

**Essential Services
Commission**

**Melbourne Water Expenditure
Review**

31 March 2009

Mr. Sean Crees
Director - Water
Essential Services Commission
Level 2, 35 Spring Street
Melbourne Vic 3000

31 March 2009

Dear Sean

Re: Melbourne Water expenditure review

Please find attached our final report in respect of the joint Halcrow/Deloitte review of Melbourne Water's operating and capital expenditure forecasts for the 2009/10 to 2012/13 Water Plan period.

Please contact myself on 9208 6584 or Paul Liggins on 9208 6648 if you have any queries regarding the report.

Yours sincerely

Robert Southern
Partner

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1 Executive Summary

1.1 Background

The ESC is currently conducting a price review of the proposed prices to be charged by metropolitan Melbourne's bulk water supplier Melbourne Water and the three retail water businesses (the retailers) – City West Water, South East Water and Yarra Valley Water. The proposed prices relate to the period 1 July 2009 to 30 June 2013, referred to in this document as 'the next regulatory period'.

Melbourne Water is a statutory corporation, fully owned by the Victorian Government. Melbourne Water provides water, sewerage and recycled water services to the three retailers, and drainage and waterways services to greater Melbourne.¹

The metropolitan water businesses (the businesses) have submitted Water Plans to the ESC for the next regulatory period. The Water Plans include forecasts of operating expenditure, capital expenditure and demand, proposed service standards and prices. The ESC will review the Water Plans and intends to release a draft decision in April 2009, with a final decision issued in June 2009.

Deloitte and Halcrow have been engaged by the ESC to review the businesses' expenditure forecasts.

The ESC has requested that in our review of the capital expenditure forecasts we focus on the major projects that comprise a significant proportion of the total capital expenditure forecasts and provide advice on whether the projects meet certain key criteria.

In relation to operating expenditure we have been asked to provide advice on whether:

- the proposed trend in operating expenditure over the regulatory period is consistent with existing obligations and the service standards are reasonable
- the operating expenditure forecasts associated with meeting new obligations and/or meeting higher service levels reflect their likely expenditure requirements.

1.2 Overview of approach

In summary, the approach followed by the engagement team to this project was as follows:

- prior to commencing work, the engagement team met with the ESC to discuss the review and identify any areas of particular interest
- the engagement team reviewed in detail the businesses' Water Plans and prepared an issues paper for consideration by the ESC which set out specific areas of interest or concern. The issues paper was discussed with the ESC and used as a basis for developing and refining interview questions for the businesses
- two core engagement teams held initial discussions with the businesses, each over two days, as set out below. The discussions mainly comprised key personnel from the businesses presenting information regarding their expenditure forecasts, with the opportunity for the engagement team to ask questions and request further information where necessary

¹ Melbourne Water's drainage and waterways services were subject to a separate review conducted by the Essential Services Commission in 2008.

- a detailed review of the information collected prior to, during and subsequent to the interviews with the businesses was undertaken to assess, to the extent possible, the prudence and efficiency of the proposed capital and operating expenditure forecasts
- as part of the review we also:
 - sought further information from the businesses on a number of specific issues
 - held further telephone and email discussions with the businesses
 - had regard to documentation and information prepared by independent third parties, including by the ABS, Reserve Bank of Australia, ABARE and the US Energy Information Administration.

1.3 Strategies, drivers and service standards

Deloitte and Halcrow conducted a review of a number of aspects of Melbourne Water's strategic and asset management planning processes and activities. This included reviewing:

- corporate strategies, including Melbourne Water's Corporate Framework (Sustainable Water), its 2008/09 to 2010/11 Corporate Plan and the Water Plan
- Melbourne Water's Planning Framework and Capital Investment Policy, and the Asset Management Policy
- the Capital Delivery Strategy and associated Capital Management Procedures, the Procurement and Purchasing Policy
- aspects of Melbourne Water's operations, such as contract procurement, budgeting, efficiency targets.

Corporate Strategies

The key strategies and policies that make up Melbourne Water's corporate and planning framework are:

- Sustainable Water – A Strategic Framework
- Asset Management Policy
- Planning Framework and Capital Investment Policy
- Procurement and Purchasing Policy
- Corporate Plan.

The *Sustainable Water – A Strategic Framework* document sets out Melbourne Water's sustainability principles, its goals and values. The strategy is informed by various stakeholders, including the community, the government and regulators.

The Asset Management Policy supports *Sustainable Water – A Strategic Framework*. The purpose of the policy is to ensure that the integrity of Melbourne Water's water, sewerage, drainage and waterways infrastructure is well maintained in a cost effective manner and protected now and into the future. These considerations form part of the annual Capital and Corporate Plan processes.

The Planning Framework and Capital Investment Policy defines the process, principles and accountabilities for developing Melbourne Water's 20-Year Capital Investment Plan in a regulated business environment. It details how Melbourne Water aims to achieve its strategic objectives and manage risk through integrated capital planning within the Corporate Plan (and the Water Plan) process.

The Procurement and Purchasing Policy defines the correct processes to be used in the procurement of goods and services. It supports the implementation of strategies and actions identified in the Corporate Plan.

The Corporate Plan summarises Melbourne Water's strategic direction and documents the strategies, priorities, significant investments and financial outcomes planned over defined three year periods. The current Corporate Plan covers the period 2008/09 to 2010/11.

Based on our review we consider that Melbourne Water's planning framework, its associated documents and the interactions between these documents, is consistent with good practice corporate planning in that it has an element of standard identification/setting, planning, delivery, reporting and review.

In reviewing the Water Plan, the strategic performance objectives and regulatory requirements that lead directly to the key activities (projects) proposed over the next regulatory period can generally be identified. This is evidenced in Appendix 1 of Melbourne Water's Water Plan, where it has identified key EPA Obligations together with its business response, activities over the period and the associated expenditure. In addition, key requirements and outcomes to be achieved over the 2009 regulatory period are clearly identified within the Water Plan (Chapter 7).

Asset Management Planning

We have reviewed the information provided during the review on Melbourne Water's Asset Management System. Asset management is articulated through the Asset Management Strategic framework which provides the linkage from policy (regulatory environment) to the operational level asset management functions. The Asset Management Strategic Framework broadly outlines Melbourne Water's links with policies from government, regulators and for customers or the community. It also identifies how asset management relates to the various company policies which are executed via specific management systems and corresponding objectives which are all underpinned by sustainability principles.

The Asset Management System is designed to achieve Melbourne Water's business performance targets using Sustainability Principles for both constructed and natural assets. The approach ensures that built assets (e.g. trunk mains and sewerage pumping stations) perform at optimum efficiency for their expected lives, after which they are refurbished, upgraded or replaced. The Asset Management Policy provides the direction for the implementation of Melbourne Water's Asset Management Information System (AMIS) as it translates through the Strategic Framework in the form of guidelines, management plans, and processes and procedures for asset operations. Key to the process is that asset information is accurately recorded and collected to provide effective asset management performance.

We found in practice that asset management is implemented through Melbourne Water's Asset Management Policy, which describes how 'Sustainable Water - A Strategic Framework' sustainability principles will be applied to the management of its assets. These considerations form a part of the annual Capital and Corporate Plan processes.

We saw evidence of the application of Melbourne Water's asset management through the development of its Strategic Asset Management Plans (SAMPs). Based on our review we consider that SAMPs are a sound basis for asset management in that they provide a reliable document to refer to for asset planning (growth/compliance/renewals/other strategic driver) or operations and maintenance initiatives.

As is common to all water businesses, producing and maintaining documents such as SAMPs is a challenge. We note that Melbourne Water has produced SAMPs for approximately 50% of its assets and that it is planning to produce the remainder over the coming 18 months to two years. We encourage Melbourne Water to undertake this initiative

and to maintain the capability in line with the annual State of the Assets process to support better asset management, asset planning capital investment outcomes.

Melbourne Water has a comprehensive Structural Assessment Guide for determining the replacement/refurbishment investment needs for sewerage assets. The approach is based on a risk-based methodology, including the consideration of asset criticality and CCTV surveys and various external inspection techniques to determine the condition grade of sewerage assets.

Renewals and other asset management decision making is based on Melbourne Water's Condition and Risk Assessment Procedure, which provides the basis for the risk-based approach adopted, outlining the business risk matrix used and the steps followed to undertake a condition assessment. We note through the interviews that the business risk matrix is currently only a four by five matrix and that Melbourne Water intend on updating it to a five by five matrix. This improvement to the current procedure will provide greater detail for the risk ratings for asset condition assessments.

We have seen evidence through the review that Melbourne Water participates in formal asset management benchmarking through the WSAA asset management process involving other similar water industry businesses. The outcome of these reviews is the identification of improvement actions for implementation. Relative comparisons of Melbourne Water suggest that it is generally in the advanced phase of asset management development. Other forms of benchmarking include qualitative mechanical and electrical benchmarking and sustainability benchmarking, as well as informal relationships e.g. with Yorkshire Water with respect to renewals planning.

Melbourne Water has identified areas for improvement as a result of participating in the asset management benchmarking review process. We encourage them to pursue its implementation to further the goal of continuous improvement to facilitate best practice outcomes.

Capital Planning

Melbourne Water's planning framework provides the context and strategic direction for capital planning. The Planning Framework and Capital Investment Policy document details how Melbourne Water aims to achieve its strategic objectives and manage risk through integrated capital planning within the Corporate Plan and Water Plan process. It defines the process, principles and accountabilities for developing Melbourne Water's 20 Year Capital Plan in a regulated business environment.

Melbourne Water's Corporate Plan, the Capital Plan, the Operating Expenditure Plan, and Water Plan are financial expressions of the Strategic Framework. These plans are interdependent and have a dynamic relationship with the strategic and corporate planning process.

Capital planning within Melbourne Water is primarily a bottom up process whereby information is gathered from across the organisation. The Asset Investment team co-ordinates inputs to the process, which incorporates a number of review stages before projects are included within the Capital Plan. There are nine key business drivers for capital expenditure, although four (Growth, Renewals, Compliance and Compliance - New) account for 97% of the capital expenditure within Melbourne Water's Water Plan, with compliance projects alone accounting for 60.2% of the forecast capital expenditure in the Water Plan.

Melbourne Water's Capital Planning processes have recently undergone a number of changes. These changes have been made in light of benchmarking studies and external reviews conducted on its capital planning and delivery processes. In 2006, and again in October 2008, Melbourne Water's Capital Planning processes were subject to an

independent review. The key objective of the reviews was to understand whether Melbourne Water's current capital planning process would meet current and future needs of the business. The 2008 review found that while the processes had improved, there was still scope for further improvement. Specifically, it recommended that Melbourne Water could improve its project prioritisation process by developing a more comprehensive and rigorous scoring system (linked to its KPIs) to enable prioritisation of projects within and across programs. We consider that implementation of this recommendation is key to ensuring greater transparency of decisions by Melbourne Water to include specific projects or programs of work within its capital plan, particularly given the significant proposed price increases in the Water Plan.

In order to better address the challenges associated with delivery of its expanded capital program, Melbourne Water, in May 2007, developed a new Capital Delivery Strategy. As part of this review, Melbourne Water also changed its Capital Management systems, processes and reporting requirements. These changes are reflected in Melbourne Water's Capital Management Procedures, which cover each step of the capital planning and delivery process from investigation, feasibility, functional design, detailed design, construction, commissioning to handover.

On the basis of our review we are generally satisfied that Melbourne Water's capital planning processes are sufficiently robust and that the application of these processes is likely to lead to efficient outcomes. However, we note that there are still some areas where existing processes can be improved, specifically in relation to project prioritisation. Melbourne Water has indicated its intent to continue to implement improvements to its planning processes which should further improve the rigour of its capital planning framework.

Operations

Melbourne Water has provided information on how it plans operational expenditure within the context of its Strategic Planning Framework and how this framework into more detailed Operating Plans. These plans relate to various internal planning documents that reference relevant Government strategies and take into account obligations included within the Statement of Obligations, customer requirements and any external environmental impacts. The operational planning process also assesses the impact of capital projects planned to identify any new operational resources/variable cost impacts that may arise in future.

Operational Plans provide the detail of the activities that will be undertaken over a forecast period of time to fulfil its strategic direction and outcomes according to the Strategic Framework. The Operational Plans are drawn together by the Program Plans which summarise the detail of the planned operating expenditure forecasts included within the Financial Operating Plan.

Operational expenditure is tracked by the cost centre for each business and classified against individual projects or expenditure types for the Financial Management Investment Steering Committee (FMISC) to monitor financial performance.

Forecast operational expenditure is predicted by Melbourne Water through an analysis of historical costs and trends. We saw evidence of this process in practice by the way in which the maintenance strategy and expenditure estimates were built up and supported. Historical data was also used in this way within the Mechanical and Electrical renewals models.

Melbourne Water has developed policies to determine whether expenditure is to be capitalised or expensed. Where a project relates to a fixed asset, then only costs during the functional design, detailed design and construction phases are capitalised. All feasibility studies and post implementation review work is considered to be operating expenditure. The definition of a new fixed asset is that it must cost more than \$500, provide future economic

benefits and it must be controlled by Melbourne Water. Operational expenditure relating to fixed assets includes asset maintenance, repairs and research and development activities.

Overall, Melbourne Water appears to have a comprehensive operational planning framework that relates to the Strategic Framework and translates through to Operational Plans, Program Plans and ultimately into the Financial Operating Plan. Operational expenditure is tracked and monitored by the Financial Management Investment Steering Committee, which reports to the Board. The policies and definitions relating to capital and operational expenditure ensure that expenditure relating to fixed assets is appropriately capitalised or expensed. We have seen evidence that historical data is analysed to support operational expenditure forecasts. These budgets and how they have been derived are discussed further in Chapters 5 and 6.

1.4 Generic issues

The ESC's metropolitan Melbourne price review is taking place against a background of unprecedented change and uncertainty. Southern and eastern Australia has experienced sharply reduced rainfall and inflows to storages and in response the water industry has forecast massive capital investment over the next five years and beyond. In addition, global economic conditions have significantly deteriorated over the past six to nine months and a marked slowdown in the Australian economy has occurred.

These issues are important considerations for this expenditure review. At the time that Water Plans were prepared, real labour costs and the prices of key inputs to water and wastewater infrastructure, such as oil and steel, had been rising consistently for a number of years. Therefore, the businesses' Water Plans incorporated, to varying degrees, sustained increases in the cost of these inputs.

Since July 2008, however, oil and steel prices have fallen sharply, construction activity has declined and unemployment has now started to rise. Adjustments to the businesses' forecasts have therefore been required to reflect these changed circumstances, which have lowered capital and operating expenditure forecasts.

Another key background issue is the recent review of the structure of the metropolitan water sector by the Victorian Competition and Efficiency Competition (VCEC). In its investigation of the Melbourne water sector, VCEC recommended, and the Victorian Government supported, that annual savings in the order of \$8-\$10 million from 'shared services' be incorporated in the businesses' Statement of Obligations.

The water businesses are in the process of assessing the possible sources of these savings, and a number of areas have been identified for further consideration. In aggregate the businesses have not proposed that savings of this extent will be achieved until 2012/13. We do not consider this is consistent with the government's support of VCEC's recommendations and accordingly we have suggested that shared services savings are greater than have been forecast.

1.5 Operating expenditure

The following table summarises our recommendations for changes to Melbourne Water's operating expenditure. Reasons for the adjustments are set out later in this document.

Table 1.1 – Overview of recommended changes to operating expenditure (\$m, 2008/09)

Melbourne Water	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Total Water Plan operating expenditure	195.65	199.06	206.08	219.46	426.43	638.72
Adjustments for errors						
Superannuation writedown	-18.80					
Re-allocation of costs	6.00					
Total adjustments for errors	-12.80					
Other recommended amendments						
Maintenance cost escalation		-0.16	-0.32	-0.48	-0.66	-0.85
VCEC productivity		0.00	-1.80	-2.70	-0.85	-0.85
Labour costs		0.00	-0.15	-0.28	0.03	0.19
Chemical costs - Tarago		-0.12	0.48	-0.73	-0.94	-0.95
Sugarloaf pipeline		0.00	-1.00	0.00	0.00	0.00
Tarago water treatment plant		-1.07	0.33	-0.35	-0.35	-0.32
Electricity		0.00	-0.50	-1.98	-3.90	-5.02
Carbon Pollution Reduction Scheme				-2.30	-2.30	-2.20
Water conservation		0.00	1.00	0.00	-0.23	-0.45
Transferred assets			-0.11	-0.11	-0.11	-0.11
Land tax		-0.58	-0.74	-2.52	-4.04	-6.13
Total other amendments		-1.93	-2.81	-11.45	-13.35	-16.69
Total amendments and error adjustments	-12.80	-1.93	-2.81	-11.45	-13.35	-16.69
Total recommended operating expenditure	182.85	197.13	203.27	208.01	413.08	622.03

1.6 Capital expenditure

Melbourne Water's Water Plan proposed a capital program of \$1,774 million over the next regulatory period, which is a significant increase over historical expenditure. The increase in capital expenditure over historical levels is primarily driven by a small number of major capital projects.

Delivery of this expanded capital program is likely to pose a number of challenges to Melbourne Water. While the economic downturn should free up construction resources across the construction industry, the larger program will still place pressure on Melbourne Water's internal resources.

From a review of Melbourne Water's capital delivery performance in recent years, it is apparent that it has encountered delays in securing approval for a number of key projects. While many of these delays are the result of external factors, they indicate the difficulties of accurately planning for key project milestones. As Melbourne Water's proposed capital program is front end loaded, any delays in the delivery of its 2008/09 program are likely to have an impact on its ability to deliver its future capital program. This may result in other projects having to be delayed or deferred.

In order to better address the challenges associated with delivery of its expanded capital program, in May 2007 Melbourne Water developed a new Capital Delivery Strategy. This has resulted in the creation of a number of program alliances, which will be responsible for delivery of a significant proportion of Melbourne Water's capital program. Melbourne Water considers that these alliances will be better placed to manage the risks associated with delivery of a capital program of this size. It has also undertaken a review of its governance arrangements, capital delivery process and systems in order to implement and support the Capital Delivery Strategy.

We consider that the use of program alliances should facilitate delivery of the capital program in an efficient and effective manner. This may be reflected as improvements in time and cost performance indicators. However, we note that given the significant shift in the approach to capital delivery, it is likely to take a number of years before the new Capital Delivery Strategy is fully embedded within the business. In the short term this may result in unforeseen delays to some projects, as both alliance teams and Melbourne Water staff familiarise themselves with this new approach to capital delivery.

Notwithstanding the above measures we consider that successful delivery of the program represents a significant challenge to Melbourne Water. Delays in securing project approvals, slippage from prior years and the capacity of the industry to deliver such a significant program of work will impact on Melbourne Water's ability to deliver its proposed capital program. While there are systems and processes in place to manage the impact of these, it is likely that the delivery of some outputs will be deferred or pushed back, with consequent impacts on project capital and operating expenditure requirements.

In addition, we note that Melbourne Water does not currently have a centralised cost database. As such, the capital project cost estimates used to develop many of the cost estimates included within the plan have largely been developed by consultants. We understand that Melbourne Water does intend to develop a centralised database of project costs and unit rates using information gathered from its recently created project alliance teams. We consider that establishing and maintaining such a database is critical to the development of more accurate and transparent cost estimation. We would expect Melbourne Water to start developing this database over the coming months, as the first of the projects

delivered by its alliance teams are completed. By the time of the 2013 Water Plan, we would expect more accurate cost estimates based on real outturn costs for similar project outputs.

We have reviewed a selection of ten of Melbourne Water's major capital projects and programs.

We have also considered programs of work which include many individual projects, such as renewals programs, in the top ten as they are easily grouped.

The projects we have reviewed are identified in the following table, together with the service, the primary business driver, estimated completion dates and project costs.

Table 1.2 Review of Top 10 capital projects and programs (\$m, 2008/09)

Project	Service*	Primary Business Driver	Estimated Completion Date	Water Plan Expenditure (2009/10 to 2012/13)	Total Forecast Project Expenditure
Sugarloaf Pipeline	W	Compliance - New	2011 (pipeline)	522.1	1,053.1
Eastern Treatment Plant (ETP) Tertiary Treatment	S	Compliance	2012	294.1	314.6
Northern Sewerage project	S	Compliance	2012	192.2	381.4
Melbourne Main Sewer	S	Renewals	2012	134.9	193.0
ETP mechanical and electrical (M&E) renewals	S	Renewals	Ongoing	59.2	-
Western Treatment Plant (WTP) wet weather capacity upgrades	S	Growth	2010	42.8	46.7
Water mains renewals Preston to North Essendon	W	Renewals	2011	37.0	52.6
Water mains renewals North Essendon to Footscray	W	Renewals	2014	32.2	\$41.3
Sewerage transfer M&E renewals	S	Renewals	Ongoing	31.7	-
Upgrade grit and screenings removal facility at ETP	S	Renewals	2012	25.6	29.4

Note (*) W = Water, S = Sewerage

These projects account for \$1,371.8 million, which is equivalent to 77% of Melbourne Water's 2009 Water Plan capital expenditure from 2009/10 to 2012/13.

On the basis of our review of Melbourne Water's 2009 Water Plan and relevant supporting documentation we recommend a number of adjustments to the forecast capital expenditure. These adjustments are based on our review of the ten major capital projects and capital

allocations, and asset renewals. Suggested reductions to Melbourne Water's capital program are summarised below and set out in Table 1.3:

- Sugarloaf pipeline projects – a reduction of \$91.59 million
- ETP Tertiary Treatment Upgrade – a reduction of \$0.95 million
- Northern Sewerage Project – a reduction of \$3.6 million
- Melbourne Main Sewer Augmentation – a reduction of \$8.65 million
- WTP Wet Weather – a re-profiling of \$2.34 million.
- Water Renewal between Preston and North Essendon – a reduction of \$1.0 million
- M&E Renewals Allocations – a reduction of \$37.4 million

We have also made adjustments to provide for the lower forecast expenditure associated with the Tarago Water Treatment Plant (a reduction of \$11.6 million), to correct for errors and altered timing of Melbourne Water's rehabilitation expenditure at the former Dandenong Treatment Plant (an increase of \$27.3 million) and the inclusion of the desalination interconnect project (an increase of \$79.9 million).

Finally, Melbourne Water has also advised the ESC of some changes to the profile of expenditure in 2008/09 which has a flow-on to expenditure in the Water Plan period. Given that the individual adjustments are small in nature relative to the overall capital program, do not change the overall project cost and have the effect of reducing the capital base (and hence prices) we have accepted the amendments as proposed.

Table 1.3 – Overview of recommended changes to capital expenditure (\$m, 2008/09)

Expenditure item		2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Major Projects							
Sugarloaf pipeline projects	Water Plan	41.6	479.3	364.1	112.0	26.0	20.0
	Revised forecast	41.6	480.9	310.5	80.0	20.0	20.0
	Net change	-	1.7	-53.6	-32.0	-6.0	-
ETP Tertiary Treatment Upgrade	Water Plan	10.62	8.95	56.7	177.2	55.8	4.5
	Revised forecast	10.6	9.0	56.5	176.6	55.6	4.5
	Net change			-0.18	-0.6	-0.2	-0.0
Northern Sewerage Project	Water Plan	72.4	87.4	69.5	60.6	62.1	
	Revised forecast	72.4	87.4	69.5	60.6	58.5	
	Net change					-3.6	
Melbourne Main Sewer Augmentation	Water Plan	11.2	40.5	48.4	54.6	31.9	
	Revised forecast	11.2	40.5	48.4	54.6	23.3	
	Net change					-8.7	
WTP Wet Weather Capacity Upgrade	Water Plan	0.4	3.5	35.4	7.4		
	Revised forecast	0.4	1.2	37.8	7.4		

	Net change		-2.3	2.3			
Water Renewal between Preston and North Essendon		0.5	15.1	22.8	14.2		
	Revised forecast	0.5	13.1	22.3	13.7		
	Net change	-	-2.0	-0.5	-0.5		
Renewals Program	Water Plan		168.5	178.9	167.0	116.3	111.3
	Revised forecast		161.4	170.8	157.6	106.3	101.4
	Net change		-7.1	-8.1	-9.4	-10.0	-9.9
Water Plan		368.5	1,016.1	805.3	564.4	277.3	127.0
Revised forecast		368.6	1,006.4	745.4	521.9	248.9	117.1
Net change			- 9.8	-60.0	- 42.5	-28.4	- 9.9
Other Projects – Net changes							
Tarago Treatment Plant			-11.6				
Desalination Interconnect			0.8	38.1	41.0		
Dandenong Treatment Plant		5.0	16.0	6.3			
Other adjustments			-46.7	46.7			
Net change – other projects		5.0	-41.5	91.1	41.0	-	-
Net change		5.0	-51.3	31.1	-1.5	-28.4	-9.9
Total recommended capital expenditure		373.5	964.9	836.4	562.9	248.9	117.1

2 Introduction

2.1 Background

2.1.1 The 2009 metropolitan water price review

Under the provisions of the *Water Industry Regulatory Order* (WIRO), the Essential Services Commission (ESC) has the power to regulate prices for prescribed services, including water and wastewater services. According to the WIRO, the ESC must be satisfied that expenditure forecasts ‘reflect the efficient delivery of the proposed outcomes contained in the Water Plan and take into account a planning horizon that extends beyond the term of the Water Plan.’

The ESC is currently conducting a price review of the proposed prices to be charged by metropolitan Melbourne’s bulk water supplier Melbourne Water and the three retail businesses – City West Water, South East Water and Yarra Valley Water. The proposed prices relate to the period 1 July 2009 to 30 June 2013, referred to in this document as ‘the next regulatory period’.

The metropolitan water businesses (the businesses) have submitted Water Plans to the ESC for the next regulatory period. The Water Plans include forecasts of operating expenditure, capital expenditure and demand, proposed service standards and prices. The ESC will review the Water Plans and intends to release a draft decision in April 2009, with a final decision released in June 2009.

2.2 Scope of work

2.2.1 Nature of advice

Under the existing legislative framework the ESC is required to be satisfied that the businesses’ expenditure forecasts:

- reflect efficient expenditure
- are consistent with delivering the required service levels, outputs and obligations over the regulatory period and
- take into account a planning horizon that extends beyond the regulatory period.

Deloitte and Halcrow have been engaged by the ESC to review the businesses’ expenditure forecasts. The ESC has requested that in our review of the capital expenditure forecasts we focus on the major projects that comprise a significant proportion of the total capital expenditure forecasts and provide advice on whether the projects meet the following criteria:

- **appropriate in relation to key drivers and obligations** – with evidence provided of such drivers and in accordance with the Statement of Obligations that sets out responsibilities of each of the businesses
- **robust (with adequate supporting analysis and systems)** – as demonstrated by reports which clearly enunciate the problems faced by the business, and sets out the analysis undertaken of the options to resolve that problem and identifies the preferred solution. The preferred solution should also fall within an overall strategy by the business
- **deliverable over the regulatory period** – the key activities comprising the delivery of the project from planning to construction need to have been identified and thought

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through and there should be evidence that the projects can be practically delivered within the proposed timeframe

- **reasonable cost estimate** – the cost estimate should be well supported either by a schedule of quantities using typical rates currently being experienced in the industry, or compare favourably with other similar projects or preferably both of the above.

In relation to operating expenditure we have been asked to provide advice on whether:

- **the proposed trend in operating expenditure over the regulatory period is consistent with existing obligations and the service standards are reasonable** – having regard to expected productivity improvements, trends in input prices and the impact of growth on operating expenditure needs and any other relevant factors
- **the operating expenditure forecasts associated with meeting new obligations and/or meeting higher service levels reflect their likely expenditure requirements** – having regard to any benchmarking or other quantitative techniques considered appropriate.

In providing advice on the above, we have been asked to have regard to:

- any guidance issued by the ESC with respect to how it will assess the businesses' proposed expenditure forecasts
- the information set out in the businesses' Water Plans (and accompanying information templates) and any explanations that the businesses provide with respect to the basis used to derive the forecasts including any assumptions used
- any readily available data and information that we have available to assess expenditure forecasts
- our experience in preparing and assessing the veracity of forecasts as well as costing projects in the water sector.

2.2.2 Issues outside the scope of this project

We have been asked by the ESC not to consider the following matters:

- toll payments (operating expenditure) by Melbourne Water associated with the proposed desalination plant
- waterways and drainage expenditure by Melbourne Water – except to the extent that the allocation of corporate costs will have implications for water and wastewater expenditure
- whether expenditure is categorised as 'operating' or 'capital'
- the structure of bulk water prices.

2.2.3 Other work

The ESC has received advice from another consultant regarding the veracity of the businesses' demand forecasts. While we are broadly aware of this work it was not received in sufficient time to be incorporated in our report.

2.3 Structure of the report

This report is focussed on the expenditure forecasts submitted by Melbourne Water. It is structured as follows:

- chapter 3 outlines the methodology adopted by us in reviewing Melbourne Water's expenditure forecasts

- chapter 4 discussed Melbourne Water’s strategies, cost drivers and service standards
- chapter 5 discusses some issues common to both Melbourne Water’s operating and capital expenditure forecasts
- chapter 6 outlines Melbourne Water’s operating expenditure forecasts, and presents our analysis and conclusions/recommendations
- chapter 7 outlines Melbourne Water’s capital expenditure forecasts, and presents our analysis and conclusions/recommendations.

2.4 Acknowledgements

We would like to thank Melbourne Water staff including Claire Preston, Felix Skliar, Suzette Vranjes and Ben Furmage, for their assistance in relation to this report.

3 Overview of approach

3.1 Process undertaken

The process adopted for this expenditure review is set out below.

Inception Meeting with the ESC

Prior to commencing work, the engagement team met with the ESC to discuss the review and identify any areas of particular interest for the ESC. At the inception meeting, the ESC provided the engagement team with a paper that outlined some of the key issues to be considered. These included:

- the ability of the businesses to deliver their capital programs within the regulatory period
- analysing each of the businesses' top ten capital projects
- the cost escalation factors used in the businesses' forecasts
- using 2007/08 as the 'base year' for expenditure
- paying particular attention to:
 - energy costs (including electricity and green energy)
 - any purchases of greenhouse gas offsets
 - productivity improvements
 - conservation programs and how they relate to the supply-demand balance
 - the cost of managing bulk entitlements.

Preparation of issues paper

The next stage of the expenditure review process was the preparation of an issues paper for consideration by the ESC. The engagement team reviewed in detail the businesses' Water Plans and set out specific areas of interest or concern. The issues paper was discussed with the ESC and used as a basis for refining discussion questions for the businesses.

Initial interviews with the businesses

In the initial stages of the project, two core engagement teams held discussions with the businesses, each over two days, as detailed in table 3.1 below.

Table 3.1 Initial meetings with businesses

Date	Business
4 and 5 December	South East Water
8 and 9 December	Yarra Valley Water
9 and 10 December	Melbourne Water
10 and 11 December	City West Water

Prior to the interviews, the businesses received a paper prepared by the engagement team highlighting the key areas for discussion. The interviews mainly comprised key personnel from the businesses presenting information regarding their expenditure forecasts, with the

opportunity for the engagement team to ask questions and request further information where necessary.

Review of proposed expenditure

A detailed review of the information collected prior to, during and subsequent to the interviews with the businesses was undertaken to assess, to the extent possible, the prudence and efficiency of the proposed capital and operating expenditure forecasts. The assessment included a review of the following:

- the planning process through which capital projects are identified and implemented
- the ability to deliver the proposed capital expenditure program
- the cost escalation factors adopted
- the proposed level of capital expenditure
- the main components of forecast operating expenditure.

As part of the review we also:

- sought further information from the businesses on a number of specific issues
- held further telephone and email discussions with the businesses
- spoke to external parties (including DSE)
- had regard to documentation and information prepared by independent third parties, including by the Australian Bureau of Statistics (ABS), Reserve Bank of Australia (RBA), the Australian Bureau of Agricultural and Resource Economics (ABARE) and the US Energy Information Administration.

Preparation of draft report

The process and findings of the review undertaken by the review team were documented in a draft report, together with recommendations in respect to the prudence and efficiency of the proposed expenditure. This draft report was discussed with the ESC and distributed to the businesses for comment.

Further interviews with businesses

Following the submission of the draft report to the ESC and the receipt of comments from the businesses, we held further interviews with the businesses to discuss their proposals.

Table 3.2 Further interviews with businesses

Date	Business
23 February	South East Water
12 March	Yarra Valley Water
12 March	City West Water
16 March	South East Water

A telephone conference was also held on 19 March with Melbourne Water.

Preparation of final report

In preparing this final report, we have had regard to:

- comments provided on the draft report by the ESC and the businesses

- further information provided by the businesses subsequent to their comments on the draft report.

In general terms our review has been more extensive and covered more areas than those discussed in this report. That is, where we have reviewed areas of expenditure and are satisfied at this time, based on the information provided to us, with the projections incorporated in the forecasts, we have generally not commented on that area in this report.

