The output from this task must incorporate a one-page summary for each project to be incorporated within the consultant's report as an appendix. The one-page summaries should include the following:

   - The planned project budget, program and outputs
   - The actual project, program and outputs (appropriate to the stage in the project)
   - Reasons for variations between actual and forecast expenditures
   - Additional information that identifies any proactive planning by Sydney Water for change of project scope or process development as a result of the project
   - Assessment of the project outcomes and contribution to Sydney Water's capital program drivers.

d. undertake a detailed investigation of the project planning for, and delivery of, the following major Sydney Water capital expenditure projects and programs:

   - Priority Sewerage Program
   - Recycled Water schemes at Rouse Hill and Hoxton Park

e. comment on the rigour of the Sydney Water's approach to managing the whole life of assets having regard to the following:

   - the audit of Sydney Water's asset management obligation (undertaken as part of this consultancy)
   - current and future service outcomes and performance requirements, including customer service and environmental outcomes;
   - the way in which Sydney Water manages the risks associated with asset failure or underperformance;
   - the clarity of drivers for capital expenditure; and
   - minimising costs over the life of the assets.

Longer term investment plans

f. comment on Sydney Water's longer term capital investment plans (10 year plans) and the reasoning that underlies these plans.

g. comment on the consistency of Sydney Water's capital expenditure program over the determination period with its longer term program of capital expenditure.

h. provide an opinion on whether the longer term service provision strategy is the most efficient amongst alternatives considered by the Sydney Water and whether processes support this.

i. comment on any particular concerns or issues relating to the process for determining and prioritising future infrastructure expenditures for Sydney Water.

Prudency and efficiency

j. comment on the prudence and efficiency of the Sydney Water's capital expenditure for the period from 2008/2009 to 2011/2012 and nominate a value for any capital expenditure considered imprudent or inefficient. Prudence should be assessed against identified drivers and variations from capital expenditure proposals identified at the 2008 Determination should be examined. The outputs from this task must include:

   - a detailed review of progress against the output measures identified at the 2008 determination
   - historic capital expenditure values (by program) for each year of the past determination period (i.e. 2008/2009 to 20101/2012)

k. provide an opinion as to the prudence and efficiency of Sydney Water's capital expenditure program for the period from 2012/2013 to 2016/2017 and provide for each year reasoned estimates of the level of capital expenditure that the consultant considers efficient in order for Sydney Water to undertake its regulated business. The output from this task must include forecast capital expenditure values (by program) for each year of the forthcoming determination period (2012/13 to 2016/17).

l. identify the potential for efficiency savings to be achieved by Sydney Water within capital expenditure program over the period 2012/13 to 2016/17 and provide evidence and reasoning to support the proposals.

m. Review the efficiency and prudency of historic and forecast capital expenditure of Sydney Water's stormwater drainage activities at Rouse Hill Development Area. In particular, the consultant must comment on Sydney Water's acquisition of land in the Rouse Hill Development Area.

Recycled water projects

n. identify and segregate the capital work projects associated with recycled water assets and ensure that capital works projects for recycled water are ring-fenced from Sydney Water's other operations.

o. identify the potential for and quantify any deferred or avoided capital costs arising from recycled water projects.

p. assess the compliance of Sydney Water's major recycled water schemes with IPART's 2006 *Pricing arrangements for recycled water and sewer mining report and determination*.

Sydney Desalination Plant

q. identify and segregate the capital works projects associated with the Sydney Desalination Plant and ensure that capital works projects for the Desalination Plant are ring-fenced from Sydney Water's other operations.

Asset classification

r. Audit and assess the accuracy with which Sydney Water has classified its existing assets and planned capital expenditure into the following asset classification classes: Civil, Electrical, Mechanical, Electronic and Non-depreciating assets (or 'CEMELND'). The consultant is required to review Sydney Water's information return and other relevant information and make recommendations regarding:

- the value of all existing assets in each classification class by business area
- the efficient capital expenditure on new assets in each classification class by business area
- the average remaining life of existing assets by classification class and business area
- the expected life of new assets by classification class and business area.

Heritage Assets

s. identify and segregate the capital expenditure associated with heritage assets and activities, and quantify the capital expenditure on heritage assets and functions that does not contribute to the delivery of services, to the extent possible.

3.2 Audit of asset management framework

The consultant will be required to audit the asset management obligation at clause 3.1 in Sydney Water's 2010-2015 Operating Licence. The consultant will conduct a detailed examination of the asset management activities of Sydney Water.

IPART needs assurance that Sydney Water is adequately managing its assets. The purpose of the audit of the asset management framework is to assess the measures taken by Sydney Water for the proper management of assets in the provision and operation of services. The audit of the asset management obligation should provide an independent report on the robustness of Sydney Water's processes, systems and plans to meet the Licence obligations.

As this is the first time the asset management obligation will be audited in its present form, we want the consultant to assess Sydney Water's compliance with the obligation for each asset class. The consultant is to use the asset classes defined in Sydney Water's asset management framework. These classes may group assets with similar asset management requirements, such as sewage treatment plants, reservoirs, reticulation systems, pump stations and pipelines.