4 Strategies, drivers and service standards

4.1 Operations, strategy and assets

4.1.1 Overview

Deloitte and Halcrow conducted a review of a number of aspects of Melbourne Water's strategic and asset management planning processes and activities. This included reviewing:

- corporate strategies, including Melbourne Water's Corporate Framework (Sustainable Water), its 2008/09 to 2010/11 Corporate Plan and the Water Plan
- Melbourne Water's Planning Framework and Capital Investment Policy, and the Asset Management Policy,
- the Capital Delivery Strategy and associated Capital Management Procedures, the Procurement and Purchasing Policy,
- aspects of Melbourne Water's operations, such as contract procurement, budgeting, efficiency targets.

Our analysis of each of these areas is presented below.

4.1.2 Corporate strategies

The key strategies and policies that make up Melbourne Water's corporate and planning framework are:

- Sustainable Water – A Strategic Framework
- Asset Management Policy
- Planning Framework and Capital Investment Policy
- Procurement and Purchasing Policy
- Corporate Plan.

The *Sustainable Water – A Strategic Framework* document sets out Melbourne Water's sustainability principles, its goals and values. The goals cover water resources, public health, the natural environment, financial viability, infrastructure, people, relationships and the workplace. The strategy is informed by various stakeholders, including the community, the government and regulators. Melbourne Water consults with its customers (the retailers) in relation to its corporate strategies, particularly when strategies are in development or when they are being reviewed. For example, it recently consulted with the retailers in relation to its Energy and Greenhouse Strategy. Some regional water businesses and various Government stakeholders were also involved.

The Asset Management Policy supports *Sustainable Water – A Strategic Framework*. The purpose of the policy is to ensure that the integrity of Melbourne Water's water, sewerage, drainage and waterways infrastructure is well maintained in a cost effective manner and protected now and into the future. These considerations form part of the annual Capital and Corporate Plan processes.

The Planning Framework and Capital Investment Policy defines the process, principles and accountabilities for developing Melbourne Water's 20-Year Capital Investment Plan in a regulated business environment. It details how Melbourne Water aims to achieve its strategic objectives and manage risk through integrated capital planning within the Corporate Plan (and the Water Plan) process.

The Procurement and Purchasing Policy defines the correct processes to be used in the procurement of goods and services. It supports the implementation of strategies and actions identified in the Corporate Plan.

The Corporate Plan summarises Melbourne Water's strategic direction and documents the strategies, priorities, significant investments and financial outcomes planned over defined three year periods. The current Corporate Plan covers the period 2008/09 to 2010/11 and contains Melbourne Water's Statement of Corporate Intent. The Statement of Corporate Intent outlines Melbourne Water's Governance arrangements, its vision, its sustainability principles, values, service responsibilities, the statutory requirements that it must operate within and its business policies.

The above documents are updated according to a pre-defined timetable, and with the exception of the Procurement and Purchasing Policy, are approved by Melbourne Water's board of Directors. The Procurement and Purchasing Policy is approved by Melbourne Water's General Manager Business Services.

Melbourne Water's Corporate Plan, the Capital Plan, the Operating Expenditure Plan, and Water Plan are financial expressions of the Strategic Framework. These plans are interdependent and have a dynamic relationship with the strategic and corporate planning process. These plans are discussed in greater detail within section 4.1.4.

Melbourne Water indicated that the retailers are able to influence Melbourne Water's corporate strategies through the annual Capital and Corporate Plan processes. The Bulk Supply Agreements contain principles of co-operative planning to ensure there is annual and ongoing collaboration between Melbourne Water and the retailers to enable the development of integrated strategies and efficient technical solutions. Melbourne Water's customers, as well as government and regulators, also influence service level requirements that must met and which are ultimately agreed and reflected in the Bulk Supply Agreements. In turn, these service level requirements influence Melbourne Water's asset management practices and policies.

Service level requirements with the retailers reflect the requirements that they in turn must meet for providing services to the end customers (e.g. water pressure and quality). Melbourne Water and the retailers work together to develop integrated strategies and efficient technical solutions for meeting these requirements.

Requirements set by the government/regulators reflect service levels provided more broadly to the community as a whole e.g. reduced sewer spills, attainment of discharge requirements, reducing leakage and the risk management of assets. Melbourne Water works closely with the government/regulators to influence policy and regulatory requirements that influence levels of service.

Based on our review we consider that Melbourne Water's planning framework, its associated documents and the interactions between these documents, is consistent with good practice corporate planning in that it encompasses standard identification/setting, planning, delivery, reporting and review.

In reviewing the Water Plan, the strategic performance objectives and regulatory requirements that lead directly to the key activities (projects) proposed over the next regulatory period can generally be identified. This is evidenced in Appendix 1 of Melbourne Water's Water Plan, where it has identified key EPA Obligations together with its business

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response, activities over the period and the associated expenditure. In addition, key requirements and outcomes to be achieved over the 2009 regulatory period are clearly identified within the Water Plan (Chapter 7).

4.1.3 Asset management planning

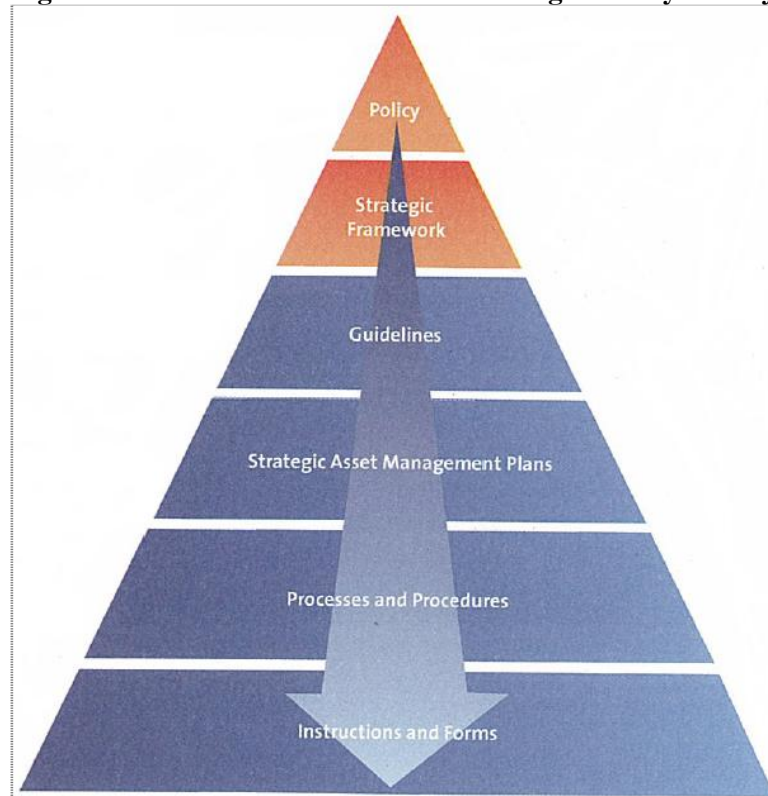
Asset Management Strategic Framework

We have reviewed the information provided during the review of Melbourne Water's Asset Management System. Asset Management is articulated through the Asset Management Strategic framework. This provides the linkage from the policy and regulatory environment to the operational level asset management functions. It also identifies how Asset Management relates to the various company policies which are executed via specific management systems and corresponding objectives which are all underpinned by sustainability principles.

The Asset Management System is designed to achieve Melbourne Water's business performance targets using Sustainability Principles for both constructed and natural assets. The approach ensures that built assets (e.g. trunk mains and sewerage pumping stations) perform at optimum efficiency for their expected lives upon which they are refurbished, upgraded or replaced. The Asset Management Policy provides the direction for the implementation of Melbourne Water's Asset Management Information System (AMIS) as it translates through the Strategic Framework in the form of guidelines, management plans, and processes and procedures for asset operations. Key to the process is that asset information is accurately recorded and collected to provide effective Asset Management performance.

Figure 4.1 shows the relationship between the Strategic Framework and Corporate Policies, as it translates to Asset Management Guidelines, Strategic Asset Management Plans, Procedures and Processes and instructions of work.

Figure 4.1 – Melbourne Water Asset Management System Pyramid



The objectives of Asset Management at Melbourne Water are explained by the following diagram (Figure 4.2).

Figure 4.2 – Melbourne Water Asset Management Objectives



Asset Management is implemented through Melbourne Water's Asset Management Policy, which describes how 'Sustainable Water - A Strategic Framework' sustainability principles will be applied to the management of its assets. These considerations form a part of the annual Capital and Corporate Plan processes. The Asset Management Policy is one of Melbourne Water's main strategy documents and it is updated every two years.

Strategic Asset Management Plans

We saw evidence of the application of Melbourne Water's asset management through the development of its Strategic Asset Management Plans (SAMPs). Our review of a selection of SAMPs indicates a comprehensive set of information regarding the assets involved. The two asset types reviewed included one water pumping station (Yering Gorge) and fluoride treatment plants. The SAMPs included general asset details; levels of service and regulatory requirements; data from the annual 'State of the Assets' asset risk assessment (frequency of failure and consequence) to determine condition showing the rating last year and the current rating; the context of operation and links to operating procedures; details of maintenance requirements and critical spares; any emergency response plans in place and any improvement initiatives proposed or underway, Melbourne Water regard these documents as the primary reference for each asset within the Asset Management System. SAMPs define asset performance requirements and what is to be done to meet and sustain them.

The SAMP also has links to various guideline documents such as the asset investment options assessment through the Triple Bottom Line (TBL) analysis; any relevant asset management standards where applicable; links to the relevant renewals strategy model; a link to technical drawings, and a live link to the online monitoring output (e.g. hydraulic profile) of the asset.

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SAMPs are a sound basis for Asset Management in that they provide a reliable document to refer to for Asset Planning (growth/compliance/renewals/other strategic driver) or Operations and Maintenance initiatives. The SAMP is updated for respective assets as part of the annual State of the Assets process which updates asset details, costs, risks and current status. We expect that any changes to the network links for various policies, guidelines or models would also be updated in the SAMP at the same time.

As is common to all water businesses, producing and maintaining documents such as SAMPs is a challenge. We note from the review that Melbourne Water has produced SAMPs for approximately 50% of its assets, and that it is planning to produce the remainder over the coming eighteen months to two years. We encourage Melbourne Water to undertake this initiative and to maintain the capability in line with the annual State of the Assets process, to support better asset management, asset planning capital investment outcomes. Completion of the SAMPs will also satisfy one of the areas of improvement identified within WSAA's 2006 mechanical and electrical (M&E) maintenance benchmarking exercise.

Further discussion of Melbourne Water's renewals process may be found in Chapter 7.

Melbourne Water has a comprehensive Structural Assessment Guide for determining the replacement/refurbishment investment needs for sewerage assets. The approach is based on a risk-based methodology, including the consideration of asset criticality and CCTV surveys and various external inspection techniques to determine the condition grade of sewerage assets.

The Structural Assessment methodology for sewerage assets defines the following:

- where and when to inspect assets
- where and when to perform other types of assessment of assets
- how to determine the structural conditions of assets
- where, when and how to undertake asset rehabilitation
- where to have emergency response plans for asset failure.

Renewals and other asset management decision making is based on Melbourne Water's Condition and Risk Assessment Procedure, which provides the basis for the risk-based approach adopted, outlining the business risk matrix used and the steps followed to undertake a condition assessment. We note through the interviews that the business risk matrix is currently only a four by five matrix, and that Melbourne Water intends to update it to a five by five matrix. This improvement to the current procedure will provide greater granularity to the risk ratings for asset condition assessments.

Asset Management Benchmarking

Melbourne Water participates in formal Asset Management benchmarking through the WSAA asset management process involving other similar water industry businesses. These benchmarking studies provide Melbourne Water with an independent view of its asset management practices and policies as well as potential process and policy improvements. The outcome of these reviews is the identification of improvement actions for implementation. Relative comparisons of Melbourne Water suggest that it is generally in the advanced phase of asset management development. Melbourne Water scored far above the median in each of the seven benchmarking categories. Particular strength was shown in the Asset Capability and Forward Planning category, which Melbourne Water put down to its improved Climate Change modelling and scenario planning capability. The relative weakness in the Asset Acquisition performance relative to the other companies has improved markedly since 2004 and will improve further by the next benchmarking review as Melbourne Water is currently in the transition phase to new Capital Delivery Strategy.

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Positive asset management initiatives coming out of the 2006 WSAA benchmarking include:

- formation of an asset management improvement team to provide a focus on longer term issues for asset management development, and to drive initiatives across the business
- provision of easier access to data through the Asset Management Information Systems Improvement Strategy (we understand that this may relate to the intention in the coming years to replace Hansen as the current AMIS with a newer more sophisticated IT solution.
- need for increased effort in documentation and process improvement to drive continuous improvement.

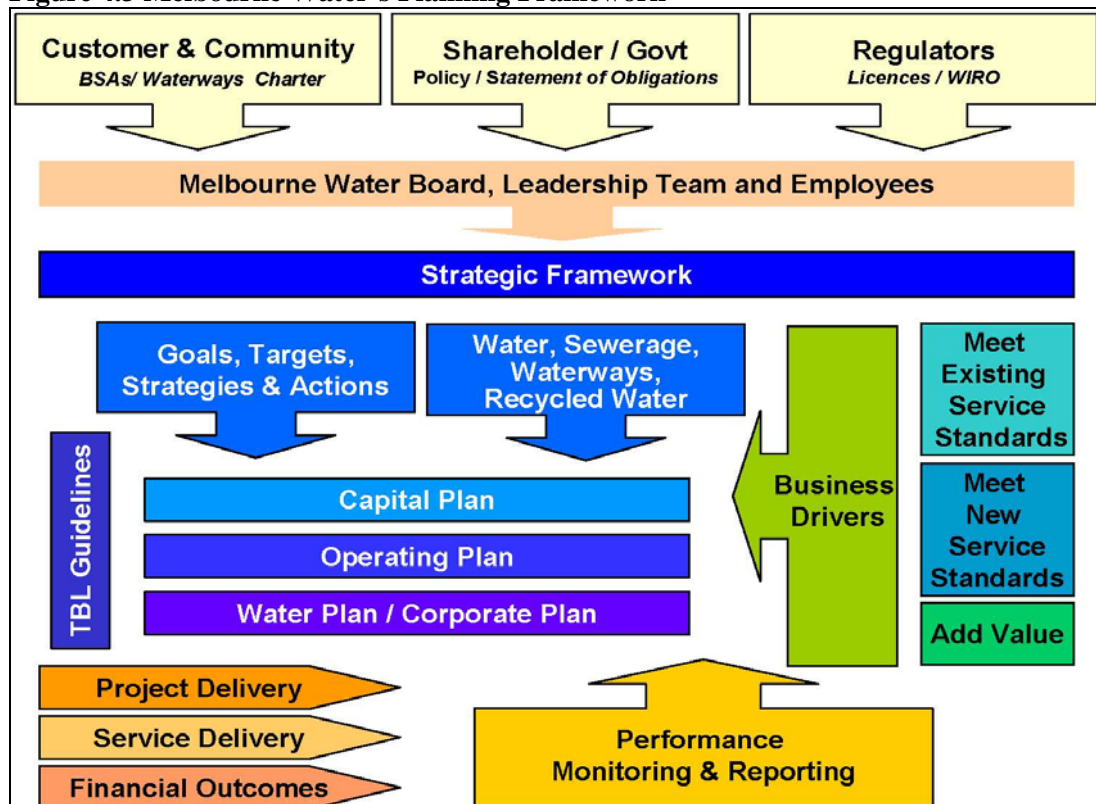
The WSAA Asset Management benchmarking exercise concluded that Melbourne Water’s Asset Planning and Asset Management systems are at an advanced stage of development. Melbourne Water has identified areas for improvement as a result of participating in the Asset Management benchmarking review process. We encourage Melbourne Water to pursue implementation to further its goal of continuous improvement to facilitate best practice outcomes.

Other forms of benchmarking include qualitative mechanical and electrical benchmarking and sustainability benchmarking, as well as informal relationships e.g. with Yorkshire Water, in respect of renewals planning.

4.1.4 Capital planning

Melbourne Water’s planning framework is summarised in the following figure.

Figure 4.3 Melbourne Water’s Planning Framework



Note: TBL = Triple bottom Line

Melbourne Water's planning framework provides the context and strategic direction for capital planning. The Planning Framework and Capital Investment Policy document details how Melbourne Water aims to achieve its strategic objectives and manage risk through integrated capital planning within the Corporate Plan and Water Plan process. It defines the process, principles and accountabilities for developing Melbourne Water's 20 Year Capital Plan. The scope of the Planning Framework and Capital Investment Policy is to support the Corporate Plan by providing transparent and robust principles for:

- ensuring alignment between strategic objectives and capital investment priorities
- determining availability and source of funds
- incorporating customer and stakeholder requirements
- allocating capital and prioritising programs/projects
- optimising project solutions
- delivering projects efficiently
- approving, monitoring and reporting project performance.

The key products of this framework are:

- the Corporate Plan, which summarises Melbourne Water's strategic direction and documents the strategies, priorities, significant investments and financial outcomes planned over a three year period. The current Corporate Plan covers the period 2008/09 to 2010/11. Melbourne Water's Statement of Corporate Intent is included within the Corporate Plan. The Corporate Plan's primary audiences are Melbourne Water's Board, management and employees, the Minister for Water and the Treasurer
- the 20 Year Capital Plan, which represents Melbourne Water's aggregated capital program
- the Operating Expenditure Plan, which sets out operating expenditure for a three year Corporate Plan period
- the Water Plan, which proposes revenue requirements and tariff structures for each of Melbourne Water's products over a defined regulatory period based on agreed customer service requirements and regulatory obligations.

Melbourne Water's Capital Framework has four planning layers. These are Capital plans, Program plans, Project plans and Project delivery. Melbourne Water compiles and updates its Capital Plan on an annual basis. The Capital Plan includes details of all capital projects, projected over a 20 year horizon. The key aims of the Capital Plan are to:

- determine the capital requirements for both short-term and long-term planning purposes
- determine the financial implications, such as revenue, cash flow and borrowing requirements
- prepare/produce financial forecasts
- model Water Plan scenarios and various other financial scenarios that are reliant upon the existence of an up-to-date Capital Plan, e.g. Water Plan's impacts on the business and its customers
- meet the shareholder requirement of submitting an annual, 3-year and 10-year financial forecast
- provide a basis for developing prices
- assist in ensuring that capital needs are appropriately identified, prioritised and delivered

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- serve as an important source document for the business.

The Capital Plan is used as an input to the Water Plan and Corporate Plan, capital delivery planning and financial planning. It is based on the Strategic Framework and assumptions for demand, service and regulatory requirements over that period. The Capital Plan is reviewed and prioritised by the Financial Management Investment Steering Committee for subsequent approval by Melbourne Water's Board.

Program plans comprise a group of projects associated with a common system component or strategic component. Program plans are developed from the capital plan, covering water, sewerage, waterways, recycled water and corporate expenditure. The program plans include specific projects and block allocations. Project Plans document the assessment of specific project solutions from investigation to delivery. Project Delivery encompasses progress reporting against key performance indicators, asset handover at commissioning of works and post implementation review to improve organisational learning.

Capital planning within Melbourne Water is primarily a bottom up process whereby information is gathered from across the organisation. The Asset Investment team co-ordinates inputs to the process, which incorporates a number of review stages before projects are included within the Capital Plan. To aid the planning process, Melbourne Water has developed six focus groups for strategic planning. These cover Western Treatment Plant (WTP), Eastern Treatment Plan (ETP), Water Supply, Sewerage Transfer & Drainage, Waterways, River Health & Stormwater Quality; and IT. The Focus Groups consider capital planning in the context of project bundling and optimisation, considering opportunities to address multiple project drivers to achieve capital efficiency. The Capital Plan is also challenged by the Financial Management Investment Steering Committee (FMISC) and the Capital Planning and Delivery Committee (a Board Committee).

Business Drivers for Capital Expenditure

Melbourne Water has nine key business drivers for capital expenditure. They are shown in the following table.

Table 4.1 Business Drivers for Capital Expenditure

Driver	Objective of capital expenditure
Growth	To meet growth in demand
Renewals	To maintain existing levels of service over the life cycled of the asset
Compliance	To comply with existing enforceable customer agreements and regulatory obligations
Compliance – New	To comply with new enforceable customer agreements and regulatory obligations
Compliance Service – New	Improve customer service standards
Environmental/Social	Improve environmental and social standards
Strategic Intent/Risk Mitigation	Improve long-term business sustainability and mitigate risks
Business Efficiency	Improve efficiency and reduce costs
Business Development	Generate non-regulated revenue

The first four drivers in the table (Growth, Renewals, Compliance and Compliance - New) are the key drivers of expenditure in Melbourne Water's Water Plan.

Improvements to planning processes

Melbourne Water's Capital Planning processes have recently undergone a number of changes. These changes have been made in light of benchmarking studies and external reviews conducted on its capital planning and delivery processes.

In 2006, and again in October 2008, Melbourne Water's Capital Planning processes were subject to an independent review by KPMG. The key objective of the reviews was to understand whether Melbourne Water's current capital planning process would meet current and future needs of the business. The review included an assessment of processes, systems, organisation and people, Investment decision/prioritisation and regulation and governance. The 2006 Review found that processes and systems supporting the capital planning and delivery process required significant improvement; and that there was a general consensus within the business on the focus areas for improvement. The review made a number of recommendations where Melbourne Water could improve its capital planning and delivery processes. In its Water Plan, Melbourne Water has identified the key areas where it has implemented improvements to its processes including more rigorous review of program and project proposals, enhanced planning and approvals process, improved cost estimation, introduction of Triple Bottom Line guidelines for evaluating expenditure proposals, and progressive development of an improved project prioritisation process.

The 2008 KPMG review found that while the processes had improved since the 2006 review, there was still scope for further improvement. Specifically, it recommended that Melbourne Water could improve its project prioritisation process by developing a more comprehensive and rigorous scoring system (linked to its KPIs) to enable prioritisation of projects within and across programs. The 2008 review made a number of additional recommendations to improve the capital planning process. We note that while Melbourne Water delayed the implementation of a number of these actions, most of the actions should be implemented by March 2009.

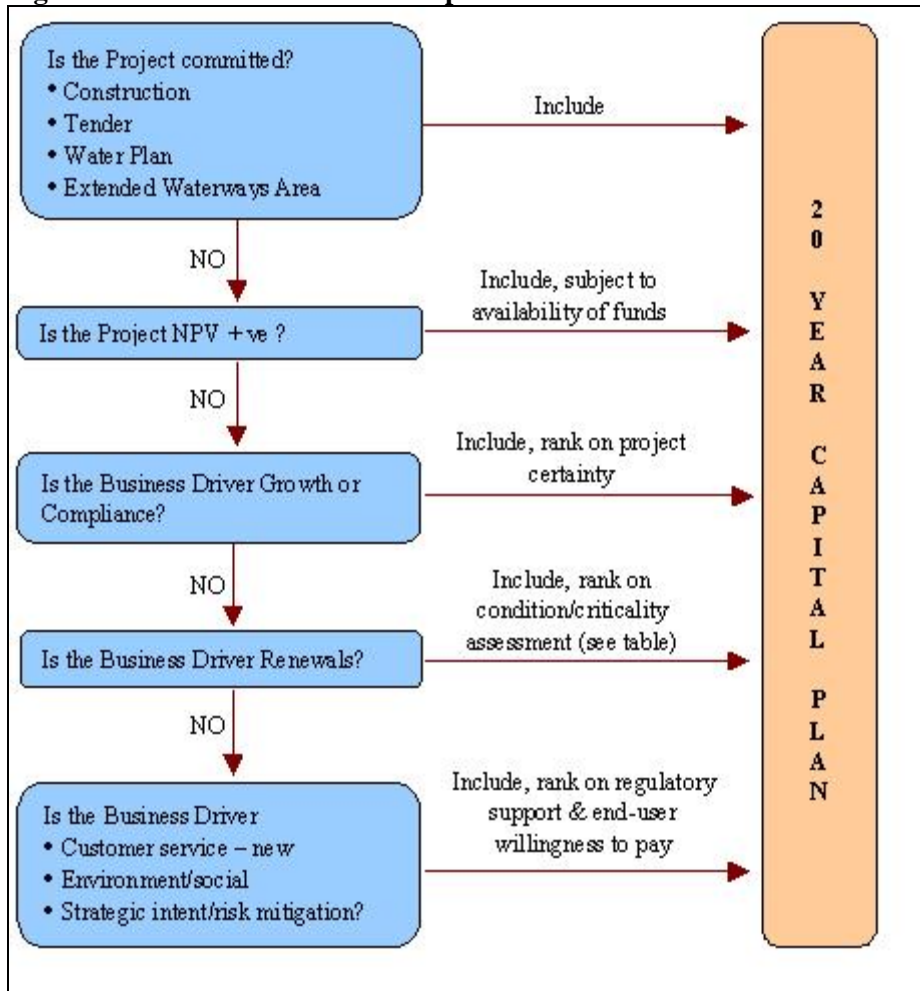
Corporate Prioritisation Guidelines

When prioritising capital expenditure for the Water Plan, Melbourne Water has reviewed capital expenditure increases in the context of discussions with the Minister around the magnitude of price increases. Melbourne Water has stated that it sought to develop its plan and manage capital expenditures within an environment of retail prices no more than doubling.

Prioritisation of expenditure involved consultation with the Minister for Water, the Department of Sustainability and Environment (DSE), the Department of Treasury and Finance (DTF), the Department of the Premier and Cabinet, the Environment Protection Agency (EPA) and the retailers on implications of expenditure changes for business risk and capacity to deliver government, regulatory and customer requirements. As a result of these reviews, Melbourne Water removed a number of planned projects from its Water Plan.

Melbourne Water has a set of high level guidelines for the prioritisation of projects into its capital plan. Prioritisation is undertaken by Melbourne Water's leadership team and specifically nominated staff. The following figure outlines Melbourne Water's Corporate Prioritisation Guidelines.

Figure 4.4 Melbourne Water’s Corporate Prioritisation Guidelines



As noted above, the recent KPMG review recommended that Melbourne Water could improve its project prioritisation process.

We consider that implementation of this recommendation is key to ensuring greater transparency of decisions by Melbourne Water to include specific projects or programs of work within its capital plan, particularly given the significant proposed price increases in the Water Plan. We would expect the prioritisation process to assess projects and programs on the basis of demonstrated links between projects and the mitigation of specific business risks. In this way Melbourne Water will be better able to demonstrate the need to include specific projects within its capital program.

Program and Project Approvals

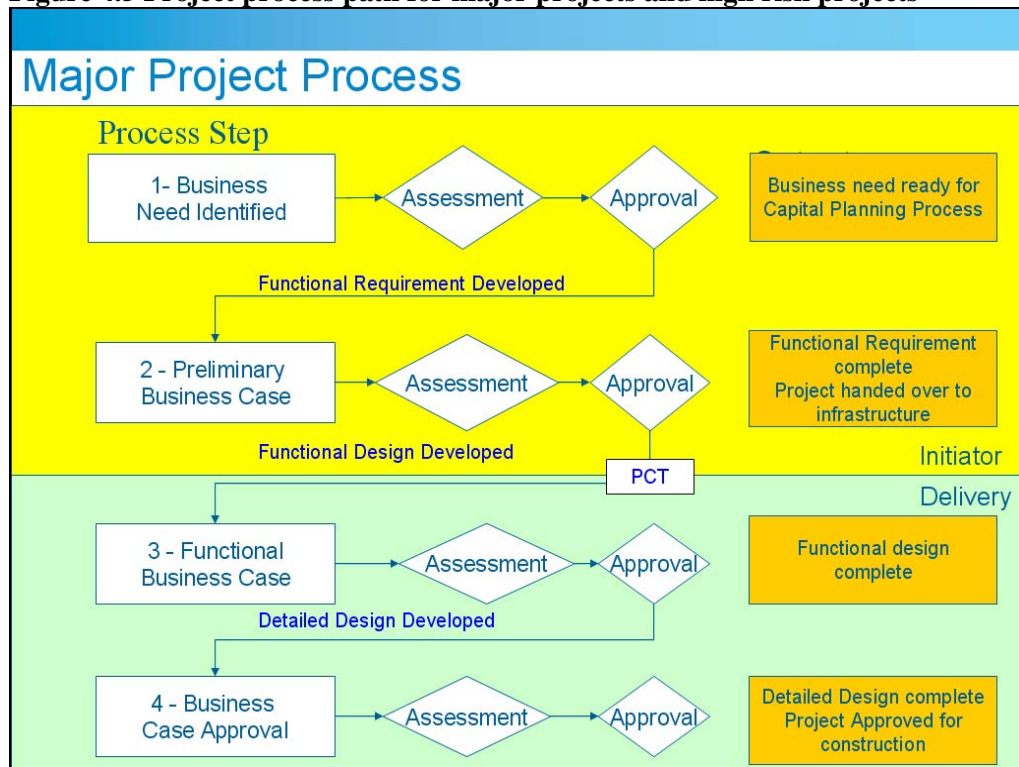
In order to better address the challenges associated with delivery of its expanded capital program in May 2007 Melbourne Water developed a new Capital Delivery Strategy. As part of this review, Melbourne Water also changed its Capital Management systems, processes and reporting requirements (in early 2008). These changes are reflected in Melbourne Water’s Capital Management Procedures, which cover each step of the capital planning and

delivery process from investigation, feasibility, functional design, detailed design, construction, commissioning to handover.

Under the Capital Management Procedures, projects are subject to a number of staged gate approvals. These are Business Need Identified (following investigation), Preliminary Business Case (following feasibility stage), Functional Business Case (following functional design stage) and Business Case Approval (following detailed design stage). This compares to the previous strategy, which only required three gates. The gateway review process is risk based, with lower risk projects being able to skip through certain gates. The criteria which distinguish between a major and low risk project are cultural heritage risk; reputation risk; environmental impact; design complexity; operational impact; and the cost of project.

The following figure provides an outline of the process to be followed for major projects and high risk projects

Figure 4.5 Project process path for major projects and high risk projects



Guidelines for the development of business cases have been developed in order to identify the key aspects of the projects that are to be considered within each business case. Approval of business cases is per Melbourne Water’s Delegations of Authority. For larger projects, project approval must also be obtained from the DTF and the DSE. Historically, the threshold for these approvals has been \$5 million although the State Government has recently advised that this threshold will increase to \$50 million.

Project Delivery

Project delivery encompasses progress reporting against key performance indicators, asset handover at commissioning of works and post implementation reviews to improve organisational learning. The activities within the construction phase of project delivery are identified within Melbourne Water’s Capital Management Procedures.

The construction phase of project delivery involves three separate components; construction; commissioning; and handover. During the construction phase the Project Manager is

responsible for developing and managing the construction strategy and plan, and documenting and reporting on construction status.

Project reporting is required to highlight to stakeholders how a project is performing. The Capital Management Procedures, which apply to Consultants, Alliance Partners, Service Providers and Project Managers, specify the type of information which is to be included within project reports, and the regularity of reporting.

Post Implementation reviews are undertaken to assess whether the original project objectives and benefits have been achieved. The reviews analyse reasons for variances in time, budget, scope and outcomes.

Conclusions

On the basis of our review we are generally satisfied that Melbourne Water's capital planning processes are robust and that the application of these processes is likely to lead to efficient outcomes. However, we note that there are still some areas where existing processes can be improved, specifically in relation to project prioritisation. Melbourne Water has indicated its intent to continue to implement improvements to its planning processes which should further improve the rigour of its capital planning framework.

4.1.5 Operations

Melbourne Water plans operational expenditure within the context of its Strategic Planning Framework discussed above. This framework translates into more detailed operating plans, relating to various internal planning documents that reference relevant Government strategies. The result is that within Melbourne Water's business structure, available resources and suitable timeframes are taken into account. The operational planning process also assesses the impact of capital projects to identify any new operational resources/variable cost impacts that may arise in future.

Operating plans provide the detail of how Melbourne Water will operate and the activities that will be undertaken to fulfil its strategic direction and outcomes according to the Strategic Framework. In the operational plans consideration is given to government policies or regulations, any related obligations required in Melbourne Water's Statement of Obligations included within the Water Plan, customer requirements and external environmental impacts.

Program Plans draw together the Operating Plans providing a summary of the key considerations of a strategic nature, including also details of performance obligations, assessments of risk, long-term trends, lifecycle costs and prioritisation, and the rationale of program allocation applied.

The principal reference for operating expenditure planning is the Financial Operating Plan, which currently covers the 2009/10 to 2012/13 period of the Water Plan, detailing expenditure and revenue forecasts as reviewed by the Financial Management Investment Steering Committee (FMISC).

Melbourne Water's business units are responsible for their future operational expenditure requirements and are accountable through the budget and reporting process. Operational expenditure is tracked by the cost centre for each business unit and classified against individual projects or expenditure types as appropriate to monitor financial performance to the Financial Operating Plan.

In order to determine forecast operational expenditure, Melbourne Water analyses historical costs and trends to predict likely expenditure in future. This was evident in how the maintenance strategy and expenditure estimates were built up and supported. Another

example of the use of historical data in this way is the mechanical and electrical (M&E) renewals models, which are discussed in Chapter 7.

Where any particular project is deemed to relate to an asset, then costs incurred prior to functional design and including the post implementation review are considered as operating expenditure. Functional and detailed design project costs as well as the construction costs of new fixed assets are deemed to be capital expenditure. New fixed assets must cost more than \$500 and provide future economic benefit to Melbourne Water, where upon creation the asset is controlled by the business. With respect to asset maintenance, where repairs, maintenance and research and development (R&D) activities are carried out on fixed assets, this expenditure is classified as operating expenditure.

4.2 Service standards

4.2.1 Historical service standards

In the 2005 price determination, the ESC set service standards for each metropolitan and regional water business. The ESC approved 11 service standards for Melbourne Water, ranging from water pressure to sewerage spills and overflows to complaints to the Energy and Water Ombudsman (Victoria) (EWOV). Melbourne Water further proposed (and the ESC approved) one additional service standard.

Melbourne Water met or exceeded most of their target service standards, on average, over the first regulatory period. The targets that Melbourne Water did not meet (within a 5% threshold) were:

Table 4.2 Service standards not met (2005/06 to 2007/08)

Service standard	Target	Actual	Variance
Level of leakage (% of water supplied, arithmetic average of three years' results)	0.82	0.96	17% higher
Number of sewer spills due to system failure (over regulatory period)	0	1	n/a
Biosolids reuse at Eastern Treatment Plant (%)	100	0	100% lower
Biosolids reuse at Western Treatment Plant (%)	33	0	100% lower

Melbourne Water explained that when the leakage target was set, the volume of water lost from draining pipes when maintenance and renewals takes place was not factored in. It further explained that with a lower volume of water supplied, the volume of leakage is divided by a lower number (although a lower water supplied volume should in theory lead to a slightly lower leakage volume). Melbourne Water noted the biosolids reuse target was based on Melbourne Water's 2002 biosolids beneficial use strategy which subsequently encountered problems upon implementation.

Many targets for Melbourne Water require 100% compliance and are therefore difficult to exceed. One indicator where Melbourne Water performed much than target was odour complaints from the transfer system, which had a target of 45 complaints over the regulatory period and Melbourne Water recorded 37 complaints.

4.2.2 Proposed service standards

Melbourne Water has proposed a set of service standards (including a number of new service standards) that seek to maintain or slightly improve Melbourne Water's current performance.

If Melbourne Water is maintaining service delivery performance, all other things being equal, there should be a relatively stable cost of service provision. Whilst it is difficult to establish an exact relationship between cost and service standards, we note that Melbourne Water's maintenance expenditure forecasts are higher than what has been spent in the current regulatory period. Chapters 5 to 7 discuss these increases.

5 Generic issues

5.1 Overview

This section discusses the engagement team's approach to analysing certain issues which are generic across each of the businesses and in several cases apply to both operating and capital expenditure. These include:

- general cost escalation factors
- labour cost increases
- productivity and other cost savings
- gainshare/painshare arrangements and other outcomes of alliance contracts.

5.1.1 Proposed price rises

A substantial augmentation program has been proposed, and indeed is underway, in order to increase the amount of water available to Melbourne customers. The augmentation projects, when combined with ongoing expenditure proposed by the businesses, will result in a dramatic increase in expenditure over the forthcoming regulatory period. The four metropolitan businesses' Water Plan forecasts were for total expenditure of \$10.8 billion (\$7.6 billion excluding bulk water charges) over the regulatory period 2009/10 to 2012/13, including \$4.3 billion of capital expenditure. Across the industry this represents a 64% annual real increase in operating expenditure (including projected toll payments for the desalination plant) and a 35% increase in capital expenditure over base year (2007/08) expenditure.

This increase in expenditure, when combined with reduced water use, results in a substantial increase in proposed water prices. Under the businesses' proposals, prices will increase by almost 100% in real terms over the five year period. Given this increase, in its issues paper the ESC has noted that, in addition to its usual examination of whether proposed expenditures is efficient and prudent, it will also consider:²

- whether the proposed profile of capital expenditure should be smoothed to occur more evenly over the period, instead of being concentrated at the beginning of the period
- whether some expenditure could be deferred into the following regulatory period
- whether businesses have the capacity to deliver the proposed large capital program during the short timeframe proposed in their Water Plans
- stakeholders views on the trade-offs between reducing the proposed price increases and meeting environmental, drinking water quality and service reliability objectives.

It is not the role of this consultancy to directly address the issue of proposed price increases. However, given the ESC's comments, in reviewing the businesses' proposals we have been cognisant of the magnitude of the price rises proposed and therefore the importance of ensuring that that discretionary expenditure is minimised or reduced entirely.

² ESC 2009, Melbourne Metropolitan Water Review 2008-09 Water Plans – Issues Paper, December, pp 6-7.

5.1.2 The current economic climate

This review is taking place at a time of significant economic uncertainty. For the vast majority of the current regulatory period, the Australian and Victorian economies have been in a phase of strong growth. Economic conditions have been characterised by:

- a falling unemployment rate, which was around 4.25% for the majority of 2008
- strong growth in real wages, particularly in professions impacted by the ‘mining boom’. This includes engineering and other technical skills engaged in infrastructure industries such as the water sector
- a relatively strong Australian dollar which almost reached parity with the US dollar in mid 2008
- increasing commodity prices, particularly in late 2007 and early 2008
- increasing oil prices, which had flow-on effects to oil by-products such as certain chemicals and plastics products
- steadily increasing domestic inflation and nominal interest rates.

We note that the ESC’s decision in relation to gas distribution prices, released in March 2008, took the view that continuing real increase in wages in the utilities industries were likely, and that non-labour cost inputs were also likely to rise.

However, there has been a significant change in the global and domestic economic outlook since mid 2008. Widely attributed to failures in the US banking system, short to medium term economic conditions will be significantly different to those in previous years.

Economic conditions are likely to reflect:

- reducing employment and increasing unemployment
- substantially lower private sector capital investment, particularly in resource industries, although this may be partly offset by higher levels of Federal and State Government investment in capital infrastructure
- a weaker Australian dollar against most currencies
- substantially lower commodity prices, including oil prices
- lower interest rates and inflation
- relatively volatile property and housing prices, with significant falls in some areas.

In our draft report we noted that although economic growth had slowed some economic indicators had not yet moved. However, since our draft report more recent data shows that:

- full time employment is falling sharply. The Australian unemployment rate has now risen to 5.2%, with Victoria’s unemployment rate well above the average at 5.6%
- gross domestic product fell 0.5% in the December quarter – the first quarterly decline since 2000/01.

This data was released after the most recent economic forecasts released by the Australian Government³ and the RBA⁴. The Government’s forecast of key economic parameters is presented in Table 5.1 below.

³ Commonwealth of Australia, *Updated economic and fiscal outlook*, February 2009

⁴ Reserve Bank of Australia, *Statement on Monetary Policy*, 6 February 2009

The Reserve Bank's forecasts are similar to the Government's. In its forecast of upcoming economic conditions the Reserve Bank noted that:

- business investment is expected to fall throughout most of the forecast period, with falls in commodity prices and resource company share prices resulting in a substantial scaling-back of mining-related investment. Non-residential building is also forecast to contract significantly
- wage growth is likely to slow in line with conditions in the labour market.

Table 5.1 Key Economic Parameters⁵

Parameter (year average percentage change)	2008/09	2009/10	2010/11	2011/12
Real GDP	1.0	0.75	3.0	3.0
Employment	1.0	-0.75	1.25	1.25
Wage Price Index	4.0	3.5	4.0	4.0
CPI	2.0	2.0	2.5	2.5
Nominal GDP	6.75	0.0	5.25	5.25

The Government has forecast that unemployment will reach 7% by June 2010.

It is also worth noting that a clear feature of the current economic downturn has been that forecasts of economic activity have consistently proved overly optimistic. This includes both forecasts by government as well as independent commentators.

Noting the above, two things are clear. Firstly, economic conditions experienced in the current regulatory period will not provide a good guide to economic conditions over the future regulatory period. Secondly, forecasts of certain input prices which were prepared in early to mid 2008 are unlikely to reflect current market conditions. In particular, impacts of the downturn are likely to include (compared to a 2007/08) baseline:

- equal or lower cost of materials such as steel, plastics-based pipes and chemicals
- equal or lower unit capital expenditure costs due to less competition from other large infrastructure projects, not only in the mining sector but in construction more generally
- equal or lower fuel costs
- reduced pressure on wages.

Finally, we encourage the ESC to closely monitor the changing economic circumstances and take them into account in its decisions.

5.2 General cost escalation factors

5.2.1 General cost escalation factors

Aggregate operating and capital expenditure forecasts are a function of both the level of activity required in the forecast period, plus the forecast change in price of the individual cost inputs.

Individual price changes will differ across cost items. While some cost items will generally follow price levels in the economy (as measured by the CPI) others will be above or below

⁵ Commonwealth of Australia, *Updated economic and fiscal outlook*, February 2009, p. 7.
Deloitte: Melbourne Water Expenditure Review

CPI. Depending on the nature of the industry in question, cost escalation for a large proportion of input costs may differ markedly from the CPI.

5.2.2 Capital expenditure escalation

The Econtech report

The businesses engaged economic consultants Econtech (now KPMG Econtech) to prepare a report that provided forecast increases for capital project prices. This report, finalised in July 2008, included forecasts for changes in water distribution, reticulation, sewerage transfer and treatment costs, as well as information on other economic indicators such as CPI, average earnings, etc. Each of the businesses has applied the data contained in the Econtech report to their forecasts in different ways. Econtech's main forecasts are included below:

Table 5.2 Econtech forecast capital project prices 2008 to 2014

Index	Annual price increase (nominal)
Water distribution	5.7%
Reticulation	4.2%
Sewerage transfer	3.2%
Treatment	2.8%
CPI (Australia)	2.6%

Melbourne Water forecasts

Melbourne Water has implemented two different approaches to estimating capital escalation over the next regulatory period. Forecast expenditure on major projects has been estimated based on a risk adjusted basis, which takes into account a number of factors, including potential input prices. Melbourne Water has confirmed that its forecasts for major projects, which account for 42% of capital expenditure in the next regulatory period, in some manner include assumptions of cost escalation above CPI.

For other capital expenditure, Melbourne Water has decided not to include any cost escalation above CPI in its forecasts, in order to limit the increases in water prices.

The question to be considered when assessing Melbourne Water's capital expenditure forecast isn't just whether an increase above CPI is appropriate (as is evidently included in the major projects), but if an increase of CPI is even appropriate given recent events in the financial sector.

Discussion

It is clear that many of the assumptions and forecasts contained in the Econtech report are not appropriate. This is not to question the veracity, integrity or methodology underlying the Econtech report. It simply reflects the fact that the sudden (and generally unanticipated) change in economic conditions since the report was prepared means that it has been overtaken by events and is not longer relevant.

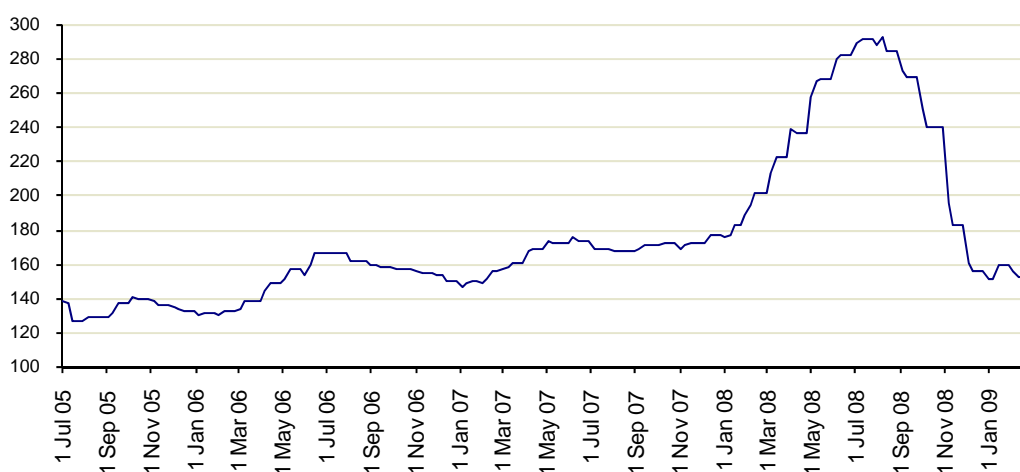
For example, a key assumption inherent in Econtech's report is a "sustained increase" in oil and steel prices, which are key inputs to water infrastructure. When the report was finalised in July 2008, this was a reasonable assumption, as both commodities had indeed experienced sustained increases for some time.

Since the Econtech report was finalised, however, there has been significant turmoil in global equity, credit and commodity markets. Section 6.2.3 of this report details the recent

(i.e. post-July 2008) falls in global crude oil prices, which decreased by 53% in real AUD terms between July 2008 and March 2009. Further, futures contracts for delivery in oil up to June 2013 are settling for around US\$50-65, which is less than AUD oil prices in July 2008.

Gauging the price of steel is a more difficult matter, because there are multiple steel products and markets throughout the world. One firm that does calculate a weighed steel price index is the CRU Group, which publishes its CRUspi index comprised of six carbon steel indices, together with indices for stainless steel and metallics. The below chart shows how the CRUspi global steel index has moved since July 2005 and shows a clear decline towards the present day.

Figure 5.1 CRUspi global steel prices index 1 July 2005 to 1 January 2009



Since July 2008, the CRUspi index has declined by 48%. This mirrors the widely recognised Reuters/Jeffries CRB (global commodities) index, which has dropped 49% since early July 2008.

Recommendations

It is clear that the Econtech assumption of a sustained increase in commodity prices, including steel and oil has not eventuated and indeed most commodities have experienced sharp falls in prices. Given steel and oil are key inputs to water infrastructure, it is also clear that any capital escalation above CPI is likely too high for the next regulatory period.

Determining what the revised capital escalation factor should be is a difficult exercise. Even back in 2005 when there was clear evidence of increases in construction costs, in its 2005 Determination for Sydney Water, IPART commented that:

“Having carefully considered the evidence available to it, the Tribunal believes that while there may be short-term variations in the rate of growth in the CPI and Total Non-dwelling Construction costs, both of these price indices are likely to follow general movements in the Australian economy as a whole. With this in mind the Tribunal does not consider that the recent higher rate of growth in Total Non-dwelling Construction costs represents a long-term trend which requires special consideration in the 2005 determination period.

This was reiterated in IPART’s 2008 draft Sydney Water price decision (confirmed in the final decision), where IPART concluded:

“... there are significant uncertainties in the global equity markets and credit markets that could have a negative impact on construction activity. Construction activity (and costs) could also be dampened by anticipated further increases in domestic interest rates, which would increase borrowing costs for businesses.

On balance, IPART has decided against Sydney Water’s proposal to inflate the future capital expenditure by the construction cost index and, instead, proposes that this expenditure be escalated by the CPI.”

Given current economic circumstances and the difficulties in forecasting a new construction index, we feel it is reasonable to adopt an assumption that on average water sector construction costs will increase by no more than the CPI. While there is arguably a strong case that increases in construction costs will be *lower* than CPI, a CPI-based increase reduces the risk that a below-CPI increase would provide to businesses. However, we will review this assumption in light of latest market evidence for the purposes of our final report.

Adopting CPI as the escalator in the next regulatory period also has the advantage of simplicity. If something other than CPI was used to inflate future prices, it would be necessary to identify escalators for different services and materials. Some may be forecast to rise relative to CPI, whereas others may fall relative to CPI. On balance, CPI is the best indicator to use, as it represents a bundle of goods and services and is easily accessible.

This approach is consistent with Melbourne Water’s forecasts for its non-major projects, however it is inconsistent with the forecasts for a number of major projects, which include rising input prices as part of the risk-adjusted estimate. The problem Melbourne Water’s approach poses, however, is that in general the probabilistic nature of the forecasts means it is not possible to isolate the impact of input price increases on the total risk-adjusted cost estimate.

Expenditure adjustment

Given the difficulties involved in adjusting the major project capital expenditure to account for lower input prices, we have not explicitly recommended any adjustment in this section. Melbourne Water’s major projects were analysed in detail as part of this review and on balance, it was more appropriate to make any adjustments at this detailed level. Melbourne Water’s major projects are discussed in detail in chapter 7.

Since Melbourne Water’s non-major projects did not provide for any escalation above CPI, no adjustment to Melbourne Water’s forecast is required.

5.2.3 Operating expenditure escalation

Melbourne Water has noted in its Water Plan (p.171) that:

“Contract rates for civil, mechanical and electrical maintenance are forecast to increase by more than the consumer price index (CPI), as reflected by anticipated movements in general construction escalation rates and labour rates included in Enterprise Bargaining Agreements for these industries.”

Melbourne Water subsequently advised that it had escalated maintenance costs to increase by 3% in nominal terms. In preparing its forecasts, Melbourne Water used an assumed inflation rate of 2.5%, meaning it has escalated maintenance costs by 0.5% per annum in real terms.

As discussed in Chapter 5, we understand that contract rates are stable or falling as a result of based on recent events in both the global and Australian economies. We therefore do not believe that it is reasonable to assume ongoing real increases in contractor maintenance costs across the regulatory period. Accordingly we have adjusted Melbourne Water’s forecasts downwards by 0.5% per annum, as shown in table 5.3.

Table 5.3 Recommended maintenance expenditure adjustment (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Maintenance forecast	Water Plan	31.20	31.80	32.50	33.60	34.70
	Revised forecast	31.04	31.48	32.02	32.94	33.85
	Net change	-0.16	-0.32	-0.48	-0.66	-0.85

5.3 Labour cost increases

5.3.1 Benchmark increases

Initial business proposals

In their Water Plans each of the businesses proposed increases above CPI for labour costs for the next regulatory period, with forecasts ranging from 1% to 2.5% per year. The businesses' escalations in labour costs were determined via a number of means, including on the basis of:

- consistency with their respective EBAs and assumptions about inflation
- independent forecasts of wage increases.

2008 price review for regional water businesses

In its price review which was concluded in June 2008, the ESC allowed for a 1.25% real annual increase in labour costs over the regulatory period. This rate was applied as a benchmark across all businesses.

Mercer and Econtech labour cost forecasts

One of the retailers indicated that it had relied on information provided by recognised human resource consultants Mercer Human Resource Consulting when determining its proposed real annual increase in labour costs.

In a 2006 report Mercer established forecasts for base salary and employment costs for a range of 'job families' extending to 2008/09, with base salary increases for construction and engineering professions increasing by 6.0% and 6.3% (in nominal terms) respectively in 2008/09.⁶

In February 2008 Mercer commissioned Econtech to model the size and structure of the Australian workplace in 2012 in terms of workforce, employment and occupations for its report – *Workplace 2012: What does it mean for employers?*

In its November update to its Workplace 2012 series, Mercer commissioned Econtech to provide updates of the demand for, and supply of, labour to account for events from February to October 2008.

Key points behind Econtech's labour cost growth forecasts include:

- unemployment was forecast to increase from a low of 4.0% in February 2008 to over 5.3% in 2009
- the shortage of skilled workers and wage pressure from a tight labour market are key drivers of labour costs

⁶ Mercer Human Resource Consulting (2006), *Quarterly Salary Review: Analysis of trends*, September 2006

- wages growth in the utilities sector is assumed to be higher than for all Australian industries, due to the higher concentration of skilled workers
- inflation was forecast to range from 2.5% in 2009/10 to 3.0% in 2012/13.

One of the key drivers of labour costs identified in the Econtech report was the pressure on wages (and wages of skilled labour in particular) arising from a tight labour market driven by the commodities boom.

Heavy investment by the mining industry was projected to continue, placing further pressure on demand for skilled workers in the engineering and construction sectors. The utilities industry, being forced to compete with the mining and construction industries for skilled labour would also be subject to the skills shortage and upward pressure on wages.

Draft report

In our draft report, we concluded that recent developments including falling commodities prices, strongly reducing private sector investment and a strong likelihood of rising unemployment were likely to reduce pressure on wages for the next regulatory period in all industries, including the water industry.

While strong investment is likely to continue in the water sector, in the context of recent developments and current wage price data, the draft report proposed a real increase in wages of 1% above CPI per annum to be a reasonable assumption for the next regulatory period noting that we would review this assumption in light of the RBA's February 2009 Statement on Monetary Policy.

Revised business proposals

Following the release of our draft report, the businesses provided revised proposals based on advice received from the Victorian Government in relation to the wage price index and CPI. The advice provided by the Victorian Government was based the forecasts and projections of key economic parameters used by the Commonwealth in its *Updated Economic and Fiscal Outlook* (UEFO), and is set out in Table 5.4 below.

Each of the businesses are now forecasting real wage increases of 1.5% per annum. This is the same escalation originally proposed by Melbourne Water in its Water Plan. The businesses have noted this is consistent with their expectations that their enterprise bargaining agreements (EBA) will be negotiated to allow for a 4% per annum nominal increase in wages over the period.

Table 5.4 Commonwealth forecasts and projections of key economic parameters

Parameter (year average percentage change)	2008/09	2009/10	2010/11	2011/12
Real GDP	1.0	0.75	3.0	3.0
Employment	1.0	-0.75	1.25	1.25
Wage Price Index	4.0	3.5	4.0	4.0
CPI	2.0	2.0	2.5	2.5
Nominal GDP	6.75	0.0	5.25	5.25

Note: all parameters are year average percentage changes, except CPI which is through the year growth to June quarter. Source: Commonwealth of Australia, *Updated Economic and Fiscal Outlook*, February 2009

Key points in the Commonwealth's domestic economy forecasts include:

- more substantial falls in commodity prices are now expected than originally forecast in the *Mid-Year Economic and Fiscal Outlook 2008-09* (MYEFO)
- tight credit conditions leading to reduced investment, with a number of projects being cancelled or deferred
- unemployment is expected to increase to 5.5% by June 2009 and reach 7% by June 2010.⁷

It should also be noted that these figures also take into account the Commonwealth's fiscal stimulus package for 2008/09 and 2009/10.

Recent developments

Similarly to the UEFO, the RBA's 6 February 2009 Statement on Monetary Policy observed weakening domestic economic conditions characterised by reductions in capital expenditure forecasts (particularly in the mining sector) as a result of the global financial crisis and tighter credit conditions.

While CPI was 3.7% to the year ended December 2008, it is expected to decline in coming quarters, with medium term expectations consistent with the Commonwealth's forecasts.

In relation to labour, the RBA noted that while employment grew by 0.2% in the December quarter (1.6% higher over the year to December), full-time employment was estimated to have fallen. Further softening of labour market conditions is expected in early 2009 with labour surveys pointing to weaker demand for labour and higher unemployment in the next year.⁸

Labour figures released by the Australian Bureau of Statistics (ABS) on 12 March 2009 were worse than generally expected, with national unemployment at 5.2% and Victorian unemployment at 5.6%.⁹

As noted above, the Commonwealth has estimated that unemployment will rise to 7% by June 2010. However, recent predictions of Victorian unemployment by economists surveyed by *The Age* range from 7%, to as high as 7-10% (National Institute of Economic and Industry Research) and 12% (Institute of Public Affairs).¹⁰

Conclusion and recommendation

In our view, the 1.5% real growth in wages may be slightly on the high side given current economic conditions. Nevertheless, we consider that the guidance provided by the Victorian Government (on the basis of the Commonwealth's UEFO) provides the clearest indicator for the businesses in relation to forecasts of real wages growth. Therefore we have adopted a real increase in wages of 1.5% above CPI per annum for the regulatory period.¹¹

While we believe that this provides a reasonable basis for real wage increases over the period, taking into account a projected recovery in the domestic economy from 2010/11, we

⁷ Commonwealth of Australia (2009), *Updated Economic and Fiscal Outlook – February 2009*

⁸ Reserve Bank of Australia (2009), *Statement on Monetary Policy*, 6 February 2009

⁹ Australian Bureau of Statistics, 6202.0 - Labour Force, Australia, Feb 2009

¹⁰ Bachelard, M. (2009), "How will Victoria's economy fare?", *The Age*, 15 March 2009

¹¹ We note that on 27 March 2009 the Treasurer of Victoria issued a press release stating that Victorian public sector wages growth would be limited to 2.5 per cent, a reduction from its existing policy of 3.25 per cent. It is not clear to us whether this restriction applies to wages for the water businesses' employees: while we have assumed this is not the case, the ESC may wish to clarify this with the Government. Further, the announcement adds weight to the view that a 1.5 per cent real wage increase is likely to represent the upper end of a reasonable range of increases.

note that on the basis of the current figures for inflation it may overstate real wage increases in the short term, which are likely to be close to zero. However, it may understate increases in the later years of the period if the Government's predictions of 4% wage price growth come to fruition.

5.4 Productivity Savings

5.4.1 The VCEC report

Background

In August 2007 the Victorian Government directed the Victorian Competition and Efficiency Commission (VCEC) to review of the Melbourne metropolitan retail water sector, with a view to recommending areas for improvement. In February 2008, VCEC released its final report *Water Ways: Inquiry into Reform of the Metropolitan Retail Water Sector*.

VCEC's final report included 21 recommendations for the government to consider, associated with structural and non-structural reform, future contestability (i.e. competition) and governance arrangements. The Government supported all but one of VCEC's recommendations, which related to setting a three year regulatory period. One key recommendation receiving government support related to the potential costs savings of 'shared services'. Specifically, VCEC's recommendation 4.1 called for:

“... (the development) and (implementation of) shared services and bulk procurement of materials. The Government should amend the water businesses' Statement of Obligations to establish a target level of future annual savings to be achieved of at least \$8 to \$10 million per annum and ensure that this is incorporated in their corporate plans.”¹²

VCEC recommended that the annual savings be achieved within six to 12 months after receiving government support. VCEC identified areas such as IT systems, coordinated procurement of capital projects and procurement of materials for minor capital works.

In its response to the VCEC recommendations, the Victorian Government supported recommendation 4.1 and indicated its intention to amend each business's Statement of Obligations (SoO) to “examine opportunities for shared services and co-ordinated procurement of common inputs, and implement such arrangements where it is assessed that they will yield material net savings in business costs.”¹³

It is unclear whether this is an explicit endorsement of VCEC's recommended cost savings or timeline, however it is understood from discussions with the businesses and the ESC that the government intends for the businesses to achieve productivity savings recommended by VCEC. On balance, therefore, we have assumed that businesses will achieve the mid-point of VCEC's recommended savings, that is, \$9 million per annum.

Proposed savings

Table 5.5 below outlines the savings that each business has included in their Water Plan submissions, less any implementation costs associated with VCEC recommendations.

¹² Victorian Competition and Efficiency Commission (2008), *Water Ways: Inquiry into Reform of the Metropolitan Retail Water Sector*, February 2008, p.xxxi

¹³ Victorian Government response to the VCEC inquiry, July 2008 p.7

Table 5.5 Proposed net shared services and bulk procurement savings (\$m, 2008/09)

Business	2008/09	2009/10	2010/11	2011/12	2012/13
City West Water	1.00	1.50	1.50	1.50	1.50
South East Water	0.00	0.00	0.50	1.50	2.00
Yarra Valley Water	0.00	0.00	0.50	1.50	2.00
Melbourne Water	0.00	0.00	0.00	2.75	2.75
Total	1.00	1.50	2.50	7.25	8.25

As can be seen from the above table, most businesses are not expecting to realise the majority of savings until the final year of the next regulatory period. Further, Yarra Valley Water and South East Water have included costs associated with the identification of the cost savings from shared services. These costs amount to \$0.5 million for each business in each of the first two years, and relate to costs such as becoming a statutory authority, moving from single contracts into joint contracts and consulting fees.

Melbourne Water has advised that it will incur costs, however it is not seeking to pass these through to customers. City West Water is also not claiming any costs associated with identifying the savings to be implemented. These two businesses, therefore, have forecast relatively higher net productivity savings than South East Water and Yarra Valley Water. City West Water and Melbourne Water's approach appears to be the most sensible to take – the savings resulting from shared services should be thought of as being *net* of any costs required to identify them.

Analysis of businesses' proposals

Although the government has not been specific on when it expects businesses to begin realising savings from shared services, it did support VCEC's recommendation 4.1 which called for the savings to be implemented within six to 12 months after the government endorsed the savings. It could therefore be argued that this is the timeframe the government has in mind.

All businesses believed the cost savings would be difficult, if not impossible to achieve in the next regulatory period. It should be noted, however, that VCEC's independent view was that the savings could be achieved and this was a better outcome than merging the businesses into one. The Victorian Government as shareholder supported this recommendation.

In addition to the quantum of savings, Melbourne Water also argued that its share of the expected savings should be relatively lower than the retailers. Melbourne Water argues that, given its size, it is already achieving large economies of scale and the retailers are better placed to gain advantages in this area.

We are of the view that Melbourne Water's arguments have some merit. It is likely that Melbourne Water is already achieving significant economies of scale and for some of the areas identified by VCEC, such as customer information and billing systems, the benefits would likely accrue mainly to the retailers. On the other hand, even if Melbourne Water was expected to match the retailers' savings (\$4.5 million assuming \$9 million in total), this would represent 1.6% of its business as usual operating expenditure over the period. The remaining \$4.5 million, shared amongst the retailers, would equate to 1.4% of their collective controllable operating expenditure.

Irrespective of the allocation, all businesses are of the view that there is little to be gained in the area of IT systems such as billing and collections nor in the adoption of consolidated call centres. Further, documentation provided by the retailers shows a number of contracts not

expiring until later in the regulatory period, reducing the ability to move to ‘bulk procurement’ options.

Progress to date

To date, the businesses have not realised any productivity savings from shared services. The businesses have convened a working group to identify areas that could be the target of shared services or procured on a ‘bulk’ basis. The working group first met in November 2008 and has established a number of sub-groups to further detail the potential savings identified by the working group.

As part of their submissions on our draft expenditure report, South East Water and Yarra Valley Water provided an extract of the progress of the working group as at 11 February 2009. The working group was assessing opportunities across a range of services, including:

- electricity
- banking
- fuel
- vehicles
- IT and telecommunications
- insurance
- over the counter collections
- laboratory services,
- water tanker management
- meter purchasing
- meter reading
- media services.

Melbourne Water also noted that the working group had prepared a summary of potential ‘quick wins’ in the above areas and that the outcome of the review to date suggested that Melbourne Water’s proposed savings over the period were reasonable.

Recommendations

We have reviewed the additional information provided by Melbourne Water (and the other businesses), however it has not provided any robust argument for revisiting the savings included in our draft report. VCEC has identified the opportunity to realise efficiencies above and beyond what the businesses have been achieving and determined that the quantum of savings was between \$8 million to \$10 million across the industry.

We reiterate that the government has supported VCEC recommendation 4.1, which explicitly outlined both the quantum and timing of savings. We recognise that no savings have been so far realised, and in light of this fact and the businesses’ response to our draft report, we consider it reasonable to expect that the businesses aim to achieve the VCEC cost savings, in full, by the third year of the next regulatory period (2011/12). Given work is currently underway to identify savings, it is reasonable to assume that 50% of the identified savings will be achieved in 2009/10, with 75% in 2010/11.

It is once again worth noting that the VCEC cost savings have been endorsed by the businesses’ shareholder – the Victorian Government. Should the ESC approve revenue requirements that include these cost reductions, and the businesses be unable to meet them, it

is ultimately to the shareholder's detriment. It is unlikely that the adoption of the cost savings targets would result in the businesses facing financial distress and the nature of the savings are a one-off saving imposed on the businesses (i.e. savings are not cumulative).

In terms of allocating the \$9 million per annum between the businesses, in our draft report we were of the view that 60%, or \$5.4 million, should be allocated to the retailers, with the remaining 40% (\$3.6 million) allocated to Melbourne Water. This approach partly reflects Melbourne Water's position that many of the benefits of shared services are likely to accrue to the retailers, whilst recognising that, in terms of Melbourne Water's total operating expenditure, such a saving is not a significant burden.

In its response to the draft report Melbourne Water indicated that a 40% allocation was too high and that it should contribute no more than 25% to any target because:

- a number of the areas identified for saving are not applicable to Melbourne Water or are in areas where Melbourne Water has minimal expenditure
- Melbourne Water already has the lowest unit costs in many areas due to its scale and mature procurement processes.