Sydney Water has been developing capital works through alliance delivery models for approximately 10 years. When considering section 3.1.2(d), the consultant is to comment on whether this approach leads to a the lowest life cycle cost of the asset in comparison with more traditional delivery models such as BOO, design and construct contracts or Sydney Water construction.

3.3. INPUTS

3.3.1 Review of operating and capital expenditure

Sydney Water will provide a detailed written submission outlining the full financial details of its past and forecast operating and capital expenditure to IPART by 16 September 2011. The list of information that IPART has asked Sydney Water to address in its submission is listed in IPART's recently released Issues Paper for this review. In general terms, this includes:

- A description of Sydney Water's monopoly services
- Its operating and capital expenditure over 2008/09 to 2010/11, and identification and explanation of variations between actual expenditure and expenditures `allowed' in the 2008 Determination
- Sydney Water's proposed operating and capital expenditure over 2011/12 to 2016/17
- Sydney Water's estimate of the avoided costs arising from its recycled water projects
- Sydney Water's longer term capital investment plans (i.e. beyond the price determination period) along with the reasoning that underlies these plans
- An explanation of the relationship between Sydney Water's expenditure and services

Sydney Water is also required to provide an Annual Information Return (AIR) and Special Information Return (SIR) to IPART by 16 September 2011.

IPART will provide the outcomes from our review of performance indicators and output measures.

In addition to its own analysis of the submission, the AIR and SIR, the consultants are required to source and report analysis of other inputs through:

- interviews with Sydney Water staff
- comparisons with relevant organisations
- the consultant's experience in water and wastewater businesses and in undertaking other similar tasks.

In the event that the consultants identify gaps in the information it is the responsibility of the consultant to take the necessary steps to acquire the required information and to liaise promptly with IPART to ensure the on time reporting of the consultancy outputs are met. Should the reliability of the information be in doubt, the consultants are expected to source `second best information', apply sound judgment and provide detail and justification for assumptions made.

3.3.2 Audit of asset management obligation

Sydney Water will provide evidence of its asset management framework as defined in clause 3.1 of the operating licence, and its implementation of the framework by the 29 August 2011.

The evidence for the framework may include asset management plans for each asset class, asset management strategies and other documentation. It must demonstrate that Sydney Water has developed and implemented the methodologies, processes, practices, programs, and the decision making processes to achieve the outcomes detailed in clause 3.1 of Sydney Water's 2010-2015 Operating Licence.

Evidence of implementation may include checklists, registers, minutes of meetings and database outputs.

4. REQUIRED OUTPUT

The primary output items from the project are set out below.

4.1 Reports

The consultants must produce two separate written reports, which address all tasks, considerations and objectives of the consultancy as outlined:

1. a report on the detailed review of Sydney Water's operating and capital expenditure
2. a report on the audit of Sydney Water's performance against the asset management obligation in the Operating Licence.

For each report the consultant will be required to produce draft and final versions which must be provided in four bound copies and four loose-leaf copies, as well as in PDF format suitable for web publication.

The consultants should note that the draft and final reports will be released as a public document and made available on the IPART website. As such the report should be clearly and logically set out and written in plain English, avoiding the unnecessary use of technical terms. The reports should incorporate appendices for supporting information and evidence where necessary.

4.1.1 Report on operating and capital expenditure

The consultant's draft and final reports must include:

- detailed outcomes or findings for each of the tasks, considerations and objectives listed above
- clear explanation of the consultants' reasons or rationale for each of these findings/outcomes, including its information sources, approach and any key assumptions used
- report values in $2010/11, applying CPI indexes to be provided to IPART.
- Provide all tables and calculations in Excel format to facilitate the transfer of their outputs to IPART's pricing models (to avoid rounding errors introduced through text-only formats).

The consultants must produce draft and final versions of their reports which should incorporate responses to comments received from Sydney Water and IPART. The consultant must undertake a thorough Quality Assurance check of all outputs to eliminate errors and inconsistencies.

4.1.2 Report on the audit of asset management obligation

The auditor's first draft report must contain detailed supporting evidence for their assessment and must provide compliance grades according to IPART's established compliance scoring methodology, set out in the following table;

Compliance Grade	Description detail
Full Compliance	All requirements of the condition have been met.
High Compliance	Most requirements of the condition have been met with some minor technical failures or breaches.
Moderate Compliance	The major requirements of the condition have been met.
Low Compliance	Key requirements of the condition have not been met but minor achievements regarding compliance have been demonstrated.
Non Compliance	The requirements of the condition have not been met.
Insufficient Information	Relevant, suitable or adequate information to make an objective determination regarding compliance was not available to the auditor.
No Requirement	The requirement to comply with this condition does not occur within the audit period or there is no requirement for the utility to meet.

The auditor's first draft report must contain these compliance grades, to allow the utility a last chance to provide further evidence to improve its performance. There will be no changes to compliance grades between the second draft and final report, only editorial changes are expected in the final review.