We agree that Melbourne Water probably has less opportunity to make savings than the retailers. A 40% allocation to Melbourne Water already represents a relatively lower share (as a percentage of total controllable operating expenditure) than the retailers. While it is ultimately a matter of judgement, we believe that a 25% allocation (\$2.25 million) to Melbourne Water is too low as it would represent a non-compounding reduction in costs of only 1.2%. It would also require substantially greater reductions from the retailers if the overall targets are to be achieved. Although it is ultimately a matter of judgement, we consider that retaining the allocation as per our draft report is reasonable.

Based on Melbourne Water's forecast shared services savings and associated costs, the following adjustment is recommended.

Table 5.6 Overview of recommended changes to shared services and bulk procurement savings (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Net VCEC savings	Water Plan	0.00	0.00	0.00	2.75	2.75
	Revised forecast	0.00	1.80	2.70	3.60	3.60
	Net change	0.00	-1.80	-2.70	-0.85	-0.85

Note: net savings refer to savings from shared services less implementation costs

5.4.2 Other Productivity savings

In addition to the VCEC shared services savings, the ESC expects businesses to achieve a 1% per annum (growth adjusted) productivity improvement compared to the baseline (2007/08) operating expenditure. The productivity expectation is calculated by:

- determining the appropriate baseline operating expenditure, which should be net of non-controllable expenditure or any 'one offs' which are not expected to continue in the next regulatory period
- escalating the baseline operating expenditure a factor equivalent to the growth in customers or volumes
- reducing the resultant amount by a compounding 1%. That is, in the first year, the saving would be 1% of the growth adjusted baseline operating expenditure, in the second year, it would be the productivity saving from the first year, plus an additional 1% of the second year's growth adjusted operating expenditure, and so on.

Melbourne Water has argued that the baseline expenditure should exclude any ‘new obligations coming into effect from 1 July 2005 that were not included in the 2005 Water Plan’. It further suggests that volumes are an inappropriate factor to grow the baseline by, and has proposed a number of alternative growth factors depending on the expenditure.

Melbourne Water notes in its Water Plan (p.172) that since its business as usual operating expenditure only growing by an average of 1% per annum, once growth is taken into account it would more than meet the 1% productivity requirement. In our draft report we noted that, if the \$18.1 million ‘expense’ associated with defined superannuation benefit write downs is excluded from 2007/08 (see section 6.1.2), business as usual operating expenditure in the price review template increases by an average of 1.7% per annum (compounded) from 2007/08 to 2012/13, which is approximately the rate at which customers in Melbourne are growing. In our draft report we sought further information from Melbourne Water as to the calculation of its productivity improvement.

Melbourne Water provided a response in which it conceded that the superannuation write down, which actually totalled \$18.8 million,¹⁴ should be removed from the productivity calculation. However, Melbourne Water also highlighted an error in its Water Plan, in which water and sewerage expenditure in 2007/08 was \$6 million lower than it should have been due to an allocation mistake between those services and waterways and drainage.

Melbourne Water’s response then set out how its operating expenditure forecast demonstrate a productivity improvement. A key factor in Melbourne Water’s calculation is how it determines the growth adjusted operating expenditure target. Melbourne Water has used a combination of the growth in water/sewerage volumes and the growth in business as usual regulated assets. Melbourne Water noted that this approach was accepted by the ESC in the 2008 waterways price review. Melbourne Water’s approach results in an annual growth factor of 4.88%.

While certain elements of the calculation of the 4.88% reduction could be challenged, we are satisfied that Melbourne Water’s forecast more than meets the requirement for a 1% productivity saving.

5.5 Gainshare/painshare and alliance arrangements

5.5.1 Introduction

Each of the businesses, including Melbourne Water, have historically contracted out large amounts of their operations, maintenance and capital expenditure programs to third party service providers. These contracting arrangements have typically included paying agreed amounts for the delivery of capital works or for undertaking specific maintenance activities or programs.

In recent years the businesses have altered their relationship with third party service providers such that they reflect more of an ‘alliance’ arrangement. Alliance arrangements are an increasingly common procurement strategy. While they differ on a case-by-case basis, they typically involve the following features:

- long term agreements
- the business pays the alliance partner’s direct costs and overheads

¹⁴ The superannuation write down is mentioned twice in Melbourne Water’s Water Plan, with differing numbers, however Melbourne Water has confirmed \$18.8 million is correct.

- the business also pays the alliance partner an agreed percentage profit margin
- forecast costs for individual projects or programs are estimated up-front and agreed by both parties
- a sharing of cost ‘savings’ or ‘over-runs’ between the business and the alliance partner (often referred to as ‘gainshare’ or ‘painshare’ payments)
- an ‘open book’ level of transparency on costs and other operational matters
- there is a commitment on both parties to work together in a collaborative manner and to avoid contract disputation and cost variations.

Alliance contracts have the potential to lead to cost reductions. For example, a review of South East Water’s alliance agreement conducted by the Victorian Auditor-General in May 2008 found that:¹⁵

- South East Water was achieving ongoing savings of \$1.63 million annually as a result of the alliance
- South East Water was paying 6.4% less for operations and maintenance work than it would have had the schedule of rates from 2005 continued, and 6.5% less for a sample of capital works projects than it would have had the alliance not existed.

The Auditor General also found that the alliance has generated additional revenue for South East Water and introduced new technologies benefiting South East Water and the water industry more generally, including through low staff turnover.

However the Auditor-General also criticised South East Water’s arrangement and found that:

- there was a lack of rigour applied in choosing alliancing as the preferred procurement strategy. South East Water did not adequately assess its chosen alliance option against other options
- there were inadequacies in the alliance commercial framework including that the margin payable was higher than for the other metropolitan retailers and that the contract, including the margins, was not reviewable for 12 years.

From a regulatory viewpoint, alliance contract issues that typically need to be considered include:

- whether alliance contracts are the most cost effective approach to procurement
- ensuring that cost savings and efficiencies are appropriately passed back to customers not entirely retained by the alliance contractor
- identifying whether any gainshare or painshare payments to the alliance partner are built into base year (2007/08) expenditure and, if so, whether it is appropriate that these payments be carried forward into future year expenditure
- whether the process for establishing ‘forecast’ costs (which ultimately will determine whether gainshare or painshare payments are made) is appropriate
- whether the margins are consistent with market rates.

In price determinations conducted by the ESC in the gas and electricity industries the ESC has expressed strong concern about certain contracting and alliance arrangements - including margin payments and other fees - particularly where the contractor or alliance partner is a related party. In several cases the ESC has not considered that payments to related parties represent efficient expenditure.

¹⁵ Victorian Auditor-General 2008, *Review of South East Water’s Alliance Agreement*, May, p. 2.
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5.5.2 Melbourne Water's alliance arrangements

Melbourne Water has entered into an alliance arrangement with Transfield for the provision of mechanical and electrical services associated with maintenance and minor capital expenditure. The contract has been in place since 2004 although the terms of the contract in respect of gainshare/painshare payments changed from 1 June 2008. Under the current terms of the contract Transfield is paid:

- direct costs plus margins and overheads
- a painshare or gainshare amount. There are two mechanisms which trigger gainshare or painshare amounts:
 - financial performance gainshare or painshare. Where the actual outturn cost (AOC) of a project is less or greater than the target outturn cost (TOC – which includes direct costs, margins and contingencies.) then the savings or overruns are shared 50/50 between Melbourne Water and Transfield
 - KRA painshare or gainshare. This is triggered where KRA performance exceeds or fails to meet the minimum conditions of satisfaction. The gainshare payment to Transfield is capped by the size of the gainshare pool. Transfield's painshare is capped at the value of TSL's profit.

Transfield was paid \$█ in 2007/08 for its performance against key performance indicators, although as noted above the KRA/KPI regime has changed since this time and this payment was not based on the arrangements detailed above.

Should Transfield meet all its KRAs, it is possible that 80% of savings compared to target outturn costs will be retained by Transfield. Where Melbourne Water's actual costs are used by the ESC to determine future expenditure benchmarks, this means that benchmarks may be significantly higher than the actual cost incurred by Transfield in performing services. It also places prime importance on ensuring that target outturn costs are appropriately set.

5.5.3 Performance payments and forecasts

Melbourne Water's forecast expenditure for certain major projects include fees forecast to be paid to alliance partners and contractors for superior performance. This superior performance may take the form of lower costs, beating construction milestones, or performance in other areas.

While this is a matter for the ESC to determine, our view is that for regulatory purposes cost forecasts should not include such payments, and particularly should not assume that payments will be at the maximum level. To the extent that performance payments are actually made, it will generally be reasonable to include them in the RAB as it is likely that they will be offset by, say, lower project costs, improved productivity, or earlier project availability (which will provide benefits to customers).

However, if such payments are included in the forecasts, then Melbourne Water's revenue and customer prices will increase commensurately, yet there is no guarantee that payments will actually be made or that superior performance will be achieved.

Accordingly, where we have been able to identify such payments, we have removed them from the forecast. This matter is discussed further in Chapter 7.

6 Operating expenditure

6.1 Historical and forecast operating expenditure

6.1.1 Overview of outcomes compared to 2005 determination

In the 2005 determination, the ESC approved operating expenditure for Melbourne Water totalling \$563.1 million (in 2004 dollars) for the three years to 2007/08, which included operating expenditure for waterways and drainage. Melbourne Water's Water Plan reports that water, wastewater and recycled water (with an allocation from corporate) accounted for \$467.6 million, once converted into 2009 dollars which is further reduced by \$4.8 million once licence fees are excluded.

Over the same period, Melbourne Water has actually incurred \$475.9 million, however 2007/08 was the only year of the three in which actual operating expenditure exceeded forecast.

Table 6.1 Actual controllable expenditure and variance to 2005 determination (\$m, 2008/09)

Melbourne Water	2005/06	2006/07	2007/08	Total
2005 determination	153.8	153.5	155.5	462.8
Actual expenditure	142.1	153.1	180.7	475.9
Variance	-11.7	-0.4	25.2	13.1

Source: Melbourne Water regulatory accounts (2005/06 and 2006/07) and price review template (2007/08). Note: 2007/08 actual operating expenditure has been revised downwards by \$18.8 million to remove expenditure related to a write down of Melbourne Water's defined benefits fund and increased by \$6.0 million to reflect a cost allocation error identified by Melbourne Water.

6.1.2 Overview of forecast

Melbourne Water has forecast that its operating expenditure will increase significantly over the regulatory period and more than treble in real terms from \$183 million in 2007/08 to \$639 million in by 2012/13. A substantial proportion of the forecast increase is due to operating expenditure associated with the desalination plant, which is due to be operational from 2011/12. Aggregate forecasts are provided in table 6.2:

Table 6.2 Melbourne Water operating expenditure forecast 2007/08 to 2012/13 (\$m, 2008/09)

Melbourne Water	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Water	94.67	90.96	88.70	89.31	89.92	90.13
Wastewater	78.56	85.37	89.75	92.57	91.50	92.81
Recycled water	7.45	9.04	8.87	8.49	8.21	8.16
Controllable expenditure	180.68	185.37	187.33	190.37	189.64	191.11
Major projects		11.91	17.13	27.46	235.17	445.73
Licence fees	2.18	1.78	1.62	1.62	1.62	1.88
Total	182.86	199.06	206.08	219.46	426.43	638.72

Source: Melbourne Water price review template. Note: 2007/08 operating expenditure has been revised downwards by \$18.8 million (\$9.2 million each from water and waste water, and \$0.4 million from recycled water) to remove expenditure related to a write down of Melbourne Water's defined benefits fund. In addition we have increased 2007/08 operating expenditure by \$6 million (\$3 million each to water and waste water) to reflect a cost allocation error identified by Melbourne Water.

Tables 6.3 and 6.4 below summarises Melbourne Water's forecast controllable operating costs from 2007/08 to 2012/13 for water and wastewater (recycled water expenditure is around \$8-\$9 million per annum over the period). Controllable costs are forecast to fall across the period by 5% for water and rise 16% for wastewater.

As noted under table 6.2 (above) Melbourne Water has included \$18.8 million in the baseline 2007/08 operating expenditure for a write down in its superannuation asset. This \$18.8 million therefore needs to be removed from 2007/08 controllable operating expenditure in order to appropriately compare the forecast to the baseline. In accordance with advice received from Melbourne Water, we have removed \$9.2 million each from water and wastewater, with the remaining \$0.4 million being attributable to recycled water. In addition, Melbourne Water has advised that it had incorrectly allocated \$6 million in corporate expenditure savings to water and waste water instead of to waterways and drainage. Consequently, we have added this expenditure back in (\$3 million each to water and waste water) as shown in tables 6.3 and 6.4 below.

Table 6.3 Forecast controllable operating expenditure – water (\$m, 2008/09)

Melbourne Water	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Operations and maintenance	52.90	48.28	50.11	51.61	54.70	55.07
Treatment	24.53	25.74	22.99	22.73	22.72	22.96
Corporate	23.44	16.94	15.60	14.97	12.49	12.11
Total water	100.87	90.96	88.70	89.31	89.92	90.13
Remove write down in superannuation	-9.20					
Add back corporate saving	3.00					
Revised water	94.67					
Gross increase over 2007/08		-3.71	-5.97	-5.36	-4.75	-4.54
Gross increase over 2007/08 (%)		-4%	-6%	-5%	-5%	-5%

Source: Melbourne Water price review template

The increase in wastewater expenditure is largely attributable to treatment costs, which are increasing due to higher energy usage associated with new projects including greater volumes through the Winneke treatment plant (from commissioning the Sugarloaf pipeline) and the Eastern Treatment Plant tertiary upgrade.

Table 6.4 Forecast controllable operating expenditure – wastewater (\$m, 2008/09)

Melbourne Water	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Operations and maintenance	17.80	19.60	21.26	21.24	21.03	19.37
Treatment	47.26	51.87	55.05	58.18	59.80	62.84
Corporate	19.70	13.89	13.44	13.15	10.68	10.60
Total wastewater	84.76	85.37	89.75	92.57	91.50	92.81
Remove write down in superannuation	-9.20					
Add back corporate saving	3.00					
Revised wastewater	78.56					
Gross increase over 2007/08		6.81	11.19	14.01	12.94	14.25
Increase over 2007/08 (%)		8%	13%	16%	14%	16%

Source: Melbourne Water price review template

6.2 Key expenditure items reviewed

6.2.1 Labour

Increases in unit labour costs

In its Water Plan, Melbourne Water indicated that labour costs are expected to increase by 1.5% per annum in real terms, which it notes is broadly in line with its EBA.¹⁶

Melbourne Water has advised that its current EBA provides for a 4% per annum nominal salary increase, the attainment of which is dependent on some corporate efficiency targets. In the context of Melbourne Water's inflation assumption of 2.5% per annum, this translates to a 1.5% per annum increase in real terms.¹⁷

Melbourne Water's proposed increase in unit labour costs is in accordance with our views and recommendations on labour cost increases as set out in section 5.3.

Melbourne Water's assumptions for forecast operating expenditure are set out in table 6.5, and correspond to the movements in FTEs as set out below.

Table 6.5 Ordinary labour operating expenditure (including overtime) (\$m, 2008/09)

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Base year expenditure	42.46					
Increase		-0.49	0.38	-0.02	0.65	1.06
Total	42.46	41.96	42.84	42.43	43.10	43.52
Increase over 2007/08 (%)		-2.2%	1.7%	-0.1%	2.9%	4.7%

Source: Melbourne Water price review template

Cost per full time employee

Melbourne Water's proposed cost per FTE of \$104,000 in 2007/08 is higher than proposed by the other businesses, which range from \$76,000 per FTE to \$88,600 per FTE. This does not appear unreasonable given that, unlike the retailers, Melbourne Water does not have a large number of staff undertaking transactional activities such as customer service.

Melbourne Water is also forecasting a sharp drop in cost per FTE from 2007/08 to \$99,000 in 2008/09, before returning to \$104,000 per FTE in 2012/13.

Melbourne Water has advised that its actual labour costs for 2007/08 were high due to redundancy payments resulting from operational efficiencies, WorkCover claims arising from industrial accidents, and offering more competitive salaries to attract staff in the skills shortage.

In our draft report, we suggested that Melbourne Water's proposed costs per FTE in 2008/09 of \$99,000 provide a more appropriate starting base for the application of the real increase in labour costs, as these costs appeared to be a more accurate reflection of normal operating costs.

In response to the draft report, Melbourne Water advised that actual 2007/08 costs were an appropriate base year for applying unit cost increases because:

- guidance from the ESC indicates that actual 2007/08 expenditure provides a more appropriate basis for comparison and trend analysis than forecast expenditure

¹⁶ Water Plan, p.75

¹⁷ Note that Melbourne Water adopted an assumption for CPI inflation of 2.5% over the regulatory period, while the metropolitan retail businesses have assumed CPI of 2.9%.

- using 2008/09 forecast expenditure as a base is inconsistent with the approach adopted for other cost categories and the other businesses
- redundancies and WorkCover claim expenses were incurred in the normal course of business and therefore should be included in base expenditure.

We agree that using 2008/09 forecast expenditure as a base from which to apply increases in unit labour costs is not consistent with the approach used for forecasting other cost categories. However, it is clear that 2007/08 is not representative of a 'normal' years labour costs. Using 2007/08 as a base and then escalating would result in labour costs far in excess of Melbourne Water's own forecasts. We do not consider that including a provision for, for example, Workcover expenditure represents prudent or efficient forecasting.

Therefore, we consider that the draft report approach of applying a 1.5% per annum real increase to 2008/09 per FTE costs remains appropriate.

Table 6.6 sets out Melbourne Water's proposed costs per FTE, and our revised forecast based on a 1.5% per annum real increase from 2008/09 levels.

Table 6.6 Melbourne Water increase in cost per FTE (\$000, 2008/09)

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Proposed	104.2	98.6	100.4	102.2	103.0	104.1
Increase p.a.		-5.4%	1.8%	1.8%	0.8%	1.1%
Revised	104.2	98.6	100.0	101.5	103.1	104.6
Increase p.a.		-5.4%	1.5%	1.5%	1.5%	1.5%

Source: Melbourne Water price review template

Changes in employee numbers

Melbourne Water is proposing to add an additional 10.4 FTEs to its labour force over the next regulatory period, with minor increases and decreases following an increase of 18.3 in 2008/09.

Table 6.7 Melbourne Water increase in staff numbers (FTEs)

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Base year	407.4					
Increase in FTEs over 2007/08		18.3	19.3	7.7	11.1	10.4
Total	407.4	425.8	426.8	415.2	418.5	417.9

Source: Melbourne Water price review template

Melbourne Water has advised that the majority of additional FTEs forecast are being added to the sewerage services area of the business, as a number of additions in FTEs were made to the water services area of the business in the last regulatory period to position the business to deliver the major water augmentation projects.

Melbourne Water's proposed additional FTEs appear reasonable in the context of its base 2007/08 FTE numbers and expenditure program.

Recommendation

As noted in section 5.3, we consider 1.5% per annum in real terms a reasonable allowance for increases in labour costs over the next regulatory period. Our revised forecast based on this benchmark has been determined by:

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- increasing Melbourne Water's forecast 2008/09 cost per FTE by 1.5% per annum to obtain a baseline cost per FTE for each year of the regulatory period (as set out above)
- multiplying the base cost per FTE in each year by Melbourne Water's forecast number of FTEs for that year.

Table 6.8 sets out Melbourne Water's original proposal in relation to operating expenditure for labour, a revised forecast based on our recommendations outlined above, and the net change to Melbourne Water's revenue requirement. We have recommended relatively minor cost changes.

Table 6.8 – Overview of recommended changes to labour operating expenditure (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Labour costs	Water Plan	41.96	42.84	42.43	43.10	43.52
	Revised forecast	41.96	42.69	42.16	43.13	43.71
	Net change	0.00	-0.15	-0.28	0.03	0.19

6.2.2 Chemical costs

In its Water Plan, Melbourne Water has forecast an increase in chemical costs over the course of the next regulatory period from \$4.4 million in 2007/08 to \$7.1 million in 2012/13, an increase of 62%. In Table 6.1 of the Water Plan, Melbourne Water suggests the increase in expenditure on chemicals is due to the fact that 'more chemicals are required due to increasing water and sewage volumes'.

We note that water related chemical costs in the Water Plan are forecast to increase by 37%, from \$3.4 million in 2007/08 to 46% in 2012/13. However, over this same period, the annual demand forecast is only expected to increase by 5.5%. During the review, Melbourne Water subsequently identified the following drivers for the increase in chemical costs:

- increased usage of alum sulphate and hydrated lime at the Winneke Treatment Plant due to increased flows from the Sugarloaf Pipeline
- new use of polyelectrolyte chemicals required for sludge augmentation works at the Eastern Treatment Plant
- a mix of a number of different chemicals required for the Eastern Treatment Plant tertiary upgrade.

Melbourne Water indicated that it only assumed CPI increases for chemical prices.

Following submission of our draft report, Melbourne Water has updated its forecast of expenditure on chemicals for the water service. It indicated that the revised forecast is based on its annual operating plan and its demand forecast, which have both been updated in the time since submission of its Water Plan. The following table shows the chemical expenditure forecasts as reported in the plan, together with the revised forecasts.

Table 6.9 Expenditure on chemicals - water and wastewater (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Expenditure on chemicals	Water Plan	5.55	5.95	6.15	6.34	7.01
	Water Plan (including original Sugarloaf pipeline volumes) ¹	5.55	6.69	7.96	8.15	8.82
	MW Revised Forecast	5.55	7.06	7.38	7.35	8.02
	Net change²	0	0.37	-0.58	-0.80	-0.80

Note: (1) Expenditure includes \$6.2 million on chemicals at Winneke Treatment Plant for Sugarloaf pipeline volumes which were previously reported against Sugarloaf pipeline costs instead of chemicals costs. (2) Change is measured as MW revised forecast less Water Plan (including Sugarloaf pipeline).

The latest Melbourne Water forecast assumes that 159GL less water will be treated over the Water Plan period than that assumed in the Water Plan estimate. The changed volumes reflect changes to the operation of the system, as well as reduced flows from Sugarloaf pipeline. While there has been a net decrease in costs, this includes increases and decreases in costs at particular sites. For example, under Melbourne Water's revised operating plan, Winneke Treatment plant will treat more water from the Yarra than originally planned, but will treat less water from the Sugarloaf pipeline. Silvan Treatment Plant will treat more water than forecast in the Water Plan.

Despite the changes to the volume of water treated, Melbourne Water has not revised its forecast for the wastewater service. Although expenditure on chemicals for wastewater treatment is primarily driven by load rather than flow, we would expect some change (reduction) in expenditure on chemicals. While Melbourne Water has provided some breakdown of its chemicals expenditure for the wastewater service, the information provided is not sufficiently detailed to enable assessment of what the revised chemical costs might be.

While Melbourne Water has assumed CPI increases for most chemical prices, for fluoridation materials it has assumed increases significantly greater than CPI. The forecast assumes that the price of fluoridation materials will increase by approximately 53%, from 2010/11, and then increase again (by approximately 10%) in 2012/13. Fluoridation materials account for over \$5 million in expenditure over the Water Plan period. Melbourne Water indicated that the increase in price reflects current contract renegotiations with the supplier in question. It indicated that there is only one supplier in the market selling the required fluoridation materials, and that market demand is currently increasing. A brief review suggests that Melbourne Water's position is reasonable.

In forecasting expenditure on chemicals at Tarago Treatment Plant, Melbourne Water has assumed that 5.5GL will be treated in 2008/09, increasing to 15GL/annum for the remainder of the Water Plan period. We understand from the ESC that the flow is more likely to be zero in 2008/09, 20GL in 2009/10, falling to 8GL/annum from 2010/11. The following table shows our calculations of the impact of the reduced Tarago flow on the operating expenditure.

Table 6.10 – Recommended changes to operating expenditure for chemicals at Tarago Treatment Plant (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Tarago Treatment Plant	Water Plan	0.10	0.30	0.30	0.30	0.30
	MW Revised Forecast	0.12	0.45	0.45	0.43	0.44
	Recommended	0.00	0.56	0.29	0.29	0.29
	Net change (with Updated MW Estimate)	-0.12	0.11	-0.15	-0.14	-0.15

Based on our review, we recommend the following changes to the forecast operating expenditure for chemicals.

Table 6.11 – Recommended changes to chemicals operating expenditure (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Chemicals	Water Plan (incl. original Sugarloaf pipeline volumes)	5.55	6.69	7.96	8.15	8.82
	Recommended ¹	5.43	7.17	7.23	7.21	7.87
	Net change²	-0.12	0.48	-0.73	-0.94	-0.95

Note (1) The recommended forecast includes Sugarloaf pipeline volumes but does not take into account any additional expenditure that might arise if changes in the operation of the network are required to balance the reduction in flows at Tarago. (2) The net change is calculated as the difference between the recommended expenditure and the Water Plan (including the original Sugarloaf pipeline volumes).

We note that the expenditure on chemicals will change with the volume of water and wastewater treated. Should the volume of water transported via the Sugarloaf pipeline be less than that currently assumed in Melbourne Water's operating plan, this may result in a reduction in expenditure on chemicals, although this will ultimately depend on the operating plan.

6.2.3 Other operations and maintenance costs

Melbourne Water's operations and maintenance costs are based on a bottom-up approach to developing scheduled maintenance budgets based on the average cost of completed project tasks. Unscheduled maintenance costs for particular facilities or asset groups are based on historical records for the past two years and projected forward for the Water Plan. New asset maintenance assumptions have been based on historical records from the Asset Information Management System (AMIS) for similar assets. Overall, this is a sensible and reasonable approach to adopt which, when combined with the application of Reliability Centred Maintenance (RCM) principles to critical assets, demonstrates best practice.

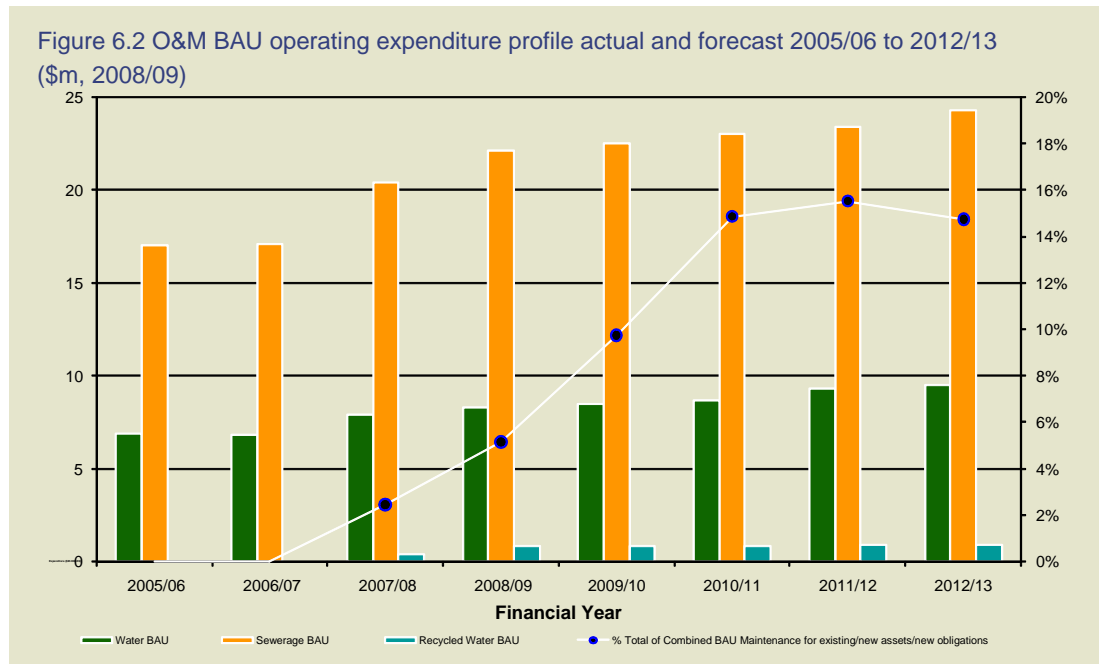
Melbourne Water started to implement this methodology five to six years ago, and it is now at a point where it considers that it is achieving net benefit from the process. Critical assets are considered by Melbourne Water to be those that may be exposed to potentially high risks, for example Major Hazard Facilities, where assets require high operating performance; where assets have unusually high maintenance costs requiring greater cost effectiveness; or significant assets which may benefit from a maintenance works to extend their useful life. Melbourne Water uses an IT tool called RCM II for its critical assets to ensure that they are maintained to meet required level of service. Key maintenance co-ordinators and managers are involved in the assessment of RCM for each critical asset in a workshop environment.

This process influences whether scheduled maintenance is required to prevent a breach in the level of service required. Therefore, as a proportion, scheduled maintenance activities have become increasingly more planned, based on their criticality. The knowledge gained from implementing the process for operations staff is an intangible benefit to the business and assists with maintenance planning, budgeting and the identification of risks for similar or related assets. We are aware of similar organisations within the industry where RCM has been applied, and this provides us with a degree of confidence that a significant proportion of the maintenance budgets are based on real data and an assessment of risk and asset criticality. In discussions with Melbourne Water over the renewals program, it appeared to have a good understanding of the frequency of maintenance activities required to maintain the asset base over time. This is encouraging, providing a relatively sound basis for determining the budget for the forecast maintenance expenditure within the next Water Plan.

We understand from the interviews that the labour costs for contract maintenance are available from utilisation reports at fifteen minute intervals per asset. This provides us with a

greater degree of certainty that the cost estimates used to build up the maintenance budgets are accurate, which is further supported by KPIs included in the contract agreements withholding payment until such information (including asset details etc.) is captured by AMIS.

Melbourne Water has proposed increases in maintenance expenditure in the order of 2.7% on average each year from 2007/08 to 2012/13 (Figure 6.2).



Melbourne Water has explained that the main driver for this increase and the gradual increase in maintenance expenditure thereafter is due to a combination of factors including:

- an increased asset base
- changing mix of assets such that M&E assets represent an increasing proportion of the asset base
- increase in contract rates due to market conditions (known increases based on renewing existing two year strategic relationship agreements with M&E and civil contractors).

We were provided with a breakdown of the main ten contributing business as usual (BAU) maintenance costs for new or existing assets as well as BAU maintenance costs for two new obligations. The breakdown of BAU maintenance costs provided by Melbourne Water for new/existing assets includes the contribution of new assets such as the Eastern Green Energy Project at the Eastern Treatment Plant; the new odour control plants at Western Treatment Plant (WTP) and implemented for the Northern Sewerage Project; the additional aeration tanks at ETP for ammonia reduction; and maintenance related to the recycled waster system upgrade at WTP.

As Figure 6.2 indicates, the contribution from new/existing asset and new obligations (including Sugarloaf Pipeline and Tarago WTP) increases in proportion steadily from 2.4% in 2007/08, to its peak of 15.5% in 2011/12. It then reduces to 14.7% in the final year of the Water plan period (2012/13).

BAU Maintenance expenditure increases by 10.8% from 2007/08 to 2009/10. It then increases by an average of 2.7% per annum over the Water Plan period. As we have already explained, a significant proportion of these maintenance cost increases may be explained by

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the contribution from ten main projects covering new/existing assets and two new obligations. Based on our review of the maintenance expenditure (and noting the general cost escalation reduction discussed in section 5.2.3) we are broadly satisfied with the business as usual expenditure.

Operating costs for new capital schemes

Melbourne Water has included within its Water Plan allowances for additional operating expenditure which it has forecast will arise from the delivery of its proposed capital program. It has forecast that by 2012/13, its operating expenditure requirements will have increased by \$19.87 million over 2007/08 levels (excluding desalination and waterways operating expenditure). This increase in operating expenditure is primarily comprised of operating expenditure associated with the Sugarloaf pipeline (\$14.31 million per annum), and operation of Tarago Water Treatment Plant (\$2.17 million per annum). Melbourne Water has forecast that the annual expenditure for both projects will increase over the period.

In its Water Plan, Melbourne Water has assumed for modelling purposes that the pipeline will transfer an average volume of 75GL/annum from 2010/11, following 30GL in 2009/10 (February to June 2010) on the basis that it will divert any surplus flows (until at least 2014) to facilitate recovery of its storages. However, it now appears these transfer volumes are likely to be overstated. We understand that Melbourne Water has recently been in discussions with DSE in relation to future demand volumes. This has resulted in a reduction to the forecast transfer volumes for the Sugarloaf pipeline. Melbourne Water has provided an update of the Sugarloaf pipeline operating costs based on these revised transfer volumes, as shown below:

Table 6.12 – Sugarloaf pipeline total operating expenditure - revised (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Water Plan*	Electricity		1.7	4.7	4.7	4.7
	RECs		1.5	4	4.1	4.1
	Pipe maintenance		0.5	1.0	1.0	1.0
	Pump Station Maintenance		0.5	1.0	1.0	1.0
	Winneke Treatment Plant increased chemicals		0.7	1.8	1.8	1.8
	Other increased electricity costs (Preston and Plenty pump stations)		0.7	1.6	1.6	1.6
	Land tax	0.1	0.1	0.1	0.1	0.1
	Total operating costs	0.1	5.7	14.2	14.3	14.3
Updated MW Estimate	Electricity		0.6	3.9	2.5	3.2
	RECs		0.5	3.2	2.3	2.9
	Pipe maintenance		0.5	1.0	1.0	1.0
	Pump Station Maintenance		0.5	1.0	1.0	1.0
	Winneke Treatment Plant increased chemicals		0.2	1.4	0.9	1.2
	Other increased electricity costs (Preston and Plenty pump stations)		0.7	0.9	0.8	0.9
	Land tax	0.1	0.1	0.1	0.1	0.1
	Total operating costs	0.1	3.1	11.5	8.6	10.3
	Net change in MW costs	0.0	-2.6	-2.7	-5.7	-4.0

While Melbourne Water has provided the above breakdown of the project operating expenditure, it has not provided the underlying calculations. Hence, we are unable to comment in detail on the figures provided. However we note that the March 2009 project report for Sugarloaf pipeline indicates that it is currently on schedule to achieve practical completion on 21 May 2010, and be commissioned on 12 July 2010. On this basis, we expect the operating expenditure in 2009/10 to be lower than that currently forecast. In particular, expenditure on pipe and pump station maintenance is likely to be minimal in 2009/10. As such, we recommend that the expenditure in 2009/10 be reduced by \$1 million.

Table 6.13 – Recommended changes to operating expenditure for Sugarloaf Pipeline (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
	Net change	0.00	-1.00	0.00	0.00	0.00

Note (*) – these forecasts take into account Melbourne Water's revised forecast

In relation to the ongoing operating costs, and particularly the pump and pipeline maintenance costs, Melbourne Water has forecast a cost of \$2 million per annum which

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represents approximately 0.3% of the capital cost of the pipeline and pumping station. Although Melbourne Water did not provide details of the assumptions underlying these forecasts, and while the actual spend will vary from year to year, over the life of the asset, we consider a 'levelised' annual allowance of \$2 million is reasonable. Although new assets generally have lower maintenance needs than older assets, a spike in maintenance in the first year is not uncommon for some asset types, after which time it will tail off for a period of time, before increasing in later years. Having said that, the expenditure profile will be lumpy with very little spend in some years, and more in others.

We note that in order to ensure consistent regulatory treatment Melbourne Water will need to ensure that its expenditure forecasts in future regulatory periods also reflects a 'levelised' approach. If Melbourne Water was to future forecasts on the specific state of the assets, there is a risk that it might be 'double' dipping or under-forecasting in some regulatory periods.

Other expenditure changes – which include amendments to chemical costs, electricity and land tax – are dealt with in other sections of this chapter.

Since submitting its Water Plan, Melbourne Water has also reviewed its operating expenditure forecasts for the Tarago project. We understand that the inflows are unchanged from those assumed in the Water Plan (5GL in 2008/09 and 15GL per annum thereafter). Despite providing a breakdown of the expenditure it has not provided us with the calculations underlying its estimates (except for chemical costs). While there is no net change in the costs for Tarago, chemical costs have increased by \$400,000, and electricity costs have decreased by a corresponding amount.

In relation to the Tarago project, we understand that that the volume of water to be sourced from Tarago is likely to differ to that in the Water Plan. The ESC has indicated that the volume of water treated at Tarago is likely to be zero in 2008/09, 20GL in 2009/10, and 8GL thereafter. In section 6.2.3 we have estimated the impact of this change in volume on the chemical costs. Based on the information provided by Melbourne Water, it is not possible to accurately assess the impact of the change in volume on the other items of operating expenditure (electricity, maintenance, sludge and overheads). However, we have undertaken a high level analysis in order to estimate the likely impact. We have proportioned the volume of variable operating expenditure items (electricity, sludge) based on flow, and have assumed that maintenance and overheads are fixed. The following table shows the results of our analysis.

Table 6.14 – Recommended changes to operating expenditure for Tarago Water Treatment Plant (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Tarago Water Treatment Plant	Water Plan	1.07	1.59	1.91	2.21	2.17
	Revised forecast	0.00	1.92	1.56	1.86	1.85
	Net change	-1.07	0.33	-0.35	-0.35	-0.32

6.2.4 Electricity costs

Components of electricity costs

The businesses' water and wastewater pumping and treatment operations, as well as their head offices, can use significant amounts of energy. This energy is typically sourced from the electricity grid (although gases from wastewater treatment are used as energy sources at wastewater treatment plants). Electricity costs comprise the following key components:

- raw energy, which is typically priced on a peak/off peak basis

- network and metering charges for distribution and transmission. These are regulated charges which are determined according to a CPI - X price path set by the ESC and Australian Energy Regulator (AER). The current distribution price path (which represents the majority of network charges) expires at the end of 2010 and generally provides for annual price increases of CPI - 0.8% to CPI - 1.5%, depending upon the distributor.¹⁸ The subsequent distribution price path will be set by the AER. Transmission prices currently follow a predetermined revenue path until 2013-14
- other miscellaneous charges such as energy levies associated with the Mandatory Renewable Energy Target (MRET) and Victorian Renewable Energy Target (VRET) schemes, NEMMCO pool fees and ancillary services fees etc
- loss factors.

Several businesses have also chosen to source some part of their energy requirement from green energy sources. They can do this by either:

- directly purchasing green energy, which is priced at a premium to the raw energy cost. The current green energy premium is about 6 c/kWh
- purchasing renewable energy credits (RECs). The current price of a REC is in the range of 4-5 c/KWh.

Many Victorian Councils and water businesses participated in a combined electricity tender co-ordinated by Strategic Purchasing and which fixed raw energy prices for the three year period commencing in July 2009. Under the contracts other cost components (including network charges) are passed through. Because pool prices have generally increased in recent years, for most businesses the raw energy prices were higher than their previous contracts. This has translated into higher forecast electricity costs.

Future changes in energy costs

The businesses' electricity costs are likely to change across the next regulatory period for a number of reasons, including:

- as their existing contracts expire and new contracts are entered into that reflect current energy costs
- as a result of changes in network charges, both within the existing price paths and following the reset of distribution network charges on 1 January 2011
- as a result of the changes in metering costs brought about by the introduction of smart meters in Victoria. The installation of smart meters will commence in 2010 with the rollout being completed by 2013. The rollout will increase electricity prices, however at this stage the extent of the price change, and the profile of the price change over the period to 2013, is uncertain. Distributors are required to make their first submission to the AER in relation to forecast costs and charges in February 2009
- the impact of the Australian Government's introduction of a carbon pollution reduction scheme (CPRS), currently planned for 1 July 2010. This scheme will take a 'cap and trade' approach whereby emitters of greenhouse gases – such as coal fired electricity generators - need to acquire a permit for every tonne of greenhouse gas that they emit. This will increase the price of raw energy, although the extent of this price increase is difficult to gauge.

¹⁸ However variations around these price changes are possible depending upon factors including the level of service provided and the impact of any cost pass-through events

Overall electricity prices are likely to increase from current levels as the impact of price increases from smart meters and the CPRS is likely to exceed the impact of any possible reduction in distribution network charges or reduction in energy costs that might be brought about by the economic downturn. However the level of the price changes is extremely uncertain. In preliminary discussions the ESC has raised the prospect of providing for a pass through of these changes. We support this approach. Our analysis below is therefore based on the assumption that the pass through arrangements will apply and that on balance the impact of other factors will be a zero net change in the cost of electricity.

Green energy

The businesses' large energy usage can mean high levels of greenhouse gas emissions. Water businesses have various obligations to operate in an environmentally sustainable manner. For example, Melbourne Water's Statement of Obligations requires it to:

- apply sustainable management principles
- improve its sustainability performance, including responding to climate change.

The businesses have interpreted their obligations in different ways, but have generally pursued one or more of the following options to reduce their environmental footprint:

- purchasing a proportion of their energy from renewable (green energy) sources. The premium for green energy is in the order of 5-6c/kWh
- purchasing their energy from non-renewable sources, but purchased renewable energy certificates (RECs). RECs are established pursuant to the Mandatory Renewable Energy Target (MRET) scheme whereby renewable generators create RECs provided they can demonstrate renewable energy production above a given baseline. RECs can be traded and then surrendered. The price of RECs is similar to that of green energy, given that they are related products, however because they are tradeable prices vary on the open market
- creating Victorian Energy Efficiency Certificates (VEECs) through the Victorian Energy Efficiency Target Scheme (VEET). VEECs represent one tonne of carbon abatement and have the potential to be created through the retailers' showerhead replacement program
- using energy generated from their own operations (e.g. mini-hydros, use of biogas).

We note the ESC has previously indicated that purchasing 10 to 20% of green energy or equivalent offsets is not inconsistent with the Statement of Obligations requirement, but that where a business proposes higher abatement levels it needs to demonstrate sufficient customer support for the associated expenditure.

Water businesses may also have separate agreements regarding energy and greenhouse gas emissions with the EPA in respect of individual capital works projects.

Melbourne Water's proposal

Melbourne Water is a large user of energy. We note that:

- Melbourne Water is among the top 15 electricity users in Victoria and top 250 in Australia. This makes it subject to the Federal Government's Energy Efficiency Opportunities program.
- while purchased electricity provides for around 40% of Melbourne Water's energy needs, an equivalent proportion of energy comes from biogas at the Western Treatment Plant.

Pursuant to its Statement of Obligations, Melbourne Water's Water Plan sets out its aim to meet the following outcomes:

- reduce greenhouse emissions by 40% of Melbourne Water's 2000/01 emissions by 2013
- 61% of total energy used or exported is from renewable sources by 2013.

Melbourne Water has already met the first objective – greenhouse gas emissions have been reduced by 48% from 2000/01 levels. The use or export of renewable energy is currently at 41%.

In a presentation Melbourne Water also indicated that it proposed to:

- reduce net greenhouse emissions to zero by 2018
- increase use or export of renewable energy to 100% of total energy used by 2018.

Melbourne Water is currently considering its long term energy procurement strategy. While its initial analysis suggests a long term renewable electricity agreement is the most attractive way of meeting its targets, it has not finalised a strategy. In late 2008 Melbourne Water issued an expression of interest for the provision of renewable energy and associated services with a decision to go to a request for proposal likely in March 2009.

In the interim Melbourne Water's electricity purchase and energy expenditure across the next regulatory period, as set out in the Water Plan is based around the following assumptions:

- the Sugarloaf project will be powered by renewable energy (as announced by the Minister for Water in June 2007) and Melbourne Water will purchase RECs to do so
- self-generation at the Western Treatment Plant (WTP) will continue and will increase over the period
- mini-hydros to be constructed as part of the Sugarloaf project will export energy to the grid and will offset energy costs by an average of \$1.2 million per annum
- the price of purchased energy will continue to increase
- higher energy usage associated with new projects including greater volumes through the Winneke treatment plant (from commissioning the Sugarloaf pipeline) and the Eastern Treatment Plant (ETP) tertiary upgrade.

Melbourne Water's electricity forecast from its Water Plan is set out in the table below.

Table 6.15 Melbourne Water Water Plan electricity operating expenditure forecasts (\$m, 2008/09)

Melbourne Water	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Business as usual	12.44	14.03	12.78	13.92	14.29	14.61
New obligations	0.00	0.06	2.65	6.14	6.92	10.00
Western Treatment Plant	2.22	2.31	2.52	2.54	2.54	2.57
Sale of electricity from mini hydros	-0.04	-0.66	-1.47	-1.49	-1.04	-1.09
Purchase of RECs			1.45	3.99	4.10	4.10
Total	14.63	15.74	17.94	25.10	26.81	30.19
% Increase		7.6%	13.9%	39.9%	6.8%	12.6%
Cost (cents/kWh)		6.94	7.53	8.49	8.62	8.44

Discussion

In our draft report we accepted Melbourne Water's forecast energy costs (including purchase of RECs) on the basis that:

- forecast costs per kWh were low and consistent with current market prices
- Melbourne Water had undertaken a willingness to pay study which showed support for a policy of reducing greenhouse gas emissions
- Government commitments had been made regarding energy use associated with the Sugarloaf pipeline
- the forecast unit cost of RECs was consistent with independent forecasts.

In response to our draft report Melbourne Water supported our views, and endorsed an approach whereby additional costs associated with the CPRS would be subject to a pass through mechanism.

In addition, in line with changes to the operation of the Sugarloaf Pipeline and a new operational plan, Melbourne Water has prepared a revised forecast of its energy expenditure. These forecasts reflect generally lower electricity usage and REC purchases, although in 2008/09 large site usage is forecast to increase associated with greater throughput at the Winneke treatment plant. In summary the revised forecast is as follows:

Table 6.16 Melbourne Water Revised electricity operating expenditure forecasts (\$m, 2008/09)

Melbourne Water	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Business as usual	12.44	14.03	14.75	13.11	14.18	13.20
New obligations	0.00	0.06	1.13	5.76	4.62	7.60
Western Treatment Plant	2.22	2.31	2.52	2.54	2.54	2.57
Sale of electricity from mini hydros	-0.04	-0.66	-1.47	-1.49	-1.04	-1.09
Purchase of RECs	0.00	0.00	0.50	3.20	2.60	2.90
Total	14.63	15.74	17.44	23.12	22.91	25.17
% Increase		7.6%	10.8%	32.6%	-0.9%	9.9%
Cost (cents/kWh)	6.5083	6.9404	7.4304	8.4433	8.2123	8.1157

We are satisfied that the revised forecasts reflect the adjustments to Melbourne Water's capital and operating program and are reasonable.

Adjustments to be made to the original forecast as set out in Melbourne Water's Water Plan are as follows:

Table 6.17 – Recommended changes to energy costs (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Energy costs	Water Plan	15.74	17.94	25.10	26.81	30.19
	Revised forecast	15.74	17.44	23.12	22.91	25.17
	Net change	0.00	-0.50	-1.98	-3.90	-5.02

As noted, these forecasts assume no change in the price of electricity as a result of the CPRS.

6.2.5 CPRS costs

In its Water Plan Melbourne Water included forecast expenditure of \$6.8 million associated with the introduction of the CPRS.

As both Melbourne Water and the ESC have noted, there is considerable uncertainty regarding the cost to buy permits under the CPRS, and indeed whether the CPRS will be implemented in the form and on the timetable currently planned by the Commonwealth Government. As discussed above, the ESC has proposed to permit a pass through for costs associated with the CPRS. To this end we have removed the CPRS purchase costs from Melbourne Water's forecast.

Table 6.18 – Recommended changes to CPRS permit purchase costs (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
CPRS costs	Water Plan	0.00	0.00	2.30	2.30	2.20
	Revised forecast	0.00	0.00	0.00	0.00	0.00
	Net change	0.00	0.00	-2.30	-2.30	-2.20

6.2.6 Information technology (IT)

Melbourne Water is proposing a small decrease in information technology (IT) operating expenditure for the next regulatory period.

Table 6.19 Information technology operating expenditure (\$m, 2008/09)

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Base year expenditure	9.5					
Increase		0.50	0.20	0.00	-1.40	-1.50
Total	9.5	10.00	9.70	9.50	8.10	8.00
Increase over 2007/08 (%)		5%	2%	0%	-15%	-16%

Source: Additional information provided by Melbourne Water, 20 Jan 2009.

Melbourne Water has advised that the decreases in IT costs coming later in the period are the result of:

- improving IT systems and process to remove redundant and duplicated hardware
- improving IT hardware through capital expenditure which will reduce maintenance expenditures
- renegotiating contracts to bring about further operational efficiencies.

In its Water Plan, Melbourne Water indicates that its IT system enhancements and upgrades are expected to deliver efficiency gains in project planning, monitoring and control processes.¹⁹

Recommendation

Melbourne Water's proposed operating expenditure for IT appears reasonable.

6.2.7 Conservation programs

Background

Each of the businesses has proposed expenditures associated with achieving water conservation targets and delivering related initiatives as required under the water policy framework in Victoria. The total conservation expenditure across the metropolitan businesses is shown in table 6.20. The majority of this expenditure is related to new obligations and would not have been incurred five years ago.

Table 6.20 Total water conservation expenditure by business¹ (\$m, 2008/09)

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
City West Water	7.27	8.10	10.26	8.79	8.36	8.32
South East Water ²	5.04	8.60	10.60	10.20	8.80	8.90
Yarra Valley Water	7.37	9.98	12.08	9.19	8.79	9.23
Melbourne Water	2.30	4.80	4.59	4.20	3.20	3.10
Total	21.98	31.48	37.53	32.38	29.15	29.55

Note: ¹ Expenditure shown in this table includes any changes proposed by businesses in response to the draft report. ² South East Water's forecast expenditure on restrictions was not included in the water conservation expenditure total. We have included this in the total for the purpose of comparison.

¹⁹ Water Plan, p.159

The key issues for review are:

- ensuring conservation programs are consistent with the policy framework for conservation measures in metropolitan Melbourne
- ensuring conservation programs are consistent with forecast restrictions and capital projects.

In particular, as noted by the ESC in its Issues Paper, this review needs to consider the purpose of certain water saving measures, given the augmentation projects being undertaken, and the impact of these measures on consumption over the regulatory period. This is important because the *Central Regional Sustainable Water Strategy (CRSWS)* (October 2006) pre-dates significant supply augmentations accelerated by the Victorian Government in *Our Water Our Future - The Next Stage of the Government's Water Plan* (June 2007) following further decline in water flows and the adoption of worst case scenario inflow assumptions. Committed projects include the desalination plant, the food bowl modernisation in Northern Victoria, the Sugarloaf pipeline and the expansion of the Victorian Water Grid. The new water supply options are expected to provide additional water supply of 240 GL per year to Melbourne by 2011, which is half of Melbourne's annual water use.²⁰

These planned augmentations will inevitably alter the balance between the supply and demand of water in metropolitan Melbourne. There is some uncertainty about the ongoing role that conservation measures will have in managing the supply-demand balance after augmentations are in place and restrictions begin to ease.

The Victorian Government policy in relation to conservation measures has not been revisited following the decision to accelerate the augmentation projects. The *OWOF - Next Stage of the Government's Water Plan* reiterated the continuing importance of water conservation of measures and per capita water consumption targets established in the CRSWS.

However, the Victorian Competition and Efficiency Commission's *Water Ways: Inquiry into Reform of the Metropolitan Retail Water Sector* report notes the importance of an iterative and adaptive approach to planning which permits adjustments as circumstances change and recommends that:

*current data and assumptions regarding the supply and demand outlook for water inform both the over-arching strategy document, including the Central Region Sustainable Water Strategy, and the retailers' draft water plans.*²¹

Similarly, the Victorian Auditor-General, in its audit of planning for water infrastructure in Victoria, noted that the scale of augmentation changes means that:

*the Department needs to revisit the strategy objectives, targets and actions in the light of these actions. For example, once these augmentation projects come on line, the justification for the scale of spending on conservation and recycling needs to be revisited.*²²

In reviewing the businesses' water conservation expenditure for the next regulatory period, our view is that it is reasonable to expect the businesses to aim to achieve the water savings required by the Victorian Government under OWOF and the CRSWS. We also note that,

²⁰ Victorian Government, *Our Water Our Future The Next Stage of the Government's Water Plan*, June 2007, p.5.

²¹ Victorian Competition and Efficiency Commission 2008, *Water Ways: Inquiry into Reform of the Metropolitan Retail Water Sector*, final report, February.

²² Victorian Auditor-General, *Planning for Water Infrastructure in Victoria*, April 2008, p.28.

given the extremely low storage levels and potential impact on water supply of the recent bushfire events, forecast restrictions levels have been revised since Water Plans were submitted, with restrictions of at least level 1 expected to be in place until the end of the next regulatory period. The new Target 155 program has also been implemented by the Government to further promote water conservation.

Having said that, we still believe that it is important to review the purpose of individual conservation measures proposed by each business, particularly in light of the fact that the long-term headline water conservation and recycling targets to be achieved in the Melbourne region by 2015 under the CRSWS have already been met or exceeded.

As noted in the Government's 12 month progress report on OWOF, Melbourne's per capita water consumption in 2007-2008 will beat the 2020 target.²³ We also note that the businesses are spending \$128.6 million (\$113.5 million for just the retailers) in total on conservation over the next regulatory period. While each individual program may have merit, when considered in aggregate terms the investment in this program is substantial.

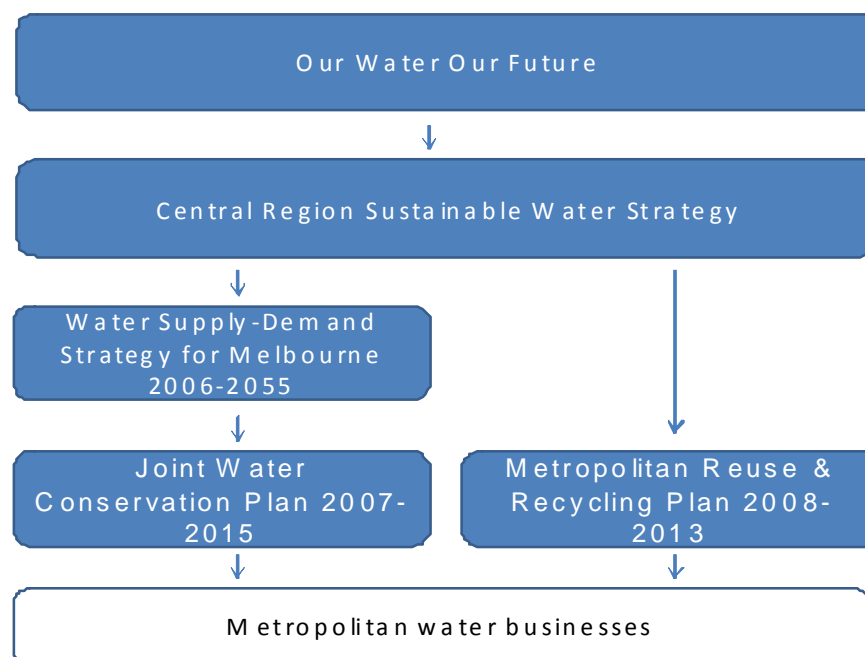
We have therefore considered issues such as the timing of proposed expenditure and the diminishing returns of additional water conservation expenditure in terms of water saved and economic benefits.

Policy framework for water conservation

OWOF is the over-arching policy framework for long-term water planning in Victoria. With the aim of securing Victoria's water supplies for the next 50 years, it sets out 24 water conservation actions aimed at achieving a target of a reduction in per capita drinking water consumption in Melbourne of 15% by 2010 compared to the 1990s average.

The OWOF policy framework for water conservation for metropolitan Melbourne is applied through regional strategies and implementation plans as illustrated in Figure 6.4.

Figure 6.4 Policy framework for water conservation in metropolitan Melbourne



²³ Victorian Government, *12 Month Progress Report*, June 2008.

The development of Regional Sustainable Water Strategies is a key action from OWOF. The strategies set out actions to secure water for industry, cities and towns in a region while safeguarding the region's rivers and aquifers. The CRSWS, which was released in October 2006, sets key water conservation and efficiency actions for industry, cities and towns in the Central Highlands, Barwon, Port Phillip and Westernport regions while safeguarding the region's rivers and aquifers.

The *Water Supply-Demand Strategy for Melbourne* details how the metropolitan water authorities will implement the Government's policy directions and actions announced in the CRSWS. The Water Supply-Demand Strategy, which was required to be developed under the Statement of Obligations of each business, is specifically focused on securing supplies for Melbourne urban water customers for the next 50 years. It is the principal planning document for the metropolitan water authorities.

The *Joint Water Conservation Plan 2007-2015* (JWCP) and the *Metropolitan Reuse & Recycling Plan 2008-2013* (MRRP) have been developed by the businesses and establish implementation plans for the businesses to meet the water conservation actions and targets set by Government in the CRSWS and outlined in the Water Supply-Demand Strategy for Melbourne. Under the Statement of Obligations for each business, the programs developed for sustainable water resource management must be consistent with these plans.

The JWCP is focused on identifying the most effective delivery method to meet the 2015 water conservation target of a 30% reduction in water usage by 2015 (from a 1990s average). This target represents a water saving of 74 GL per year by 2015, including 42 GL for maintaining savings and 32 GL of additional savings. Of the additional savings requirement, the JWCP directly allocates the GL target to each business as follows:

Table 6.21 Water savings under the JWCP to meet targets²⁴

	Water saving GL/year by 2015
City West Water	6.9
South East Water	12.0
Yarra Valley Water	12.7
Total	31.6

The MRRP identifies the most efficient and prudent recycling and reuse schemes that achieve the potable substitution target (and interim target) established in the CRSWS. 13 priority projects have been identified by the water businesses to achieve the 2015 interim target and the 2030 target at a cost of \$307.3 million. For the purpose of this review recycling projects have been considered under capital expenditure if they fall into the top 10 projects by size.

Appendix A maps the programs set out in the JCWP to the policies, strategies and objectives set out in OWOF, the CRSWS and the Water Supply-Demand Strategy.

Melbourne Water's proposal

In its Water Plan Melbourne Water forecast that its expenditure on conservation programs will increase by 35% from \$2.30 million in 2007/08 to \$3.10 million in 2012/13. In response to the draft report Melbourne Water revised its forecasts to include an additional \$0.5 million in each of 2009/10 and 2010/11 for the Target 155 program.

²⁴ Note this table includes only additional savings and only those savings that have been directly allocated to each of the four businesses.

Table 6.22 Water conservation expenditure (\$m, 2008/09)

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Direct costs of administering restrictions (e.g. advertising, publications, customer advice etc)	0.4	0.2	0.5	0.5	0.5	0.5
General behavioural change (e.g. advertising, publications, customer advice etc not directly related to restrictions or covered by other programs)	0.7	1.6	1.0	1.0	1.0	1.0
Smart Water Fund		1.2	0.8	0.4	0.1	
Non-revenue water (leak detection/prevention)	1.2	1.8	1.8	1.8	1.6	1.6
Total Water Plan proposal	2.30	4.80	4.09	3.70	3.20	3.10
Revised proposal in response to draft report	2.30	4.80	4.59	4.20	3.20	3.10

In the draft report it was noted that the breakdown of Melbourne Water's forecast expenditure shows that it is expecting no change in expenditure from 2009/10 levels for both the direct costs of administering restrictions (\$0.5 million per year) and its general behavioural change program (\$1.0 million per year). It was proposed in the draft report that half of this forecast expenditure be phased out between 2010/11 and 2012/13, reflecting that restrictions were expected to ease from 2010/11 onwards, that headline targets for water conservation set out in the CRSWS are currently being met or exceeded, and that the measures noted above are not specific to particular actions established under the JWCP.

It remains our view that we would still expect to see some phasing out of conservation expenditure as restrictions are lifted. In taking this view we note that the Target 155 program is temporary and that lifting of restrictions from 2011/12 is being forecast. We also believe that customer awareness about restrictions and knowledge of water saving will be at its maximum by the time restrictions begin to ease, and that the current level of conservation management is not expected. We therefore consider that it is reasonable to phase out 30% of this expenditure on this measure between 2011/12 and 2012/13. This equates to the following changes:

- for expenditure on the administration of restrictions a reduction of \$0.08 million in 2011/12 and \$0.15 million in 2012/13
- for expenditure on its behavioural change program a reduction of \$0.15 million in 2011/12 and \$0.30 million in 2012/13.

Since submitting its Water Plan Melbourne Water has proposed additional expenditure related to the Target 155 program of \$0.5 million in each of 2009/10 and 2010/11. In reviewing this we note that we have received information from the Department of Sustainability and Environment indicating that during 2008/09, additional funding of \$3.7 million is required to fund Target 155 and that the campaign costs have been split equally between the four metropolitan businesses. If we take this as a benchmark it seems reasonable for a business to be spending approximately \$1.0 million in 2009/10 on Target 155 plus an amount for in-house conservation programs. However, we note that as this program is not committed beyond 2009/10 we do not believe that it is not reasonable for Melbourne Water to include expenditure on this program in the 2010/11 forecast. We therefore recommend that Melbourne Water's conservation expenditure be revised to include \$1.0 million in

2009/10 but no additional expenditure in 2010/11. This is effectively a transfer of \$0.5 million from 2010/11 to 2009/10.

Recommendations

Table 6.23 sets out Melbourne Water's original proposal in relation to additional expenditure for water conservation, a revised forecast based on our recommendations outlined above, and the net change to Melbourne Water's revenue requirement.

Table 6.23 – Overview of recommended changes to water conservation expenditure (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Water conservation	Water Plan	4.80	4.09	3.70	3.20	3.10
	Revised forecast	4.80	5.09	3.70	2.98	2.65
	Net change	0.00	1.00	0.00	-0.23	-0.45

6.2.8 Other expenditure

Melbourne Water and Yarra Valley Water have agreed that a number of minor asset transfers will be made on 1 July 2009 to facilitate improved management of the system. These involve the transfer of the Lewis Hill tank and Merri Parade distribution mains from Yarra Valley Water to Melbourne Water, and the transfer of the Yarrambat pump station and tank, Lilydale pump station and tank, and Morang outlet main and pipe track from Melbourne Water to Yarra Valley Water. The result of this transfer will be a small net reduction in costs to Melbourne Water, however Melbourne Water advises that has inadvertently omitted the reductions from its forecasts. Melbourne Water's estimate of the reduction of costs is slightly different from Yarra Valley Water's estimate of the additional costs to be incurred: for the purposes of consistency we have adopted the Yarra Valley Water cost increases.

Table 6.24 Net operating cost savings from transferred assets (\$m, 2008/09)

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Reduction in expenditure			0.113	0.113	0.113	0.113

6.2.9 Land tax

Land tax is assessed on a calendar year basis by the State Revenue Office (SRO) and is based on land value assessments for the preceding year. The taxable value of land is the municipal unimproved value (site value) provided by the relevant municipality or by the Office of the Valuer General. Under the Valuation of Land Act 1960, municipal councils are required to conduct general valuations for land in their municipality every two years.

Land Tax exemptions are provided for land used for public open space, Crown Land managed by the businesses and land used for primary production.

Land tax rates have been falling in recent years. The highest rate has fallen from 4% in 2005 to 2.25% currently. Recent changes are shown in the table below:

Table 6.25 Land tax rates

Land tax rate	2007	2008	2009
Threshold and rate	\$29,600 plus 3% for each dollar over \$2.7 million	\$22,480 plus 2.5% for each dollar over \$2.7 million	\$18,225 plus 2.25% for each dollar over \$2.7 million

Source: State Revenue Office, 2008/09 budget papers

In its Water Plan Melbourne Water forecast that its land tax bill would increase over the regulatory period as shown in the table below. Land tax represents the second highest operating cost category behind labour and external services.

Table 6.26 Melbourne Water projected land tax costs (\$m, 2008/09)

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Forecast		16.57	18.09	20.65	22.68	25.28

Melbourne Water's proposal reflected a number of assumptions, including:

- that the proposed taxation rate and threshold will remain in place for the regulatory period
- forecasts of land to be acquired
- that the unimproved capital value of land will increase by 30% in nominal terms in 2009, 2011 and 2013. This is the assumption that has the greatest impact on the forecast.

To support its forecast Melbourne Water:

- indicated that the average increase in Melbourne Water's land tax payments for 2000 to 2007 was 14.6%.
- provided an email from Charter Keck Cramer (CKK), strategic property consultants, that noted the following average annual increases in land values from 2000 to 2007:

Table 6.27 CKK data on annual increases in land values

	Average growth
Residential	17.26%
Rural Outside UGB Removed	11.97%
Industrial	25.60%

In our draft report, we noted that given current economic conditions it is extremely unlikely that unimproved capital values will increase at the rate of 30% every two years. And to the extent that this was the case, it would be likely (although by no means certain) that the government would move to reduce land tax rates as it has done in recent years to prevent the equivalent of 'bracket creep'.

Therefore, the draft report concluded that Melbourne Water's forecasts of land tax payments were likely to be overstated. For the purposes of the forecasts, we assumed an average 5% nominal increase²⁵ (or 2% in real terms) in unimproved capital value on the basis that this was more likely to reflect economic conditions. This resulted in a recommended reduction in Melbourne Water's forecast expenditure of \$22.1 million (in aggregate) over the next regulatory period.

In response to the draft report, Melbourne Water noted that it agreed that current economic conditions would dampen the growth rate in land values, and provided a revised forecast of land tax payments based on the following assumptions:

²⁵ This was intended to reflect a 2% real increase above forecast inflation (2.9%). However, as Melbourne Water's forecast is based on a 2.5% inflation forecast, the increase should more correctly have been 4.5% in nominal terms.

- taxable value of land for 2009 and 2010 would be based on municipal valuations as at 1 January 2008, which are likely to reflect a 15% per annum increase
- 2011 and 2012 assessments would be based on the valuation as at 1 January 2010, which is likely to reflect a 5% per annum increase
- removal of \$8.3 million from the valuation to reflect unregulated assets which were inadvertently included in the initial valuation
- in 2013, the growth rate will return to the long-term average of 10%.