The auditor is to provide a matrix of compliance grades, which includes a grade for each sub-clause for all asset classes. The asset classes should correlate with the asset classes Sydney Water use in its asset management framework.

The auditor's first draft report is to contain explanations of what is required for full compliance for the clauses where full compliance is not achieved by Sydney Water.

4.2 Additional outputs of the consultancy

Additional outputs of the consultancy include:

- initial presentation to IPART (including Tribunal members) on consultants' proposed methodology for review
- fortnightly written one-page progress updates detailing:
  - the tasks of the consultancy that have been completed
  - the work undertaken since the last progress report
  - progress towards the key milestones detailed in the 'Timing' work schedule below
  - any issues or problems that have arisen and how they have been dealt with or addressed
- discussions and meetings with Sydney Water, IPART and/or the IPART Secretariat
- presentation of draft findings to Sydney Water and IPART
- presentations to IPART and/or the IPART Secretariat which outline the major issues and findings.

On completion of the consultation, the consultants' reports, working papers and advice provided to IPART will become the property of IPART.

5. LIAISON/CONSULTATION

The consultant may be required to attend and participate in meetings, have involvement in consultation, attend and present at workshops or Tribunal meetings as circumstances dictate.

6. TIMETABLE

The consultant must meet the following work schedule:

Date	Activity
Early August 2011	Inception meeting with IPART Secretariat
8 August 2011	Commence audit of asset management framework in the operating licence
7 September 2011	Presentation of approach/methodology for review of operating and capital expenditure to IPART Tribunal
Mid September 2011	Commence interview component of asset management framework at Sydney Water's offices
21 September 2011	Commence review of Sydney Water's submission on operating and capital expenditure
14 October 2011	Submission of first Draft Report on audit of the asset management framework
4 November 2011	Submission of Draft Report on review of operating and capital expenditure
11 November 2011	Submission of second Draft Report on audit of the asset management framework
9 November 2011	Presentation of consultants' Report findings to the Tribunal
18 November 2011	SWC and IPART responses to review of operating and capital expenditure.
25 November 2011	Submission of Final Report on audit of the asset management framework and on review of operating and capital expenditure

Appendix D - Meetings & Interview Program

Date	Meeting
2nd August 2011	Inception meeting with IPART
28th September and 3rd October 2011	Methodology meeting with IPART
14th October 2011	Initial findings presentation to IPART and SWC

Table E.1 – Meeting Program

Date	JNSJ	AH	AN	JAJ
Tuesday 4th October	Overview presentation by Sydney Water Management Team. Presentation of proposals of price path/ performance in current period/ proposals for future/ key drivers/ operating environment/ legislative and regulatory requirements/ government policies and initiatives/ long term investment plans for growth and supply options. Management structure and responsibilities/ asset serviceability/ delivery plans and outputs.			
	SWC presentation on Business Systems and Processes Strategic business planning process: long term planning/ growth/ environment operating expenditure: operations and support/ maintenance/ admin and overheads. Capital expenditure: asset management/ project initiation and approvals/ cost estimating/ procurement/ program management.			
Wednesday 5th October	Opex functional analysis Structures Variance analysis Corporate and Admin Sustainability	Avoid Fail Sewer Rehabilitation Program Dry Weather Overflow Reduction Wet Weather Overflow Abatement Wastewater Treatment Plant Renewals Program	Planning for growth Variance analysis Capex growth projects	Meter Investment Program Customer Management System
Thursday 6th October	Asset Classification Operations and support activities Maintenance Asset management opex Visit to Control Room	Critical Water Main Renewals Reticulation Water Main Renewals Reservoir reliability program Water Pressure Management Program System Reliability	Sewerage Schemes Wastewater government programs - future PSP Stormwater Renewals Replacement Flows	Asset Classification Other IT Projects

Date	JNSJ	AH	AN	JAJ
Friday 7th October	Brief update meeting with to review progress and issues/ information			
	Energy Customer Community Relations Opex projects Desal plant	Water Pumping Station Renewals Program	Capex recycled water projects	Property Program Heritage assets capex/ opex
Tuesday 11th October	Asset Classification (Re-visited)			Asset Classification (Re-visited)

Table E.2 – Interview Program

Appendix E – Feedback on Draft Report

Feedback on Draft Report

Sydney Water Corporation and IPART had in line with our Terms of Reference an opportunity to comment on the draft report that we produced.

In its response dated 16th November 2011, Sydney Water identified:

- errors of fact;
- challenges on issues of judgement; and
- other minor comments relating to errors, issues of judgement and/or interpretation.

Sydney Water Corporation also provided additional evidence where appropriate.

We considered each of the points raised by Sydney Water Corporation. As a result of the feedback we have received, changes have been incorporated into the final report as required. These changes include corrections where errors of facts have been made, verbatim inclusion of Sydney Water's viewpoint where appropriate as well as amendments and/or responses to comments received from Sydney Water.

WS Atkins International Ltd
Woodcote Grove
Ashley Road
Epsom
Surrey KT18 5BW
England

Email: jonathan.archer@atkinsglobal.com
Telephone: +44 (0)1372 754208