Melbourne Water's revised proposal also reflects revised forecasts of disposals and acquisitions of land resulting from current economic conditions. The Water Plan proposal, draft report recommendation and revised proposal are set out in the table below.

Table 6.28 Melbourne Water revised land tax costs (\$m, 2008/09)

	2008/09	2009/10	2010/11	2011/12	2012/13
Water Plan	16.57	18.09	20.65	22.68	25.28
Draft report revised proposal	15.22	15.46	16.15	16.40	16.04
Melbourne Water revised proposal	16.57	17.40	18.21	18.81	20.34

We have reviewed Melbourne Water's proposal and accept its view that the taxable value of land for 2009 and 2010 are likely to reflect valuation increases in the order of a nominal 15% per annum. We also broadly accept that a 2% real increase in land values (4.5% in nominal terms, using Melbourne Water's inflation rate) is a reasonable assumption going forward, but consider that this should apply this to all remaining years of the regulatory period. This results in the following forecast of land tax.

Table 6.29 – Overview of recommended changes to land tax (\$m, 2008/09)

		2008/09	2009/10	2010/11	2011/12	2012/13
Land tax	Water Plan	16.57	18.09	20.65	22.68	25.28
	Revised forecast	15.99	17.35	18.13	18.64	19.15
	Net change	-0.58	-0.74	-2.52	-4.04	-6.13

We note that Melbourne Water has not yet received its 2009 land tax assessment from the State Revenue Office and that this is expected to be received in late April or early May. The ESC may wish to review the land tax forecast at this time.

6.2.10 Not prescribed

As shown in table 6.22, Melbourne Water's not prescribed services are expected to contribute \$146.0 million to its revenue over the next regulatory period. The operating expenditure associated with delivery of these services is expected to be \$146.3 million over the same period. The Werribee Agriculture Group (WAG) contributes 92% of this revenue, with hydro electric power generation and other minor services making up the remainder.

Melbourne Water has advised that the increase in not prescribed revenue from 2007/08 to 2008/09 is due to changes in sewage treatment processes at Western Treatment Plant that have permitted the lifting of restrictions on cattle trading, leading to improved trading and breeding conditions resulting in higher WAG revenue.

While we have not reviewed the not prescribed costs in any detail, we note that Melbourne Water's allocated costs are approximately equal to the revenue earned. On this basis we are satisfied that the costs are appropriately allocated.

Table 6.30 Revenue and expenditure associated not prescribed services (\$m, 2008/09)

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Revenue	24.15	36.74	36.54	37.34	36.49	35.61
Operating expenditure	33.57	36.24	36.45	37.39	36.63	35.81
Capital expenditure	0.60	0.53	2.66	2.05	1.44	1.36

6.3 Conclusions and recommendations

For the reasons set out above, we recommend that the following changes be made to Melbourne Water's operating expenditure forecasts:

Table 6.31 – Overview of recommended changes to operating expenditure (\$m, 2008/09)

Melbourne Water	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Total Water Plan operating expenditure	195.65	199.06	206.08	219.46	426.43	638.72
Adjustments for errors						
Superannuation writedown	-18.80					
Re-allocation of costs	6.00					
Total adjustments for errors	-12.80					
Other recommended amendments						
Maintenance cost escalation		-0.16	-0.32	-0.48	-0.66	-0.85
VCEC productivity		0.00	-1.80	-2.70	-0.85	-0.85
Labour costs		0.00	-0.15	-0.28	0.03	0.19
Chemical costs - Tarago		-0.12	0.48	-0.73	-0.94	-0.95
Sugarloaf pipeline		0.00	-1.00	0.00	0.00	0.00
Tarago water treatment plant		-1.07	0.33	-0.35	-0.35	-0.32
Electricity		0.00	-0.50	-1.98	-3.90	-5.02
Carbon Pollution Reduction Scheme				-2.30	-2.30	-2.20
Water conservation		0.00	1.00	0.00	-0.23	-0.45
Transferred assets			-0.11	-0.11	-0.11	-0.11
Land tax		-0.58	-0.74	-2.52	-4.04	-6.13
Total other amendments		-1.93	-2.81	-11.45	-13.35	-16.69
Total amendments and error adjustments	-12.80	-1.93	-2.81	-11.45	-13.35	-16.69
Total recommended operating expenditure	182.85	197.13	203.27	208.01	413.08	622.03

7 Capital expenditure

7.1 Historical and forecast capital expenditure

7.1.1 Overview of outcomes compared to 2005 determination

In the 2005 determination, the ESC approved operating expenditure for Melbourne Water totalling \$512.9 million (in 2004 dollars) for the three years to 2007/08, which included operating expenditure for waterways and drainage. Melbourne Water's Water Plan reports that water, wastewater and recycled water (with an allocation from corporate) accounted for \$455.5 million of this, converted into 2008/09 dollars.

Over the same three year period, Melbourne Water has actually incurred \$695.1 million²⁶, which Melbourne Water attributes to:

- improving water security as a response to the drought
- new legislate and regulatory obligations
- increases in construction costs
- bringing forward capital expenditure based on revised information about asset condition.

Table 7.1 Actual capital expenditure and variance to 2005 determination (\$m, 2008/09)

Melbourne Water	2005/06	2006/07	2007/08	Total
2005 determination	122.0	137.6	195.9	455.5
Actual expenditure	139.5	187.1	368.5	695.1
Variance	17.5	49.5	172.6	239.6

Source: Melbourne Water regulatory accounts (2005/06 and 2006/07) and price review template (2007/08).

It is important to note that the impact on businesses which incur capital expenditure greater than forecast is minimised to some extent by either the driver for the increased expenditure, or the regulatory system. That is:

- if capital expenditure exceeds forecast because of higher than expected growth, the higher expenditure will be offset by higher revenue from additional customers
- at the end of the regulatory period, actual capital expenditure is rolled into the regulated asset base, on which businesses receive a return on and return of capital.

Therefore, the financial impact on the business is the short term cost of funds between incurring the additional expenditure and having it rolled into the regulated asset base, less any additional revenue from higher than forecast growth.

7.1.2 Overview of forecast

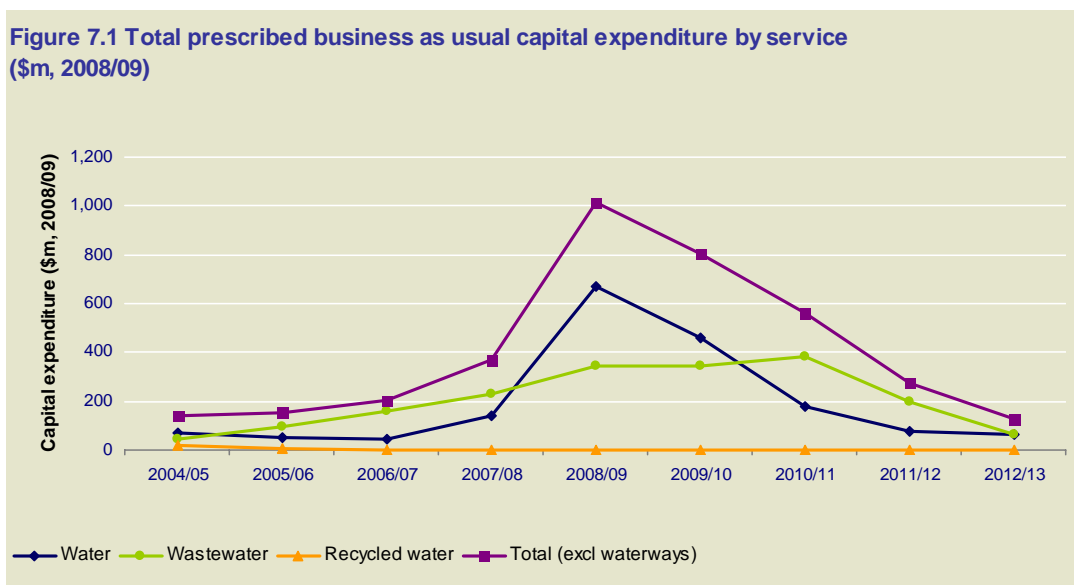
Melbourne Water's Water Plan proposes a capital program of \$1,774 million over the next regulatory period. This is a significant increase when compared to historical levels of capital expenditure. The following table provides a breakdown of the forecast capital expenditure for the years 2007/08 to 2012/13.

²⁶ Note that this figure is from Melbourne Water's regulatory accounts. Melbourne Water has treated expenditure related to the Dandenong Treatment Plant decommissioning and mini-hydro facilities differently in the regulatory accounts compared to its Water Plan.

Table 7.2 Forecast capital expenditure by service (\$m, 2008/09)

Capital Expenditure by Service	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total 2009/10 - 2012/13
Water	139.74	672.43	462.18	181.77	77.80	62.26	784.01
Wastewater	227.55	341.99	342.43	382.07	199.06	64.26	987.81
Recycled Water	1.24	1.71	0.72	0.54	0.43	0.53	2.22
Total (excluding Waterways)	368.53	1016.13	805.33	564.38	277.29	127.05	1774.04

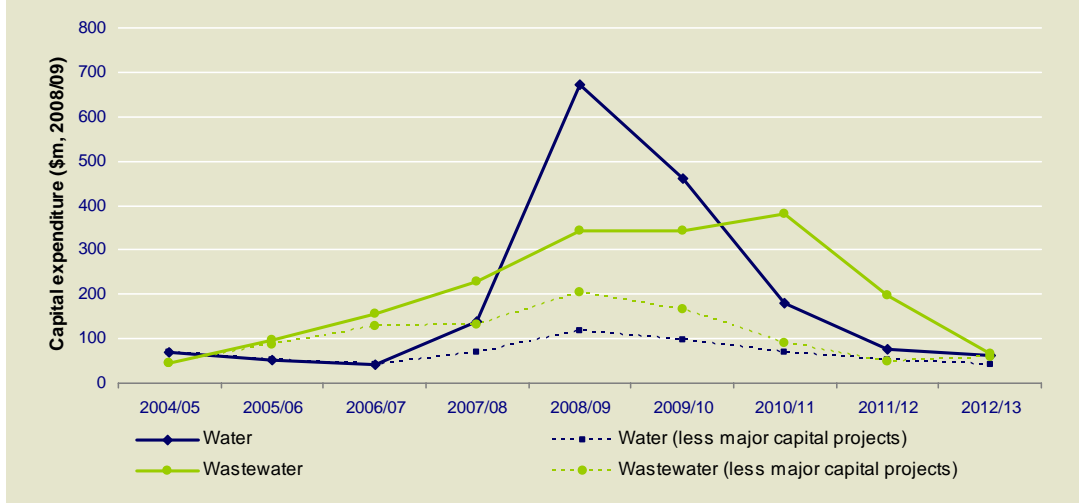
The increases in capital expenditure are driven by significant increases in both the water and wastewater services. The proposed capital expenditure on the recycled water service remains in line with historical levels. This is illustrated in the figure below, which graphs Melbourne Water’s actual and proposed prescribed BAU capital expenditure over the period 2004/05 to 2012/13.



Source: Melbourne Water’s price review template

Melbourne Water’s forecast capital program is noticeably front end loaded, with capital expenditure returning to historical levels by 2012/13. As explained by Melbourne Water in its Water Plan, the increase in capital expenditure over historical levels is primarily driven by a small number of major capital projects. In its Water Plan, it has identified these projects as the Sugarloaf Pipeline, Northern Sewerage Project, ETP Tertiary Treatment, and the Melbourne Main Sewer Augmentation. Together, these projects account for \$1,143 million or 65% of the total capital expenditure requirement. These projects are reviewed in more detail in Section 7.3. Expenditure on the Tarago Water Treatment Plant between 2006/07 and 2008/09 also resulted in a higher than usual expenditure over these years. The impact of these major projects on Melbourne Water’s capital expenditure is shown in Figure 7.2 below.

Figure 7.2 Prescribed water and wastewater business as usual capital expenditure including and excluding major projects (\$m, 2008/09)



Source: Melbourne Water’s price review template

As is evident in the figure, once the impact of Melbourne Water’s major capital projects is removed, the water capital expenditure profile is dramatically reduced and is more in keeping with historical levels. Wastewater capital expenditure is also significantly reduced, although the expenditure in the period 2008/09 to 2010/11 remains elevated.

In its Water Plan, Melbourne Water has indicated that apart from the small number of major projects, this increase in expenditure is primarily driven by expenditure on asset renewals, which is comprised of specific renewals schemes and allocations.

The following table, which breaks down the forecast expenditure by primary business driver, shows that renewals account for approximately one third of Melbourne Water’s forecast capital expenditure. Asset renewals are discussed in more detail in Section 7.4.2 and allocations are discussed in greater detail below.

Table 7.3 Forecast capital expenditure by primary business driver – 2009/10 to 2012/13 (\$m, 2008/09)

Primary Business Driver	Water	Wastewater	Recycled Water	Corporate*	Total	% of Total
Business Development				9.90	9.90	0.5%
Business Efficiency	4.92	0.62		3.98	9.53	0.5%
Compliance	22.59	542.17	0.21	1.15	566.11	31.3%
Compliance - New	522.09	0.00			522.09	28.9%
Customer Service-New		0.00		0.22	0.22	0.0%
Environmental /Social	3.35	4.18	0.00	0.23	7.75	0.4%
Growth	11.34	51.51		2.15	65.01	3.6%
Renewals	189.08	361.44	0.78	47.49	598.78	33.2%
Strategic Intent /Risk Mitigation	8.97	9.06	0.00	8.64	26.68	1.5%
Total	762.34	968.98	0.98	73.76	1806.07	100%

Note (*) Including \$29 million of Waterways allocations and \$3.1 million unregulated allocations.

As evident in the above table, in addition to asset renewals, the main drivers of capital expenditure during the next regulatory period are 'Compliance' and 'Compliance – New' projects. The \$522 million reported under 'Compliance – New' relates to the Sugarloaf pipeline project. The expenditure reported under 'Compliance' relates to new obligations, which Melbourne Water has defined as those coming into effect within the 2005 regulatory period. In Section 7.3 we have reviewed in detail a number of these compliance projects.

Cost estimates

As Melbourne Water has noted in its Water Plan, the accuracy of capital expenditure forecasts over the next regulatory period varies for each project according to its maturity. The forecasts included within the Water Plan range from contracted capital expenditure to allocations of capital expenditure where planning has not yet progressed to a point where specific projects can be identified.

The following table shows the Water Plan forecast capital expenditure broken down by the basis of Melbourne Water's cost estimate.

Table 7.4 Basis of capital expenditure forecasts in Water Plan (\$m, 2008/09)

Basis of capital expenditure estimate in Water Plan	Water	Wastewater	Recycled Water	Corporate	Total (2009/10 to 2012/13)	% of Total Water Plan
Contracted Projects	229.10	332.50			561.60	32%
Food Bowl Contribution - directed by DTF	205.00				205.00	12%
Risk Adjusted Nominal Estimation (RANE) estimate (excluding expenditure of contracted projects)	99.40	42.80		10.40	152.60	9%
Non-RANE cost estimate	152.94	434.44	0.20	3.96	591.54	33%
Allocations	75.91	159.24	0.78	27.37	263.30	15%
Total	762.34	968.98	0.98	41.74	1774.04	

As shown in the above table, 32% of the expenditure forecast in the Water Plan relates to projects currently in construction phase. The forecasts for these projects are primarily based on contracted expenditure. For alliance projects this is the approved target outturn cost and for non-alliance projects this is the tendered cost. In general, we would expect that the costing of these schemes to be fairly accurate, although the outturn cost will also depend on any pain/gain share arrangements.

Melbourne Water's contribution to the Food Bowl Modernisation project has been directed by the Department of Treasury and Finance, and the requirement has been confirmed in writing.

The remaining capital expenditure relates to projects that are yet to reach construction stage. Cost estimates for these projects are made up from Risk Adjusted Nominal Estimation (RANE) cost estimates, and non-RANE cost estimates.

In June 2008, Melbourne Water rolled out the RANE methodology. In future, the methodology is to be applied to all projects over \$1 million and within six years of capital expenditure. In the Water Plan, eight projects (excluding those projects currently contracted) have RANE cost estimates, totalling \$152.6 million.

Under Melbourne Water's RANE process, risks are identified and quantified in terms of cost consequence and likelihood in a workshop environment. A series of approximately thirty risk prompts covering a wide range of areas are used to stimulate conversation and risk identification. This includes risks associated with market trends in resources and materials which may not be captured within CPI.

A base case cost estimate is developed, which includes an assessment of the likely variation in the cost of each element (in percentage terms). The base cost, together with a project's risk assessment, it is then fed into a Monte Carlo model to determine a probabilistic risk adjusted cost estimate. In forecasting its Water Plan capital expenditure requirement, Melbourne Water has used the statistical median cost estimate (known as the P50).

We note that Melbourne Water does not currently have a centralised cost database. As such, the capital project cost estimates used to develop base case cost estimates have largely been developed by consultants. We understand that that Melbourne Water does intend to develop a centralised database of project costs and unit rates using information gathered from its recently created project Alliance teams. We consider that establishing and maintaining such a database is critical to the development of more accurate and transparent cost estimates. We would expect Melbourne Water to start developing this database over the coming months, as the first of the projects delivered by its alliance teams are completed. By the time of the 2013 Water Plan, we would expect more accurate cost estimates based on real outturn costs for similar project outputs.

Melbourne Water has indicated that its RANE process and supporting Monte Carlo model have been reviewed externally and the approach has been benchmarked against similar methodologies employed by VicRoads and endorsed by the Department of Transport and the Department of Treasury and Finance. A register of projects that have undergone RANE is currently maintained by the Asset Investment Team. Melbourne Water intends to undertake a regular internal review of RANE estimates over the project life cycle when an appropriate data set has been developed and final outturn costs are available (following the defects liability period). In addition, as a means of continuously improving cost estimation, Melbourne Water intends to establish an independent review panel, comprising selected Melbourne Water staff and an independent specialist, to conduct robust peer review of all critical projects. This will challenge the RANE cost estimates and key assumptions and provide feedback into new projects to continually improve the reliability of estimates.

We note that as the RANE cost estimates used in the plan are probabilistic, it is not possible to quantify the impact of individual risks on the cost estimate. Hence it is not possible to identify the impact of risks associated with cost increases above CPI (i.e. where Melbourne Water has assessed the risk that market trends in resources and materials may not be captured within CPI).

Non-RANE project cost estimates account for approximately 33% of the Water Plan capital expenditure forecast. This expenditure relates to projects at various states of planning. Melbourne Water has indicated that the accuracy of non-RANE estimates typically ranges from $\pm 30\%$ to $\pm 50\%$ for investigation, with accuracy increasing at each stage to $\pm 5\%$ for construction. As for the base case cost estimates used in determining RANE estimates, the Non-RANE cost estimates have largely been developed by external consultants. We expect that the accuracy of cost estimation should increase once Melbourne Water has developed a centralised database of project costs and unit rates. This will enable cost estimates to be developed from more up to date and comparable unit rates and projects.

Allocations are made where a business need has been identified, but where planning is still in the preliminary stages and has not progressed to the point where specific projects can be identified. Allocations account for approximately \$263 million of capital expenditure over the next regulatory period. These allocations are broken down in the following table.

Table 7.5 Value of capital expenditure allocations within the Water Plan (\$m, 2008/09)

Service	Allocation (\$m)	% of Service capital expenditure
Water	75.91	10%
Wastewater	159.24	16%
Recycled Water	0.78	79%
Corporate	27.37	66%
Total	263.29	15%

Renewals programs account for 89% of the water allocations and 95% of the wastewater allocations. IT renewals account for a significant proportion of corporate expenditure. Melbourne Water's renewal programs are discussed in more detail in Section 7.4.2.

7.2 Ability to deliver capital program

Melbourne Water's proposed capital program for the next regulatory period is approximately three times greater than the program delivered during the 2005 regulatory period. Delivery of this expanded capital program is likely to pose a number of challenges to Melbourne Water. While the economic downturn should free up construction resources across the construction industry, the larger program will still place pressure on Melbourne Water's internal resources.

In order to better assess how Melbourne Water has been performing in terms of delivery of its capital program we sought information on the number of projects delivered in 2007/08 versus what was planned, together with the number and value of 2007/08 projects carried over into 2008/09. While Melbourne Water explained at a high level, the basis of the differences between 2007/08 actual expenditure and the expenditure forecast in the 2005 Water Plan and in its 2007/08 quarter 1 for that year, it has not provided any details on the number of projects that were deferred, delayed or brought forward in the 2007/08 year.

However, in Section 5.5 of its Water Plan, Melbourne Water has provided a status update (as at June 2008) of its major capital projects which had outputs to be achieved during the 2005 regulatory period (Table 5.6). While most of the water projects identified in the table were delivered in advance or according to schedule, a number of wastewater projects were delayed. These delays were due to various factors including technical and stakeholder issues, the reprioritisation of expenditure and delays in securing approvals. Despite delays and deferral of a number of projects, Melbourne Water's significantly exceeded its capital expenditure forecasts in the 2005 Water Plan. Increases over planned expenditure were due to various factors including projects unforeseen at the time of the 2005 Determination, the fast tracking of some projects (e.g. Tarago Water Treatment Plant) and changes to the scope of existing projects.

From a review of Melbourne Water's capital delivery performance in recent years, it is apparent that it has encountered delays in securing approval for a number of its key projects. While many of these delays are the result of external factors, they indicate the difficulties associated with accurately planning for key project milestones. For example, as a result of the delays in obtaining environmental approvals, Melbourne Water has now revised its

2008/09 forecast capital expenditure for Sugarloaf pipeline from \$442 million to \$366 million to reflect the delayed start of the construction. Forecast practical completion has been pushed back from 21 May 2010 to 12 July 2010. In addition, delays in completion of detailed design, such as with the Tarago Water Treatment Plant Project, resulted in delays to construction with practical completion pushed back. This highlights the dynamic nature of capital planning and the complexities associated with forecasting the timing of project delivery dates years in advance. While these delays mostly tend to be short in duration (one to two months), the financial impact (in terms of changes to the profile of capital expenditure incurred) may be significant, particularly for larger projects which have significant capital expenditure.

As noted in Section 7.1.2, Melbourne Water's forecast capital program is front-end loaded. As such, any delays in the delivery of its 2008/09 program are also likely to impact its ability to deliver its future capital program. This may result in projects having to be delayed or deferred to enable delivery of the 2008/09 program. As at October 2008, expenditure on Melbourne Water's 2008/09 capital program was significantly lower than planned. Year to date expenditure was \$236.2 million, which was \$191.1 million below plan. Melbourne Water identified the following key factors which contributed to this underspend. These were:

- purchase of the water entitlement associated with Food Bowl Modernisation Project was delayed as the Business Case was not yet approved by Cabinet (\$87 million)
- significant delays in the commencement of construction of Sugarloaf Pipeline due to approvals (\$51.6 million)
- underspending by alliance programs: poor expenditure phasing not adequately reflecting time required to mobilise Alliances (\$41.4 million)
- Melbourne Main Sewer delays in commencement of construction due to approvals (\$9.1 million).

The above delays were partly offset by the remaining non program alliance projects originally scheduled for delivery in 2007/08 now being delivered in 2008/09 (\$19.4 million).

Despite the delays identified above, Melbourne Water indicated that as at December 2008, all of its major projects were on track to spend their planned budgets for 2008/09

In order to better address the challenges associated with delivery of its expanded capital program, in May 2007 Melbourne Water developed a new Capital Delivery Strategy. The strategy was developed in conjunction with water industry suppliers and it has seen Melbourne Water move away from traditional project delivery models and Design & Construct (D&C) contracts. At the time it was acknowledged that given the limited size of the capital delivery team, Melbourne Water was unlikely to have sufficient resources to deliver the significantly expanded capital program using traditional or D&C delivery models.

In Chapter 10 of its Water Plan, Melbourne Water has identified the key actions implemented under its Capital Delivery Strategy. As part of its new strategy, Melbourne Water allocates projects to one of five separate categories for capital delivery. These are major projects, bundled alliance delivery programs, bundled non-alliance delivery programs, minor works programs and miscellaneous programs. Melbourne Water's bundled alliance delivery programs will be responsible for delivering approximately \$700 million of the forecast capital program (including Waterways). The Alliances currently in place are:

- the Pipelines (Sewerage and Drainage) Alliance
- the Water Supply Alliance
- the STaPS (Sewage Treatment Plant and Pumping Station) Alliance

- the Waterways and Stormwater Quality Alliance.

In addition to the above, Melbourne Water intends to transform its two main service providers for civil maintenance and mechanical and electrical maintenance into an alliance to deliver both maintenance and minor capital works. Melbourne Water considers that these Alliance teams will be better placed to manage the risks associated with delivery of a capital program of this size. It has also undertaken a review of its governance arrangements, capital delivery process and systems in order to implement and support its Capital Delivery Strategy.

We consider that the use of program alliances should facilitate delivery of the capital program in an efficient and effective manner. As project and program performance data from the alliance contracts becomes available, and as these new working practices become more embedded within the business, we expect that the Melbourne Water will be in a position to improve its capital project delivery performance. This may be reflected as improvements in time and cost performance indicators. However, we note that given the significant shift in the approach to capital delivery, it is likely to take a number of years before the new Capital Delivery Strategy is fully embedded within the business. In the short term this may result in unforeseen delays to some projects, as both alliance teams and Melbourne Water staff familiarise themselves with this new approach to capital delivery.

Notwithstanding the above measures to facilitate delivery of a vastly expanded capital program, we consider that successful delivery of the program represents a significant challenge to Melbourne Water. Delays in securing project approvals, slippage from prior years and the capacity of the industry to deliver such a significant program of work will impact on Melbourne Water's ability to deliver its proposed capital program. While there are systems and processes in place to manage the impact of these, it is likely that the delivery of some outputs will be deferred or pushed back, with consequent impacts on capital and operating expenditure requirements.

7.3 Top 10 capital projects

In respect of Melbourne Water's capital expenditure forecasts, the ESC has requested that we focus on the major projects that comprise a significant proportion of the total capital expenditure forecasts. We have reviewed a selection of ten of Melbourne Water's major capital projects and programs to assess whether they meet the following criteria:

- appropriate in relation to key drivers and obligations – with evidence provided of such drivers and in accordance with the Statement of Obligations (SoOs)
- robust (with adequate supporting analysis and systems) – as demonstrated by reports which clearly enunciate the problems faced by the water business, set out the analysis of the options, and identify the preferred solution within the businesses' overall strategies
- deliverable over the regulatory period – whether the key activities comprising the delivery of the project, from planning to construction, have been identified and projects can be practically delivered within the proposed timeframe
- reasonable cost estimate – the cost estimates should be well supported either by a schedule of quantities using typical rates currently being experienced in the industry or compare favourably with other similar projects

We have considered programs of work which include many individual projects, such as renewals programs, in the top ten as they are easily grouped and are typically given a single project number.

The projects we have reviewed are identified in the following table, together with the service, the primary business driver, estimated completion dates and project costs.

Table 7.6 Review of Top 10 capital projects and programs (\$m, 2008/09)

Project	Service*	Primary Business Driver	Estimated Completion Date	Water Plan Expenditure (2009/10 to 2012/13)	Total Forecast Project Expenditure
Sugarloaf Pipeline	W	Compliance - New	2010 (pipeline)	522.10	1,053.10
ETP Tertiary Treatment	S	Compliance	2012	294.10	314.60
Northern Sewerage project	S	Compliance	2012	192.20	381.40
Melbourne Main Sewer	S	Renewals	2012	134.90	193.00
ETP M&E renewals	S	Renewals	Ongoing	59.20	-
WTP wet weather capacity upgrades	S	Growth	2010	42.80	46.70
Water mains renewals Preston to North Essendon	W	Renewals	2011	37.00	52.60
Water mains renewals North Essendon to Footscray	W	Renewals	Ongoing	32.20	41.30
Sewerage transfer M&E renewals	S	Renewals		31.70	-
Upgrade grit and screenings removal facility at ETP	S	Renewals	2012	25.60	29.40

Note (*) W = Water, S = Sewerage

7.3.1 Project 1 – Sugarloaf Pipeline Project

Project Description

The key components of the Sugarloaf pipeline project are included within the Water Plan as four separate projects. These are:

- Sugarloaf pipeline and pumping station
- contribution to the Food Bowl project
- upgrade of Winneke treatment plant
- upgrade of downstream transfer works.

The Sugarloaf pipeline and pumping station project is currently in the construction phase. The project involves the construction of a pipeline linking the Goulburn River (near Yea) to Sugarloaf Reservoir in Melbourne's north-east. In its Water Plan, Melbourne Water has assumed for modelling purposes that the pipeline will transfer an average volume of 75GL/annum from 2010/11, following 30GL in 2009/10 (February to June 2010).

In addition to the Sugarloaf pipeline and pumping station project, in June 2007 the Victorian Government announced that Melbourne Water would contribute \$300 million to the \$1

billion first stage of the Food Bowl Modernisation project. The project is aimed at creating water savings which will be shared equally between irrigators, the environment and Melbourne (transferred via the Sugarloaf pipeline). The payment will be made to DSE for the acquisition of a bulk water entitlement.

The upgrade of Winneke Treatment Plant is required to ensure that the plant can reliably treat the additional water supplied by the Sugarloaf pipeline. The project has received preliminary approval and is currently in functional design stage. It will involve upgrading Winneke Treatment Plant to increase its production rate from an average of 157GL/annum to 170GL/annum. In addition to the plant upgrade, Melbourne Water is proposing a separate project for the management of residual sludge for the treatment plant, and another for reliability upgrades at the plant. While the existing sludge system is capable of removing the expected increase in sludge by discharging to sewer, Melbourne Water's strategy is to remove the sludge to Eastern Treatment Plant (ETP). Melbourne Water expects that the additional sludge load will impact the treatment capacity and efficiency of ETP and will require an upgrade to handle the additional load.

The upgrade of the downstream transfer works relates to an opportunistic project that Melbourne Water is proposing to undertake in order to utilise 50GL/annum additional flow from Sugarloaf pipeline. The project involves constructing a new pumping station at Preston, together with associated pipework to facilitate transfer flows to Mitcham and Olinda supply zones. The project will enable water treated at Winneke to be transferred into areas currently supplied from Silvan Reservoir, including Greenvale, Olinda and Mitcham water supply zones.

Key drivers and obligations

Melbourne Water has identified its Statement of Obligations (SoO) as the key driver for the investment in the Sugarloaf project, which requires it to 'develop a program of works or initiatives to secure water supplies beyond seven years'.²⁷ In addition, development of the works is consistent with the CRSWS and the State Government's Water Plan. The State Government's Water Plan requires delivery of the project by 2010.

Our Water Our Future (OWOF) states that the upgrade of the downstream infrastructure is required in order to ensure that the additional water treated at Winneke is integrated throughout the Melbourne Supply zones. In addition, Melbourne Water has identified that the works are required to drought proof Melbourne and that they form part of Melbourne Water's Drought Response Plan.

Solution development and fit with overall business strategy

Pipeline and Pumping Station

Prolonged low surface water flows at Melbourne Water's main water storages, coupled with a decade of below long-term average stream flows have raised questions about the ongoing security of Melbourne's water supply and its vulnerability to climate change.

OWOF identified a number of risk reduction strategies to address water scarcity within the state. These included a reduction in reliance on the existing water supply reservoirs through a greater diversification of water sources; development of new water sources from a contribution from water conservation to traditional reservoir storages; and water reuse from recycling and the use of rainfall independent sources of water.

The Goulburn-Murray Food Bowl irrigation district was identified by the Victorian Government for water saving, and it was estimated that updating infrastructure in the district would deliver approximately 450GL of water savings by the end of 2015. The Government

²⁷ Melbourne Water Statement of Obligations, Part 5, s.29

indicated that one third of the savings available would be provided for use in the water supplies for Melbourne. Hence, construction of a new pipeline from the Goulburn River was required in order to transport these water savings to a reservoir in Melbourne.

The initial pre-feasibility study for the Sugarloaf pipeline was conducted in May 2007. Subsequent investigation by Melbourne Water included technical investigation by specialists consulting with Melbourne Water and the DSE.

Four options were considered for the Sugarloaf pipeline. These were:

1. Base Case - Do Nothing (assuming continuation of past 10 years average rainfall)
2. Do nothing (assuming continuation of past 3 years average rainfall)
3. Sugarloaf Pipeline (Melba Highway Route)
4. Yan Yean/Sugarloaf Pipeline (Hume Highway Route).

A Triple Bottom Line (TBL) framework was adopted to determine which of the four options provided the greatest benefits to the community and the environment, while meeting the efficiency requirements of public spending. The Melba Highway option was selected as delivering the best value for money outcome.

Melbourne Water appointed a consortium under an Alliance Agreement to provide design and project approval services to the Project. The Alliance developed a preliminary design which was used as the basis of the business case for construction of the pipeline. The business case covered all aspects of the project, from the assessment of options to the preferred delivery model.

Board approval was secured, and in December 2007, the Minister for Water and the State Treasurer approved the business case for construction of the pipeline. Due to the size and nature of the project it was subject to the Gateway review process as part of the project approval process.

Prior to Board approval, Melbourne Water commissioned three separate independent reviews of the project. An independent expert estimator reviewed the target outturn cost (TOC). The review encompassed a detailed analysis of the rates, material quantities and construction techniques proposed for the project, with additional advice provided on the strategic assumptions behind the TOC. An independent reviewer undertook a strategic overview of the project in order to assist Melbourne Water with its appraisal of the TOC. A technical review of the design was also performed.

A Project Impact Assessment (PIA) of the project was undertaken in order to ensure that project specific environmental, social and cultural effects of the project were considered and documented. It outlines how these issues will be managed and how compliance with policy and statutory requirements will be achieved. The PIA was completed in consultation with relevant statutory agencies, and it formed the basis of the approvals process.

In August 2008, Melbourne Water's Board approved the project cost for the Sugarloaf pipeline, and in September 2008, the Treasurer also granted approval to proceed with construction.

Based on the information provided by Melbourne Water, it is evident that the project is clearly aligned to its strategic objectives and that it has been subject to a detailed and robust review at each stage of development.

Upgrade of Winneke Treatment Plant

The Water Plan capital expenditure for the Winneke Treatment Plant project comprises two key sub projects, the upgrade itself and a project for the management of residual sludge. In

addition, allowances have been made for other reliability upgrades at the plant. Each of these projects is discussed below.

Upgrade of treatment plant - filters

The inclusion of the upgrade of Winneke Treatment Plant in the Water Plan follows investigations by Melbourne Water in 2007 into the readiness of the treatment plant for the additional flows from the Sugarloaf pipeline. The study concluded that in order to utilise the additional flows from the Sugarloaf pipeline, additional capacity would be required. Melbourne Water, together with assistance from the retails and external consultants, assessed options for upgrading the plant. Two options and a Do Nothing option were initially considered. The options considered were to construct a new treatment plant to treat the additional load; or to undertake a retrofit of the existing plant and build additional filters. However, the Do Nothing and the New Treatment Plant options were dismissed immediately. The Do Nothing option did not meet flow requirements and the new treatment plant was deemed to be excessive in cost and construction would not be completed in sufficient time to meet project deadlines. The preferred option involves constructing two new filters at the plant.

The preferred option was approved by Melbourne Water's Board on 15 August 2008. In August 2008, a business case for the upgrade seeking approval for the upgrade was submitted to the DTF/DSE. DTF/DSE approval was obtained in November, one month later than originally planned.

On the basis that the upgrade of Winneke Treatment Plant is required to ensure full utilisation of the Sugarloaf pipeline, we consider that the upgrade project is consistent with Melbourne Water's strategic objective and business strategy. We note that timing on this project is a critical issue, as flows from the Sugarloaf pipeline will not be able to be fully utilised until the Winneke Treatment Plant has been upgraded. Hence, timely delivery of the scheme is critical to the success of the Sugarloaf pipeline and pumping project.

Sludge handling project

The 2007 study into the readiness of Winneke Treatment Plant for the additional flows from the Sugarloaf pipeline found that the existing sludge system was capable of removing the expected increase in sludge by discharging to sewer (for treatment at ETP). However, the resulting increase in load is expected to have a significant effect on the operation of the ETP, and will require significant capital upgrade at ETP to process the additional solids load.

Melbourne Water has indicated that at the time the Water Plan was prepared, the residual sludge project was expected to be constructed over the period 2009/10 – 2011/12. This assumed that ETP would have sufficient capacity to accept additional suspended solids from Winneke (due to the need to treat additional Sugarloaf Pipeline water) for the intervening period until completion of the sludge project, and therefore the project could be profiled over the later years of the Water Plan period. However, Melbourne Water indicated it now estimates that there is a significant risk that ETP will be overloaded with solids due to the additional sludge load from Winneke approximately six months after the completion of the Sugarloaf pipeline project. It is expected that this would result in a breach of ETPs discharge licence. This means the project must be completed by mid to late 2010.

Melbourne Water commissioned a consultant to undertake a review of sludge handling options. The review was completed in December 2008, and it involved the assessment of eight options, six involving treatment at Winneke Treatment Plant, one involving the transfer of sludge to sewer for treatment at ETP (current practice), and one involving the transfer of sludge to sewer for treatment at ETP.

A TBL framework was adopted to determine which option represented the most efficient and effective approach for the business. The review identified a centrifuge drying plant located at **Deloitte**: Melbourne Water Expenditure Review

Winneke Treatment Plant as the preferred option. Following completion of the options review, Melbourne Water prepared a Business Needs Identifier, and approval to proceed to development of the Preliminary Business Case was secured in January 2009. The Functional Design is currently underway, after which Board Approval will be sought (in April 2009). Approval must also be secured from the DTF before the project can proceed.

On the basis that the sludge upgrade is required to ensure full utilisation of the Sugarloaf pipeline, we consider that the project is consistent with Melbourne Water's strategic objective and business strategy. We note the current uncertainty around the volume of water that will be available for transfer via the Sugarloaf pipeline. Based on the information provided, it is unclear whether Melbourne Water has assessed the possibility of phasing the delivery of the project. However, we note that this might not be possible as the full bulk water entitlement (75GL) will be transferred in the first year of operation.

Reliability upgrades

In addition to recommending the construction of two new filters, the 2007 investigation of Winneke Treatment Plant recommended a number of other projects to improve reliability such that the additional flows from the Sugarloaf pipeline could be reliably and effectively treated. The Preliminary Business Case for the Winneke Treatment Plant, dated July 2008, identified the following project as being specifically designed to improve reliability of the plant:

- a new washwater recovery tank
- Program Logic Controller (PLC) network upgrades
- additional fluoride storage and service water automation
- Reservoir Pump Station (RPS) upgrade (covered by separate business case)
- lime upgrade (covered by separate business case).

In addition to these projects, a set of secondary projects specifically designed to maintain or improve service levels were also identified. These are:

- filter backwash upgrade
- clarifier flow split
- clarifier monitoring equipment
- relocation of pre-lime dosing and new pH meter
- coagulant aid polymer system
- reservoir automation.

Except for referencing the 2007 investigation, the Preliminary Business Case does not provide any detail in relation to how the reliability projects were identified or assessed. While the need to undertake the first five reliability projects within the Water Plan period is clear (i.e. to ensure that the plant is capable of treating additional flows from the Sugarloaf pipeline), the need and timing of the remaining six projects is less substantiated. For example, the Preliminary Business Case notes that the coagulation and filtration upgrades proposed will lower the average filtered water turbidity of the water. It states that although Winneke already exceeds drinking water quality requirements, providing further improvements in this area reduces the impacts of process upsets and demonstrates commitment to providing industry best practice in water treatment process. Given the significant increase in prices proposed over the next regulatory period, we requested that Melbourne Water provide further supporting evidence to substantiate both the need and proposed timing of these secondary upgrade projects.

In response, Melbourne Water provided copies of the Functional Requirements Statement for the ancillary (reliability) works (dated April 2008), a process audit report undertaken at Winneke (dated November 2004), and a functional design report with project costings (dated August 2008). The audit report identified a number of processes and assets that required capital upgrades to ensure process stability. These were primarily related to the filters and backwashing, and the clarifiers. The functional requirements statement and design report outline the works to be undertaken as part of the secondary projects.

Melbourne Water indicated that due to the Sugarloaf Pipeline project, and the need for Winneke to operate at capacity for sustained periods, the works have now been brought forward. Construction is now scheduled to coincide with the upgrade of the filters.

Melbourne Water is of the opinion that not undertaking the works at all will pose a 'very significant risk' of losing process control and ultimately failure of the treatment process. It has indicated that delaying the works until after the Sugarloaf Pipeline project is completed is not practical as it would require taking sections of the plant offline, which would reduce the capacity of the plant. While Winneke Treatment Plant produces water that meets its water quality targets, and Melbourne Water is confident that this will continue to be the case, it indicated that if the plant is running at higher throughputs there is an increased risk that water quality requirements will not be met. Hence, in order to ensure that water is of sufficient quality, the throughput of the plant will have to be reduced to ensure that quality is maintained.

From the additional information provided by Melbourne Water it is clear that the reliability projects are required to ensure full utilisation of the Sugarloaf pipeline. Hence, we consider that the projects are consistent with Melbourne Water's strategic objective and business strategy. However, the need to undertake the secondary projects in the coming Water Plan period appears less critical. It is not clear whether Melbourne Water has considered delaying any of the secondary projects in light of the uncertainty surrounding the Sugarloaf pipeline volumes, or the significant increase in prices proposed over the next regulatory period. However, it is evident that there are efficiencies to be achieved by undertaking the works in conjunction with the upgrade to the filters.

On the basis that the reliability upgrades are required to ensure full utilisation of the Sugarloaf pipeline, we consider that the projects are consistent with Melbourne Water's strategic objective and business strategy. While the need to undertake the secondary projects in the coming Water Plan period appears less critical, it would appear that efficiencies may be achieved by undertaking these works in conjunction with the reliability projects.

As the cost of each of the individual reliability project upgrades is below the \$5 million threshold for approval from DTF and DSE, Melbourne Water has indicated that the projects would be delivered internally by Melbourne Water in accordance with its internal delegation of authority.

Upgrade of the downstream works

An investigation conducted by Melbourne Water in 2007, *Victorian Water Plan: Drinking Water Implications for Melbourne*, concluded that to maximise the utilisation of water supplied by the Sugarloaf Pipeline, water treated at Winneke will require substitution into areas currently supplied from Silvan Reservoir, including Greenvale, Olinda and Mitcham water supply zones.

Investigation for the project commenced in January 2008. Three options, including a Do Nothing option were considered. The assessment of options was against Melbourne Water's Triple Bottom Line Criteria, by a multi-criteria assessment, and by an assessment against project objectives. The multi-criteria assessment involved a review of the net present cost of the options, greenhouse emissions, water quality, system flexibility, community impacts

during construction, and community impacts during operation. The assessment against project objectives included a review of whether the option could transfer the available volume of water, whether it would maintain water quality levels consistent with the Bulk Water Supply Agreement and whether the works could be completed in parallel with the Sugarloaf pipeline (in terms of time to construct).

The Do Nothing option was discounted on the basis that it would compromise Melbourne Water's compliance with the OWOF strategy. The other options investigated were a pumping station at Preston to supply the Mitcham and Olinda zones (the preferred option), or a link main from Winneke treatment Plant to Mitcham Reservoir or Olinda Reservoir. The pipeline option was discounted on the basis that it was not possible to construct the pipeline in within the required timeframe, and hence was not viable. The preferred option had the lowest whole of life cost and the highest score in the multi-criteria assessment.

Functional design of the preferred option commenced in April 2008, and a functional business case was prepared. In accordance with a request from the Treasurer in December 2007 that further information relating to the projects to be delivered downstream of the Sugarloaf Pipeline projects be provided, a business case was forwarded to DTF for approval in October 2008. Melbourne Water has indicated that approval for the upgrade of the downstream works was obtained in December 2008.

On the basis that the upgrade of the downstream works is required to ensure full utilisation of the flows from the Sugarloaf pipeline, we consider that the upgrade project is consistent with Melbourne Water's strategic objective and business strategies. Melbourne Water has undertaken a review of options and the project has been approved by DTF.

Deliverability over the regulatory period

Pipeline and pumping station

The Sugarloaf pipeline is being delivered by Melbourne Water's Water Supply Alliance. The completion date of Sugarloaf pipeline announced by the State Government is mid 2010. Melbourne Water has indicated that in light of ongoing water shortages, it is working to complete this project earlier than mid 2010. We note that due to delays in obtaining approvals from the DSE, construction on Sugarloaf did not commence until September 2008, which was five months later than planned. When questioned as to whether this would result in delays to the overall program, Melbourne Water indicated that it remained confident of meeting the mid 2010 commissioning date.

The October 2008 project report for the Sugarloaf pipeline and pumping station indicates that practical completion and completion dates have been revised as a result of the delay in gaining project approvals. The practical completion date has been moved from March 2010 to the end of May 2010, and the commissioning date moved from May 2010 to mid July 2010. The capital progress report for February 2009 indicates that despite some delays to construction due to the bushfires, Sugarloaf remains on schedule for practical completion in May 2010 and commissioning in July.

We note that the timing of the scheme is critical to its success, as the pipeline must be commissioned and available to transfer water from the Goulburn River in the spring/summer of 2010/11 when the flows are available from releases from Eildon for irrigation purposes. A failure to have the pipeline available for commissioning during the 2009/10 irrigation season could limit the volumes able to be transferred in the 2010/11 spring/summer.

Based on the information provided by Melbourne Water, the project it appears that the project is currently is on track to meet mid 2010 deadline. However, we note that much of the contingency built into the project schedule has been lost due to delays experienced in securing project approvals.

Winneke Treatment Plant

As noted above, the Winneke Treatment Plant project consists of an upgrade to the treatment plant, a sludge handling project and a number of reliability upgrades. Each of these is discussed in the following sections.

Upgrade of treatment plant - filters

The delivery of the upgrade of the Winneke Treatment Plant will be via the Water Supply Alliance. The key objective of the project is to ensure that the additional water will be able to be fully used following completion of the Sugarloaf pipeline. Hence, completion of the works is required to coincide with the completion of the pipeline.

The business case submitted to DTF for the upgrade works indicated that approval from the DTF would be secured by October 2008, with construction commencing in November or December 2008.

We understand that DFT/DSE approval was obtained in November 2008 and that site construction for the filters is expected to commence around March 2009, which is approximately three months later than planned. In addition, Melbourne Water commenced procurement of long lead items in late 2008, with progressive placing of orders commencing from January 2009, which is three months later than originally planned.

Melbourne Water indicated that although the start date of the filters has moved back, the commissioning date of the Sugarloaf pipeline has also moved back. Hence, it considers that there is sufficient time to complete the project in time to be ready for the commissioning of the Sugarloaf pipeline, now forecast for mid July 2010.

Melbourne Water provided a copy of the updated project programme. The programme indicates that commissioning of the new filters will take place in November 2009.

Melbourne Water has indicated that it has implemented a number of actions to ensure that it will achieve the commissioning date. Approximately \$1.4 million of materials have been, or are in the process of being procured, and it is currently tendering the civil and earthworks packages. Contractors started on site in the last week of February, which is ahead of the project schedule.

Given the delays to the project it is necessary to re-profile the project expenditure reported in the Water Plan. This is discussed in greater detail below, under cost estimation for the project.

Sludge handling project

Melbourne Water has indicated that at the time the Water Plan was prepared the residual sludge project was expected to be constructed over the period 2009/10 to 2011/12. This was based on the assumption that ETP would have sufficient capacity to accept additional suspended solids from Winneke (due to the need to treat additional Sugarloaf Pipeline water) for the intervening period until completion of the sludge project. Hence, Melbourne Water profiled expenditure for this project over the later years of the Water Plan period. Melbourne Water has since found that short term capacity constraints at ETP due to growth and the timing of augmentation projects, has necessitated the earlier completion of the sludge project (April 2010) to broadly coincide with the commissioning of the Sugarloaf Pipeline.

Melbourne Water provided a copy of a project timeline which was prepared as part of the development of the project functional requirements. The programme indicates that the Preliminary Business Case is due to go to Melbourne Water's Board for approval in April 2009. Following this, Melbourne Water will also be required to submit a separate business case to the DTF and the DSE for approval.

The project approval process will be undertaken in parallel to the functional and detailed design so as to minimise the impact of the approvals process on delivery of the project in the required timeframe. As the project must be delivered by July 2010, Melbourne Water has compressed both the functional and detailed design stages to just over three months. According to Melbourne Water's Capital Management Procedures, for a project of this size, functional design and detailed design usually take approximately four months.

The project timeline also indicates that Melbourne Water intends to place the order for the centrifuges following Board approval, but prior to DTF approval.

During our interviews with Melbourne Water, it indicated that fast-tracking of projects through the planning process extremely difficult. Given that the project must be completed by April 2010, any delays experienced during the approvals process, design or construction will impact Melbourne Water's ability to meet the project deadline. On this basis, we consider that there is a high risk that the project will fail to meet the planned date for practical completion of April 2009.

Reliability upgrades

The Preliminary Business Case for the Winneke Treatment Plant (dated July 2008) indicates that the reliability projects will be delivered by the Water Supply Alliance along with the other upgrades at the site (including the new filters). It states that a combined project program had been developed for all the works, of which the reliability upgrades formed part. While a combined delivery of the projects should assist a more timely construction, we understand that individual business cases for each of the reliability projects will have to be developed. Melbourne Water has indicated that individual projects have been approved to internal Preliminary Business Case stage, with no individual projects exceeding \$5 million.

As noted above, construction of the upgrade works at Winneke has been subject to delay. This has resulted in corresponding delays to the reliability projects. This is evident in the programmes for a number of the reliability projects, which show slippage of a number of milestones. We note that Melbourne Water has now taken a number of actions to facilitate timely delivery of the projects, including advanced procurement of a number of items. While we note that the timing for these reliability projects is becoming increasingly constrained, Melbourne Water considers that the projects will be delivered within the required timeframe. Successful delivery will be dependent on the timely delivery of all future milestones.

Given the delays to the project it is necessary to re-profile the project expenditure reported in the Water Plan. This is discussed in greater detail below, under cost estimation for the project.

As a result, Melbourne Water has reforecast the expenditure profile for the reliability projects, particularly given that none of the projects is at an advanced in the project planning process.

Upgrade of the downstream works

The business case for Preston Pumping Station (the upgrade of the downstream works) indicates that the primary objective of the works is to ensure that additional water from the Sugarloaf pipeline can be used immediately, meaning that the timing of the project is crucial to a successful outcome.

The Business Case submitted to DTF identified each of the key milestones for this project. The timing of the implementation is based on the assumption that DTF approval would be obtained by November 2008, with construction commencing in January 2009. Construction

is expected to take approximately 11 months, and completion was expected to be achieved between September 2009 and February 2010.

We understand that the DFT/DSE approval was obtained in December 2008, which was one month later than planned. Given the contingency built into the project plan, the delay should not impact on Melbourne Water's ability to deliver the project by the required deadline. We note that the Water Supply Alliance is responsible for delivery of the project and hence any delays to other Sugarloaf projects may have a consequential impact on delivery of Preston Pumping Station.

Cost estimate

The cost estimate for the Sugarloaf Pipeline project included in the Water Plan is broken down as follows:

Table 7.7 Capital Expenditure for Sugarloaf pipeline projects (\$m, 2008/09)

Project	2008/09	2009/10	2010/11	2011/12	2012/13	Water Plan Expenditure (2009/10 to 2012/13)	Total Project Expenditure
Pipeline and pumping station	357.25	229.09	0.00	0.00	0.00	229.09	627.85
Capital contribution to food bowl project	85.00	85.00	80.00	20.00	20.00	205.00	300.00
Upgrade of Winneke treatment plant	20.00	12.00	17.00	6.00	0.00	35.00	55.00
Upgrade of downstream transfer works	17.00	38.00	15.00	0.00	0.00	53.00	70.21
Total	479.25	364.09	112.00	26.00	20.00	522.09	1,053.05

Pipeline and Pumping Station

In Melbourne Water's Water Plan, the capital expenditure for the Sugarloaf pipeline and pumping station was forecast to be \$628 million, of which \$229 million fell within the next regulatory period. The expenditure for this project was approved in a letter by the Treasurer in September 2008, a copy of which was provided by Melbourne Water.

The project cost estimate is the 50th percentile estimate (P50), which is the expected outturn cost accounting for known risks. The expenditure is comprised of the Target Outturn Cost (TOC) for the Sugarloaf Pipeline Project Alliance responsible for delivering the project (\$582.6 million), non TOC project costs (\$42.2 million) and an allowance due to the protracted delay to commence the project (\$3 million). The agreement with the Alliance Participants includes a Target Cost Gain/Pain share arrangement, with savings or project overruns shared according to a pre-determined agreed split.

The TOC has been subject to review by an independent expert estimator. The review process took a number of months, an involved a detailed analysis of rates, material quantities and construction techniques proposed for the project.

The TOC includes escalation costs (\$23.7 million) which cover labour, materials (excluding pipe supplied by Melbourne Water), subcontractors, staff, consultants and plant. According

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to the TOC (dated 27 May 2008), 'the escalation estimate was calculated to include realistic allowances for the increased costs over the project duration due to time. Specific factors such as the price of steel and oil prices due to demand outstripping supply for the next two to three years as well as more general factors such as the newly announced federal budget pumping \$20 billion into the infrastructure construction industry and significant projects in the region (e.g. Melbourne Desalination Plant), have been considered in the escalation calculation'. The escalation analysis in the TOC indicates that rates vary depending on the material in question, with escalation of reinforcing steel and fabric the greatest, at 35.50%.

The \$23.7 million escalation is broken down as follows:

- materials (excluding Melbourne Water supplied pipes) - \$10.5 million (15.48% average annual escalation)
- subcontractors - \$8.3 million (8.46% average annual escalation)
- labour - \$0.7 million (5.00% average annual escalation)
- plant - \$2.5 million (6.2% average annual escalation)
- staff - \$1.7 million (8.90%).

As discussed in chapter 5, material prices (including steel and fuel) have fallen sharply in recent months. In addition, given the current economic climate, we consider it unlikely that expenditure on staff and labour will escalate at the rates assumed in the TOC. As these costs have been factored into the TOC, savings on materials, labour or the purchase of plant (i.e. below that assumed in the TOC) will result in a lower outturn cost, with savings shared between Melbourne Water and the Alliance team according to its pain/gain arrangement.

On the basis that these escalation allowances are unlikely to materialise, we do not consider that they should be included within the forecast capital expenditure for the next regulatory period. However, we note that as this is a performance based contract, the contractor will be entitled to 50 percent share of any savings made. As such, we accept that Melbourne Water may be obliged to pay 50 percent of the escalation allowance. However, we recommend that the remaining escalation allowance (\$11.85 million) be excluded from the allowed capital expenditure. As the pain/gain payment is likely to be made at the end of the project, we recommend that this allowance be excluded from the capital expenditure forecast for the last year of the project (2009/10).

An allowance of \$24.7 million for risks and opportunities is also included within the TOC. In order to quantify the commercial risk, six workshops were held in 2007, which were attended by various members of the alliance team, Melbourne Water and an independent estimator. A total of 41 risks were identified with potential project cost implications, and the likelihood and consequence of each was estimated. A probabilistic estimate of the risk allowance was calculated using @Risk software. This was used at the basis for the TOC risk and opportunities allowance. The most significant risk identified was that the productivity varies from the planned rate (slower progress than planned). This risk was identified as 'extreme', with the cost of the risk materialising expected to fall within the range -\$10.6 million to \$26.2 million. Also included within the risk assessment was the 'Accuracy of Escalation/Rise and Fall Predictions', which is the risk that escalation rates may be higher or lower than forecast. This risk was assessed as 'high'. The cost of such a risk materialising was ±\$4 million. As the ultimate risk contingency is probabilistic, it is not possible to identify the ultimate impact of each risk occurring on the TOC.

Non TOC project costs include \$█ in performance fees to the alliance which will be paid for outstanding performance in key result areas, easement and land acquisition costs (\$9 million) together with other items such as insurance. It also includes a small allowance (of \$726,000) for risks and opportunities. Given that the performance of the alliance team in its

key result areas is unlikely to be finalised until the completion of construction, the requirement for this payment remains uncertain.

Melbourne Water has indicated that advice from its consultants is that most Alliances achieve better than business as usual performance allocation (■ percent) but not the full allocation (100 percent). The \$■ allowance in the Water Plan therefore represents ■ percent of the total performance fee that will become payable if the contractor achieves all the project performance targets.

As Melbourne Water's Alliance programme is still in its early stages, we recommend that only ■ percent (\$■) of the performance allowance be included within the capital expenditure forecast. We consider that this better reflects the current uncertainty surrounding the payment of the performance bonus, and represents an equitable split of the pricing risk between Melbourne Water and its customers. As such, we recommend that the capital expenditure forecast in the Water Plan be reduced by \$■.

On the basis of our review we confirm that the expenditure reported within the Water Plan for the pipeline and pumping station is committed, and in line with the project approval provided by the Treasurer in September 2008. We have reviewed the TOC for the project, together with relevant project approvals. On the basis of our review, we recommend that the capital expenditure allowance within the Water Plan be reduced to exclude part of the allowances for escalation (\$11.85 million) and performance fees (\$■). Hence, our revised estimate is \$611.3 million (project total), and \$212.6 million for the Water Plan period.

The capital progress report for February 2009 indicates that Melbourne Water now forecasts that the Sugarloaf pipeline will be delivered for \$601.5 million, which is \$26.3 million below the Water Plan forecast, and is also lower than our revised estimate (\$611.3 million). From the information provided in the capital progress report, it is not possible to identify where these savings have been made. Due to time constraints, we have not had the opportunity to investigate this further. However, we consider it likely that lower than expected escalation on materials and labour is likely to have contributed to these savings. This reduction is not unexpected as the project forecast and TOC were agreed at a time when market conditions were significantly more buoyant.

On the basis that the February forecast represents the most up to date project cost estimate, we recommend that this estimate be used for the purposes of determining Melbourne Water's expenditure requirements.

Table 7.8 Overview of recommended changes to Sugarloaf pipeline and pumping station (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13	Water Plan Expenditure	Total Project Expenditure
Sugarloaf pipeline and pumping station	Water Plan	357.25	229.09				229.09	627.85
	Revised forecast	362.8	197.2				197.2	601.5
	Net change	5.5	-31.9				-31.9	-26.3

On the instruction of the DTF Melbourne Water has included an allowance for a contribution to the Food Bowl modernisation project within its Water Plan. Melbourne Water's contribution to the project will total \$300 million (over the period 2008/09 to 2013/14), with \$205 million falling within the Water Plan Period.

Melbourne Water provided a copy of an email from the DTF, which specifies both the contribution and the phasing of payments to the Food Bowl Modernisation project. Within the email to Melbourne Water, the DTF has stated that it is possible that the current cash flow projections may be subject to re-phasing. However, no indication of what the re-phasing might be is available.

Upgrade of Winneke Treatment Plant

As noted above, the Water Plan capital expenditure for the Winneke Treatment Plant is comprised of two key sub projects, the upgrade itself and the management of residual sludge. In addition, allowances have been made for other reliability upgrades. The total of these is \$55 million, of which \$35 million will be incurred over the coming regulatory period.

In the business Case for the Winneke Treatment Plant upgrade submitted to DTF in August 2008, Melbourne Water has indicated that the cumulative cost of all these components (i.e. the Winneke upgrade, the management of residual sludge, and other reliability upgrades) is expected to be less than \$55 million. On the basis that only prudent and efficient expenditure should be included within Melbourne Water's expenditure allowance, we sought additional information from Melbourne Water as to the expected outturn expenditure of these projects. In response, Melbourne Water indicated that at this stage, the cumulative cost of all the projects is estimated at \$55 million based on revisions to the cost estimates. It did not provide any additional information as to the nature and reason for these revisions.

Upgrade of treatment plant - filters

Melbourne Water has included an allowance of \$28 million for the Upgrade of the Winneke Treatment Plant, which is for the construction of the new filters and the reliability projects (discussed in greater detail below). A single RANE estimate has been produced for these projects as it is assumed that they will be delivered together. Of the \$28 million forecast for the Upgrade of Winneke, \$14.6 million relates to the new filters.

The cost represents the P50 probabilistic risk adjusted cost estimate. The estimate was developed by the Water Alliance team using Melbourne Water's cost estimation guidelines. As noted in Section 7.1.2, as part of the RANE methodology, a base case cost estimate is developed for the project, together with an estimation of the likely variation in cost of each element. Project risks are then identified and quantified in terms of cost consequence and likelihood in a workshop environment. The base cost estimate, together with projects risk assessment, is then fed into a Monte Carlo model to determine a probabilistic risk adjusted cost estimate.

Melbourne Water indicated that the base costs in RANE were based on typical rates and schedules of quantities, and on experience based on previous projects. The cost estimation process involved a collaborative review of base costs and identified risks from a range of departments in Melbourne Water and key external parties including the design engineers, and engineering advisors.

A review of the input risks indicates that an allowance has been made for input cost inflation (specifically materials, labour, construction costs, fuel and steel) ranging from \$80,000 to \$170,000. As the cost estimate is probabilistic, it is not possible to identify the impact of this risk on the P50 cost estimate. Given current market conditions, we do not consider it appropriate to include within the capital expenditure forecast, allowances for the escalation of items such as materials, fuel and steel. However we note that, given the upper and lower range of the input risk, the allowance in the capital cost estimate is unlikely to be material.

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For the most part, we consider the allowance included in the Water Plan for this project reasonable and well supported. However, we note that the estimate may be subject to change when the TOC is developed in the coming months.

Melbourne Water has now re-profiled the project expenditure to account for the delays in the project planning phase and \$3.2 million has shifted from 2008/09 to 2009/10. The revised forecast capital expenditure for the Winneke project is shown in the table below.

Sludge handling project

In its Water Plan Melbourne Water has made an allowance of \$27 million for the sludge handling project. Melbourne Water indicated that the estimate was 'based on a consultant's preliminary estimate for mechanical dewatering of the expected sludge load and therefore the estimate is expected to be accurate within + or - 40%'.

In January 2009, following the review of options, the 'Business Need Identifier' for the project was approved at \$13.4 million. Since that time Melbourne Water has identified a number of benefits with locating the centrifuges at a location close to, but not at, Winneke Treatment Plant. It has stated that the cost of this re-location will be \$0.9 million, although it has not provided any substantiation of this estimate. In addition, it has indicated that as a RANE estimate is yet to be completed; it considers it appropriate that an additional 30% be added to the estimate, taking it to \$18.6 million.

Based on our review we do not consider it appropriate to include a contingency allowance without formal project approval. In addition, as Melbourne Water has not provided any substantiation of the \$0.9 million allowance for re-location, we have been unable to verify this figure. Hence, we recommend that only the approved expenditure (\$13.4 million) be included within the capital expenditure forecast, phased over 2008/09 and 2009/10.

Reliability upgrades

As noted above, Melbourne Water has included an allowance of \$28 million for the Upgrade of the Winneke Treatment plant, which is for the construction of the new filters and the reliability projects. A single RANE estimate has been produced for these projects as it is assumed that they will be delivered together. Of the \$28 million, \$13.4 million relates to the reliability projects.

The project reliability upgrades are split into those specifically required to improve reliability to ensure that the plant can treat additional flows from the Sugarloaf pipeline, and a second set of projects (secondary projects) that are designed to maintain or improve asset service levels. These projects include such works as installation of new clarifier monitoring equipment, reservoir automation, upgrading the existing filters and a filter backwash upgrade.

The base cost estimates for the reliability upgrades were estimated as part of the Functional Design. The accuracy of the estimates is approximately 30 percent, which is reasonable given the current stage of development. For the most part, we consider the allowance included in the Water Plan for this project reasonable and well supported. However, we note that the estimate may be subject to change when the TOC is developed in the coming months.

Table 7.9 Overview of recommended changes to Winneke Treatment Plant projects (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Winneke projects – Water Plan	New filters & reliability projects	19.00	9.00			
	Sludge handling project	1.00	3.00	17.00	6.00	
	Total Water Plan	20.00	12.00	17.00	6.00	
Winneke projects – MW Updated Forecast	New filters & reliability projects	15.80	12.20			
	Sludge handling project	0.34	18.26			
	Total Updated Forecast	16.14	30.46			
Winneke projects – recommended expenditure	New filters and reliability upgrades – phasing adjustment	15.80	12.20			
	Sludge handling project	0.34	13.10			
	Total revised forecast	16.14	25.30			
	Net change*	-3.86	13.30	-17.00	-6.00	

Note (*) - The net change is the recommended expenditure less the Water Plan forecast

Upgrade of the downstream works

The cost of the upgrade of the downstream transfer infrastructure includes four packages of work:

- construction of the Preston Pumping Station, including the connection of the current water supply system
- surge mitigation works required between Preston Reservoir and Olinda Reservoir
- Olinda Reservoir Connection Works
- Greenvale Reservoir Connection works.

The cost estimate for the works is a probabilistic, risk based estimate developed using Melbourne Water’s cost estimating guidelines. The expected project cost is \$20 million (P50 - 50th percentile), with the range expected to fall between \$19 million (P5 - 5th percentile) and \$22 million (P95 - 95th percentile). The cost estimate was developed via a collaborative review of base costs and identified risks by stakeholders across Melbourne Water, the design consultant and engineering advisors.

The project cost estimate for the upgrade of the downstream works that is included within the Water Plan is currently forecast at \$70.2 million, of which \$53.0 million will be incurred during the next regulatory period. The \$70.2 million forecast was based on the assumption that a pipeline would be constructed as opposed to a pumping station. However, the pipeline option has since been discounted.

During our interviews with Melbourne Water, it indicated that it intends to use the savings from the project (i.e. the difference between the \$70.2 million allowance and the \$20 million for Preston Pumping Station) to fund the capital works that will be required to connect its existing water network to the outlet transfer main from the proposed desalination plant. Separate allowances for these works have not been included within the Water Plan.

The exact scope of the works required to interface the network with the desalination plant are still uncertain although they are likely to involve upgrading the existing pumping stations at Soldiers Road and Cardinia, and the installation of a number of pressure reducing valves. At the interviews, Melbourne Water indicated that it expected that the capital expenditure associated with these works was likely to be in the order of \$50 million. This estimate was based on a preliminary concept investigation.

Melbourne Water has since developed further the project design and cost estimates for the desalination interconnection projects, and finalised the Preliminary Business Case. The project development process is now nearing completion of concept design, including identification of preferred options. This work is now suggesting that the interface works will cost \$79.9 million, spread over 2008/09 to 2010/11. As the scope of our review excludes the desalination plant or works directly associated with it, we have not undertaken a separate review of the interface works, or of the latest cost estimate.

Although we note that Melbourne Water has not included any allowance for the desalination interface works within its Water Plan, and that funding for these works will be required for the next regulatory period, on the basis this additional expenditure does not relate to the Sugarloaf pipeline project we have excluded it from the forecasts for the purposes of this report.

Table 7.10 Overview of recommended changes to the downstream works (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Upgrade of downstream works – Water Plan	Upgrade of downstream works - Preston Pump Station	17.00	3.00			
	Desalination interface works		35.00	15.00		
	Total Water Plan	17.00	38.00	15.00		
Upgrade of downstream works – recommended expenditure	Total revised forecast	17.00	3.00	0.00		
	Net change	0.00	-35.00	-15.00		

On the basis of our review of the four Sugarloaf projects (the Sugarloaf pipeline and pumping station; the Contribution to the Food Bowl project; the Upgrade of Winneke treatment plant; and the Upgrade of downstream transfer works) we recommend the following adjustment to the capital expenditure forecast for the Sugarloaf Pipeline project.

Table 7.11 Overview of recommended changes to Sugarloaf pipeline projects (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Sugarloaf pipeline projects	Water Plan	479.25	364.09	112.00	26.00	20.00
	Revised forecast	480.94	310.50	80.00	20.00	20.00
	Net change	1.69	-53.59	-32.00	-6.00	0.00

7.3.2 Project 2 – ETP Tertiary Treatment

Project Description

Following a two year study for Melbourne Water by CSIRO into the environmental impact on the marine environment from the discharge outfall at Boags Rocks, Melbourne Water agreed with the EPA to undertake a pilot project to reduce ammonia concentrations in the effluent. The project also involved additional monitoring of the receiving waters and studies to investigate increased water recycling opportunities. Addressing the impact of the effluent discharged at Boags Rocks has been a condition of the EPA licence for ETP, the timing and implementation for which was agreed in 2001 between the EPA and Melbourne Water in with the 2001 Sustainable Resource Management Plan.

In response to the CSIRO study findings, Melbourne Water proposed in its 2003 works approval submission that it would take a total water cycle approach in line with its long term plan for ETP. This was to involve tertiary filtration, upgraded effluent disinfection, ammonia reduction, additional monitoring of environmental and public health impacts, investigation of future recycling opportunities, an assessment of the extension of the outfall and biosolids management. The implementation work on the tertiary/outfall elements was deferred in 2005 by agreement with EPA pending further studies and investigation.

In 2006 the Victorian Government announced that the ETP was to be upgraded to treat wastewater to Class A standard in line with EPA amended works approval for the ETP, with project completion scheduled for 2012.

The two main issues for the project relate to the choice of preferred tertiary treatment process and the scope of work for the upgrade to ensure that project timelines are met. The project is to be delivered on this basis in two phases as follows:

- Phase 1 – Design Services: development and selection of the process train based on tertiary technology treatment trials (12 months duration from February 2008) of both Class A and advanced treatment processes to determine the preferred tertiary treatment systems and scope of the upgrade works (Functional Design). To develop robust cost estimates for presentation to key stakeholders including the EPA, the Department of Human Services (DHS), DTF and DSE in preparation for the Business Case
- Phase 2 – Delivery of the project including the procurement plan based on the preferred process option developed in Phase 1.

We note that the business case approval process has progressed from Preliminary Business case approval and expenditure approval for Design Services in July 2008 through to Board approval of the Delivery Strategy in September 2008. A Risk Adjusted Nominal Estimation (RANE) assessment of cost estimates is planned within the following months, in preparation for the external Business Case submission in June 2009. This will be subject to review and approval by DTF and DSE.

The project is currently in the planning stage, and the preferred treatment option is pending the analysis of the results from the tertiary treatment trials (of more than ten treatment process trains) to assess the feasibility of alternatives and inform the Functional Design stage for progression of the project to Business Case approval.

Key drivers and obligations

In accordance with Melbourne Water's Planning Framework and the Capital Investment Policy, the driver of the ETP Tertiary Treatment upgrade project is compliance.

The justification to proceed with the project is in line with the EPA discharge licence requirements for the ETP, the existing State Environment Protection Policy, and the agreed

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EPA Works Approval for the ETP. In accordance with the Environment Protection Act and the Statement of Obligations, Melbourne Water must upgrade ETP to tertiary standard by 2012. Discussions with Melbourne Water indicated that the project had been deferred in 2005 by agreement with the EPA, pending further studies and investigations.

The project will address the stakeholder concerns over the impact of discharges to the marine environment at Boags Rocks, and will facilitate increased water recycling opportunities in the future. Successful implementation will satisfy the intent of the Victorian State Government's policy contained in *Our Water Our Future: the Next Stage of the Government's Water Plan*.

Melbourne Water must comply with its EPA discharge licences for the ETP over the Water Plan period. This requires various projects to be undertaken which have been determined as necessary, following extensive options assessment and review / challenge processes, including external consultant input, as well as consultation with the EPA and the retailers. For example, in addition to this project there are other projects planned at ETP including the ETP fine screens – grit and screening upgrade and the ETP odour reduction scheme (see later sections for further details).

Categorised as a compliance project, the ETP tertiary treatment upgrade has been appropriately assigned to the most appropriate driver.

Solution development and fit with overall business strategy

As the project has not reached Functional Design, and is effectively still in the planning stage until the outcomes from the tertiary treatment trials in the first quarter of 2009, solution development is not well advanced. We expect from the information cited that the options appraisal to decide the preferred solution will be robust based on substantial supporting evidence and sound scientific and engineering principles. Melbourne Water's solution development process should involve a rigorous assessment methodology incorporating risk assessment and stakeholder input similar to the level of rigour that was applied to select the appointed design consortium, and the delivery method for construction.

As the project is an existing compliance initiative that is required by the EPA licence, and is consistent with Melbourne Water's long term sewage management plan, the EPA's works plan and the State Government's Water Plan, it is clear that the project is in accordance with the business strategy.

Deliverability over the regulatory period

The choice of delivery method for the Tertiary upgrade of the Eastern Treatment Plant (ETP) was facilitated through the development of a Project Delivery Mechanism Support Tool in consultation with DTF and DSE. The tool incorporates risk assessment, key delivery criteria and weightings reviewed through a stakeholder workshop process to produce comparison tables and charts for review to select the preferred project delivery mechanism.

Key delivery criteria for assessment of the project delivery options included:

- appropriate allocation of project risks for construction on a critical operational site
- ability to meeting the delivery date of 2012
- flexibility to cater for evolving scope
- allowing for stakeholder involvement or acceptance
- effective management of project whole-life costs including effective scope change management.

Analysis of the results from the Project Delivery Mechanism Support Tool showed that the second and third most beneficial delivery methods provided flexibility to cope with scope evolution whilst allowing for stakeholder and constructor input during the design phase. However, such flexibility was not possible during the construction phase. These two more adversarial contract methodologies would most likely incur significant cost risks and time delays due to scope variations during the construction phase. Other methodologies including Design and Construct, Private Public Partnerships and Design, Build, Operate approaches were assessed, but the risk transfer to the financier/design/constructor was seen as the least favourable option allowing no scope flexibility or stakeholder involvement and time delays due to the nature of the delivery mechanisms involved would mean that the target delivery date could not be achieved.

The review of the delivery method used Monte Carlo simulation and Pert Master scheduling scenario analysis of the timelines for delivery by employing the various delivery methods over different delivery schedules. This outcome of this work indicated that the Alliance approach was the only delivery method capable of ensuring project delivery by 2012.

In September 2008, the Melbourne Water Board considered and approved the Delivery Strategy for the project, which incorporated approval stages and the procurement methodology. It will be progressed under an Alliance model specifically for the project, integrating the already appointed designer with the constructor to be sourced from the open market into the Alliance team. One major benefit of this delivery method is the transparency that comes from sharing of cost data, which will assist with more accurately planning for future asset delivery initiatives.

Due to the complexity of the project (process asset and operations interfaces) and the need to develop robust cost estimates for the Business Case, the constructor will be appointed prior to the delivery phase. We note that this delivery strategy diverges from the standard Government process, but we see this as a positive step to ensure more accurate cost estimates and to lower potential risks in project delivery with regards constructability, project management and procurement considerations. This proactive decision assists in securing the resources required in advance of construction, allowing more time to mobilise the alliance team and will enhance the chances of the project to start construction on time and to meet project milestones for the 2012 delivery deadline.

Commercial terms for the Alliance, covering both the designer (already selected) and the constructor (yet to be appointed), have and will be agreed under a Pain/Gain share model.

From the documentation provided it is evident that Melbourne Water recognises the major project risks and the likely challenges in delivering the tertiary upgrade project at ETP. To this effect it has already taken steps to address these risks and challenges, or has planned a mitigation strategy for them.

Cost estimate

The current cost forecast for the tertiary upgrade project is based on the classic 'S curve' profile for capital delivery where the costs may be regarded to be accurate in the order of up to +/- 30% at this stage of the project delivery process.

As was previously stated, the RANE assessment will be conducted in the coming months and we expect the costs may change following that analysis. Similarly, the project milestones allow for a mid-plan review, which may result in a change in the estimates if necessary. Melbourne Water has revised its cost estimates since submission of the Water Plan. The revision corrects an incorrect conversion of figures from the September 2008 Board paper. The revised figures are reported in the table below, which shows that the proposed project expenditure from the September 2008 Board paper (\$302.1 million) is approximately consistent with the Corporate Plan, but \$12.4 million less than the Water Plan forecast. The

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Preliminary Business Case (PBC) approval cost estimate (\$284.7 million) is \$29.9 million less than the Water Plan forecast (\$314.5 million).

Table 7.12 – Revised ETP Tertiary Treatment upgrade project cost profile comparison (\$m, 2008/09)

Project Expenditure	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total for 2009 Water Plan 2009/10 to 2012/13	Totals	Net difference from 2009 Water Plan Total Estimated Expenditure	% variance from 2009 Water Plan Total Estimated Expenditure
Preliminary Business Case ¹			8.5	51.3	166.6	54.8	3.5	268.5	284.7	-29.9	-9.5%
Proposed Expenditure ²			7.9	56.7	177.2	55.8	4.5	294.2	302.1	-12.4	-4.0%
Corporate Plan Allowance ²			4.0	50.0	177.2	52.1	15.6	295.0	299.0	-15.6	-5.0%
Water Plan	0.8	10.6	9.0	56.7	177.2	55.8	4.5	276.2	314.5	-	0.00%

Note (1) Expenditure based on Preliminary Business Case approval document for CMS from July 2008. (2) The second and third cost profiles used in the table above have come from the September 2008 Board Meeting Delivery Strategy Board paper. This document was based in 2007/08 real dollars as advised by Melbourne Water on 19 January 2009.

Melbourne Water explained this variance is in part due to \$11.5 million for design and construction of the tertiary treatment trials plant and other investigation/design work conducted in 2006/07 and 2007/08. This expenditure was only included in the Water Plan figures and not the other forecasts.

We requested further clarification of the remaining difference of \$18.4 million between the PBC approval amount and the Water Plan estimate. Melbourne Water advised that the PBC cost estimate is incorrect. Melbourne Water has not provided the corrected figure. While the cost estimate entered into the PBC template was in error, Melbourne Water indicated that it was only used for Capital Management System reporting purposes. We have been assured that the reports for Board review were not affected as they are generated from a separate estimate from the Finance system. Further, the estimate in the PBC has not been used for approval purposes. We recommend that Melbourne Water reviews this oversight and seeks to improve the quality assurance of its Capital Management System to ensure that the capital figures entered are based on correct data.

The most recent cost estimate for the ETP Tertiary Treatment upgrade was prepared by consultants in December 2006. The options analysis report contains a P50 estimate of \$256 million (2006/07 dollars) for the membrane filtration option. This estimate was adjusted by Melbourne Water to \$300 million (2006/07 dollars) to include \$10 million for technology trial costs, a \$17 million increase for a revised cost estimate for the membranes and \$17 million for corporate overheads (6%). The \$300 million cost estimate (2006/07 dollars) is equivalent to \$320.34 million (2008/09 dollars). This compares to \$314.5 million reported in the Water Plan. We have not been able to fully reconcile these figures.

Melbourne Water has not provided the consultant's report or documentation to support these adjustments, and hence we have been unable to confirm whether they are reasonable. It is not clear whether the Water Plan estimates have been approved by Melbourne Water's Board.

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On this basis we recommend that the expenditure be reduced to \$313.60 million, which is the total project expenditure proposed for approval at the September 2008 Board meeting, with an additional \$11.5 million for the design and construction of the tertiary treatment trials plant.

Table 7.13 – Overview of recommended changes to ETP Tertiary Treatment Upgrade expenditure (\$m, 2008/09)

	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total Water Plan	Total Project Expenditure
Water Plan	0.83	10.62	8.95	56.7	177.2	55.8	4.5	294.2	314.5
Revised forecast	0.8	10.6	9.0	56.5	176.6	55.6	4.5	293.2	313.6
Net change				-0.18	-0.6	- 0.2	-0.0	-0.95	- 0.95

During the interviews Melbourne Water suggested that pending the results of the trials and further investigation/process design works it is possible that the tertiary treatment upgrade costs may increase marginally overall, but with the benefit that it will result in negating the need to extend the outfall discharge pipe at Boags Rocks for a cost in the order of \$300 million to \$400 million. Adopting this approach will be prudent if the whole life cost analysis can demonstrate that this will in fact be the case, however, the expenditure saving will not be realised until the next Water Plan period.

7.3.3 Project 3 – Northern Sewerage project

Project Description

Existing development in the northern suburbs, particularly in the Moonee Ponds Creek, Merri Creek and Darebin Creek sewer catchments has meant these sewerage systems have insufficient capacity to meet the EPA's standard to contain all flows resulting from a rainfall event at, or more frequent than, a 1 in 5 year return interval (State Environment Protection Policy (SEPP), Waters of Victoria). These catchments are predicted to undergo considerable growth over the next twenty years.

The existence of throttles built into the upper reaches of the Merri Creek and Darebin Creek sewerage systems means that eventually dry weather spills will occur at these hydraulic restrictions as flows increase due to growth.

Melbourne Water together with Yarra Valley Water commenced strategic planning processes in 1999, in order to identify options that would meet the objectives of the SEPP and would cater for future growth in these catchments.

The resulting strategies were the Northern Suburbs Sewerage Strategy (NSSS) and the Upper Moonee Ponds Sewerage Strategy (UMPSS). On the basis of least risk, cost and community impact, Melbourne Water and Yarra Valley Water jointly determined that the augmentation of the sewerage system was the preferred option for meeting the objectives of both the NSSS and UMPSS.

The NSSS and UMPSS were adopted by the Boards of both businesses in 2000. In both strategies, the preferred approach comprised a combination of gravity sewers and flow control facilities. The responsibility for design, construction and ownership of the components was also agreed in 2000.

Joint reviews of the preferred NSSS strategy and the preferred UMPSS strategy commenced in 2002. The purpose of the reviews was to incorporate the latest planning information and

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other developments within the catchment, and consider the appropriate levels of service and design standards; revised growth forecasts; constructability constraints; timing of works; financial, risk and sensitivity analyses and the location of interception points.

After review of the strategies, augmentation of the sewerage system remained the preferred strategy, with deep tunnelled gravity sewers required for both strategies and businesses. The Northern Diversion Sewer (NDS) (from the NSSS) and the Moonee Ponds Interceptor Sewer (MPIS) (from the UMPSS) were to be delivered by Melbourne Water; the Northern Intercepting Sewer (NIS) (from the NSSS) to be delivered by Yarra Valley Water. Other augmentation works for the Moonee Ponds, Merri and Darebin Creek sewerage catchments to be delivered by Yarra Valley Water comprised gravity sewers and flow control facilities.

Preliminary Project Approval (PPA) was given for the NDS in 2003 and the MPIS in 2004. At this stage, the NDS was estimated to cost \$88 million (nominal 2003 dollars). This included investigations (\$2.9 million), construction (\$65.1 million) and contingency of 20%. The accuracy of the cost estimate was thought to be within $\pm 30\%$. MPIS at PPA was estimated to cost \$48.1 million. This included investigations (\$4.0 million), construction (\$30.8 million), and contingency of 20%.

The main issue with these preliminary cost estimates was that the projects carried significant delivery risks, namely the unknowns with respect to the geology of the substrate and constructability considerations impacting on the route alignment and hence project costs.

As the strategies moved into concept design, it was evident a combined alignment for the NDS and MPIS would provide the best outcome for Melbourne Water. The construction of the NDS, MPIS and Yarra Valley Water's NIS were combined to form the Northern Sewerage Project (NSP), with Melbourne Water and Yarra Valley Water adopting a common construction contractor.

The NSP was granted approval in 2007 by DTF to construct 13 km of deep tunnel sewers (between 15m and 64 m below ground) along Merri Creek valley from Coburg to Reservoir and Moonee Ponds Creek at Pascoe Vale.

The proposed works were to proceed in two stages as follows:

- Stage 1 – Melbourne Water to construct 4.7km of 2500mm diameter deep tunnel sewer and 3.2km of 1600mm diameter deep tunnel sewer connecting the North Western sewer at Moonee Ponds Creek
- Stage 2 – Yarra Valley Water to construct 4.5km of 1800mm diameter deep tunnel sewer.

Key drivers and obligations

According to Melbourne Water's Planning Framework and Capital Investment Policy, the Northern Sewerage project is categorised under the Environment business driver and also includes a secondary business driver of Growth.

The project resolves the outstanding requirement under the State Environmental Protection Policy to satisfy EPA's service standard for Yarra Valley Water and Melbourne Water to contain flows in the wastewater system resulting from a one in five year storm. The project also provides the necessary capacity for the growth corridor encompassing Craigieburn, Epping North and South Morang.

Melbourne Water is required to ensure that the:

- hydraulic capacity of new sewers contains flows up to a one in five year rainfall event and that existing sewers are to be progressively upgraded to this standard
- the sewerage system is managed so that spills due to system failure do not occur.

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Solution development and fit with overall business strategy

The Northern Suburbs Sewerage Strategy is an example of a joint planning initiative between Melbourne Water and Yarra Valley Water.

From the Northern Suburbs Sewerage Strategy (2005) it is evident that the strategies available to Melbourne Water and Yarra Valley Water were jointly assessed through computer modelling including the status quo (do nothing), an investigation of storm water inflow and infiltration reduction measures, local sewage treatment plant and wastewater system augmentation.

The status quo was not a valid strategy as the Merri Creek throttle would cause a wastewater overflow in dry weather conditions by 2015 with daily surcharging expected in 5 years and a 55% increase in overflow volumes during a 1 in 5 year storm events.

Inflow from stormwater run off through broken manhole covers or illegal stormwater connections to the wastewater system or infiltration during storm events from seepage through cracked, jointed or broken pipes was difficult to quantify and resolution of the diffuse sources was considered impractical. At best it was anticipated that a 50% reduction of inflow/infiltration may be achieved overall through remedial works on Melbourne Water's and Yarra Valley Water's sewers, however wet weather wastewater discharges would continue in the Merri Creek catchment and dry weather overflows would occur in time due to growth.

As peak flows are the main contributor to the wastewater overflows during wet weather a sewage treatment plant (STP) solution option was considered unsuitable.

Augmentation of the wastewater system was therefore considered the most viable strategy to resolve the capacity constraints causing overflows during peak wet weather flows (compliance) and dry weather flows (growth).

Five augmentation strategies were assessed incorporating a mixture of gravity and pumped sewage options and considering the inclusion of flow control facilities (FCFs) or attenuation tanks within the network. The most cost effective options included using the North Western Sewer as the outlet and directing flow to Western Treatment Plant at Werribee rather than the Eastern Treatment Plant. From the network perspective, the least cost options included the combination of flow attenuation in the upper catchment (Yarra Valley Water's area) and gravity sewers in the lower catchment (Melbourne Water's area). Both deep tunnel and shallow tunnel solutions were investigated for the North Western Sewerage strategy, while a pumped solution involving the North Yarra Main and Brooklyn Pumping Station bypass strategy was also examined.

Sensitivity analysis was performed to determine the effect of timing variations, growth rates, capital costs and infiltration rates on ranking of the strategy employed. It was found that the preferred strategy did not change despite the timing considerations, or growth and infiltration rates. Further, a large cost increase in the preferred strategy would be required before the Net Present Cost approached the next least cost strategy. Results from risk assessment evaluation showed that the preferred option i.e. Merri Creek Diversion Sewer and Flow Control Facilities was the one with the least planning, construction and operational risks at the lowest whole life cost.

Deliverability over the regulatory period

John Holland was contracted in 2004 by Melbourne Water for pre-construction and construction services for six years under a Cost Reimbursable Performance Incentive (CRPI) contract. The contract contains a range of incentives to encourage strong project performance and to exceed expectations.

The project was scheduled to be delivered in mid-2011 to meet commitments given to the EPA and developers in the Epping growth corridor. However, the time taken to obtain government planning approvals and resolving outstanding issues raised by Moreland City Council delayed the expected completion date to May 2012. According to a recent Project Report, the completion date has however since been revised to January 2012, accounting for more up to date delivery and programming information.

The project milestones for Stage 1 and progress in meeting project schedule are as shown:

Table 7.14 Northern Sewerage Project (Stage 1) delivery status report August 2008

Description	Plan	Forecast	Actual
Construction Start	August 2007	August 2007	August 2007
Vanberg Road Shaft excavation	December 2008	January 2009	
Brearley Reserve Shaft Excavation	March 2009	November 2008	
Bass Street Shaft Excavation	June 2009	February 2009	
DeChene Shaft Excavation	September 2009	April 2008	December 2007
Carr Street Shaft Excavation	April 2010	August 2008	July 2008
Tunnel from DeChene to Carr Street	September 2010	December 2008	
Construction end	June 2012	January 2012	

Overall the project is ahead of the practical completion date and the date of final completion will depend on tunnelling and production rates achieved.

The project is tracking well to date and barring unforeseen events is currently forecast to be delivered five months earlier than the contractual project completion date of June 2012 and should meet the budget forecast project completion cost.

Cost estimate

The Water Plan includes \$381.4 million capital expenditure (excluding contingency and provisional sums) for Stage 1 of the Northern Sewerage Project over 2005/06 to 2011/12.

Table 7.15 details the change in the forecast total project costs since the original PPA estimate of \$88 million in November 2003 for the NDS scheme excluding the MPIS, which became part of the NSP scope.

Table 7.15 Northern Sewerage Project (Stage 1) cost estimates 2003 to 2008 (\$ million)

Stage 1 Cost Estimate	Date	Project Cost Estimate (\$ nominal)	Total Project Cost Estimate excluding contingencies (\$ nominal)	Project Cost Estimate excluding contingencies (\$2008/09)*
Preliminary Project Approval (NDS only) (PPA)	Nov 2003	88.0	68.0	78.1
NSP Project Approval by MW Board (Jun 2007)	Apr 2007	422.0	360.8	357.4
NSP Adjusted Project Approval (Sept 2007)	Sep 2007	423.0	361.8	358.5
NSP Water Plan Expenditure	Nov 2008	N/A	381.4	381.4

Note (*) figures take into account forecast timing of project, except the PPA cost estimate, as timing was not identified in the PPA.

As shown in the table above, the forecast cost escalated significantly from Preliminary Project Approval stage to when the Melbourne Water Board approved the project, following DTF approval which was granted in April 2007. The DTF approval comprised:

- Stage 1 - \$422.0 million for implementation by Melbourne Water
- Stage 2 - \$228.5 million for implementation by Yarra Valley Water.

Melbourne Water indicated that the main reasons for the increases in the Preliminary Project Approval cost estimate were geotechnical design issues, community impact management and noise abatement. The Preliminary Project Approval was based on preliminary data with a resultant low level of accuracy. The Preliminary Project Approval did not account for a number of key scope items that were later included within the approved project scope, for example sewer lining.

Following approval by DTF, the cost estimate for Stage 1 was later adjusted to \$423.0 million (an increase of \$1.0 million) and the cost estimate for Stage 2 was adjusted to \$222.3 million (a decrease of \$6.1 million). Melbourne Water indicated that the increases were due to project planning approval delays, resulting in additional payments to the contractor. The increase was approved internally by Melbourne Water. The overall \$6.1 million decrease in Stage 2 of the project related to a reduced insurance premium and other scope reductions, from which it was proposed that the \$1.0 million Stage 1 increase would be funded.

We asked Melbourne Water to explain the material difference (\$24 million) between the project expenditure included within the Water Plan as compared to the estimate approved by DTF. Melbourne Water has not provided any additional information to explain or substantiate the increase other than to state that the approval ‘*underestimated expenditure for 2007/08 and planned expenditure for 2008/09*’.

The Project Approval Document includes \$█ in performance fees for the contractor (\$█), the design consultant (\$█) and the project management firm (\$█). Melbourne Water has indicated that of the \$█, only \$█ has been included in the Water Plan expenditure forecast. Of this, \$█ is the contractor’s base fee (profit). The remaining \$█ relates to performance payments that are subject to adjustment depending on the performance of the contractor.

The Water Plan estimate also includes \$█ for design and project management performance fees. Melbourne Water has stated that this represents █ per cent of the total performance fees payable.

The financial summary from the February 2009 project report for the Northern Sewerage project is shown in the following table.

Table 7.16 Northern Sewerage Project (Stage 1) Financial Summary February 2008

Year to Date (\$m Nominal)			Corporate Plan (\$m 2008/09)			Project Plan (m Nominal)	
Plan	Actual	Difference (Plan – Actual)	Corporate Plan	Current Forecast	Difference (C. Plan – Actual)	Project Total	Forecast Total
60.8	46	14.8	89.2	72.8	16.4	405.8	375.7

As the table above indicates, as at February 2009, the forecast total cost for the Northern Sewerage Project was \$375.7 million, which is slightly below the \$381.4 million estimate included within the Water Plan. We note however that the latter estimate does not include for

the sale of properties (\$7.4 million) which will offset the capital expenditure by the completion of the project by this amount.

Given that the performance in key result areas is unlikely to be finalised until the completion of construction, the requirement for this payment remains uncertain. As previously discussed (in Section 7.3.1) we recommend that only ■ percent of the performance allowance be included within the capital expenditure forecast. We consider that this better reflects the current uncertainty surrounding the payment of the performance bonus, and represents an equitable split of the pricing risk between Melbourne Water and its customers. As such, we recommend that the capital expenditure forecast in the Water Plan be reduced by \$3.6 million. We have not made any deductions to the \$■ contract's base fee, as this margin will be payable regardless of performance.

Table 7.17– Northern Sewerage project cost estimate and recommended adjustment to expenditure (\$m, 2008/09)

Source of Cost Estimate	2005 /06	2006/ 07	2007/ 08	2008/ 09	2009/ 10	2010/ 11	2011 /12	2012/ 13	Project Total
Project Approval (DTF & Melbourne Water) ¹		34.7	58.0	73.3	94.9	69.9	26.7		357.4
Water Plan	8.6	20.9	72.50	87.30	69.50	60.60	62.10		381.4
Recommended expenditure	8.6	20.9	72.5	87.3	69.5	60.6	58.5		377.8
Net change	0.0	0.0	0.0	0.0	0.0	0.0	-3.6		-3.6

Note: 1. DTF approval figures exclude overall project contingency and provisional sums

7.3.4 Project 4 – Melbourne Main Sewer Augmentation

Project Description

This project involves the augmentation of the Melbourne Main Sewer (MMS) which conveys flow under gravity from the city area to the Hobson Bay Main. The MMS serves an area including the CBD, Southbank and Docklands. The sewer was constructed between 1894 and 1897, and has reached the limit of its intended operating capacity.

The project involves construction of a 1.8m diameter tunnel 2.2km long south of the Yarra River using a tunnel boring machine; 150m long open-cut excavation across the Yarra River; 1.5m diameter pipe-jacking on the north side of the river, the construction of vertical access shafts, and the construction of 2.5km of branch and reticulation sewers to reconnect the retailers.

Key drivers and obligations

The key driver for the project is renewals, although there is a growth element. In 2003, Melbourne Water rated the criticality/structural condition of the main as AAA4, which is the most critical asset with a notional residual life of 5 years. The Preliminary Project Approval for the renewals project (dated late 2003) indicates that the sewer was flowing close to full and parts of the blockwork section were surcharging on a daily basis.

The DTF business case for the project, dated May 2008, indicates that the key driver for replacing the MMS is the risk of asset failure through inadequate structural strength to withstand internal surcharge loads. This is primarily due to the ageing and deterioration of the main over 110 years of operation. In addition, increased flows over the past 10 years due to urban redevelopment within the catchment (primarily the CBD and Docklands) have

exacerbated the risk. Flows are expected to increase in the future, further affecting the asset life.

In the DTF business case, Melbourne Water has identified the key policy and compliance instruments that are relevant to the project. It has stated that replacement of the MMS is necessary to ensure compliance with:

- Melbourne Water’s Environmental Policy, which includes the goal to ‘deliver safe sewerage transfer, treatment and disposal’
- Melbourne Water’s Risk Management Policy which sets out the process for assessing and ranking business risk
- its obligations under relevant key Acts comprising, amongst others, Water Act, Environmental Protection Act and the Occupational Health and Safety Act.

The context in which these compliance requirements exist are listed as follows:

- providing adequate system capacity (sewerage transfer) to meet the catchment growth estimates defined in the MMS Concept Design document
- complying with EPA and Melbourne Water policies for sewage spills/containment
- complying with OH&S regulations and associated Melbourne Water policies and guidelines
- complying with EPA guidelines and Melbourne Water’s policies/strategy for odour control management and control
- complying with statutory planning and local government requirements
- complying with the Department of Infrastructure’s Melbourne 2030 – Planning for Sustainable Growth
- complying with Federal and State environmental legislative and policy requirements
- complying with Federal and State heritage protection legislative requirements
- complying with other regulatory requirements.

In addition to the above, we note that Melbourne Water’s Statement of Obligation requires it to manage its assets in ways which allow it to supply its services sustainably; maintain the levels and standards of service; minimise the overall whole of life costs of assets; and minimise detrimental social, economic or environmental effects of managing its assets.²⁸ On the basis of the information provided by Melbourne Water in relation to this scheme, we are satisfied that the drivers for replacement of the MMS are appropriate and in accordance with the SoO.

Solution development and fit with overall business strategy

Initial investigations to determine the structural condition and hydraulic capacity of the main were undertaken in 2000. Since that time a number of further investigations and condition assessments have been undertaken both internally by Melbourne Water, and various external consultants.

Four options were identified by Melbourne Water for consideration at the Preliminary Project approval stage. A ‘Do Nothing’ option was not considered sustainable in the medium to long term.

²⁸ Melbourne Water Statement of Obligations, s.14.1.

The four options considered were:

1. Gravity replacement main to Hobsons Bay Main and decommissioning of the existing Melbourne Main Sewer
2. Gravity reliever main to Hobsons Bay main, and structurally reline the existing Melbourne Main Sewer
3. Construction of a pumping station and rising main to North Yarra main and structurally reline the existing Melbourne Main Sewer
4. Construction of a pumping station and rising main to Hobsons Bay main and structurally reline the existing Melbourne Main Sewer.

The scope of the options considered was based on broad concepts and preliminary information. Option 2 was identified as the preferred option and Preliminary Project Approval within Melbourne Water was granted in late 2003. At this time, the total project cost estimate was \$34 million.

Due to the nature of the project and location of the Melbourne Main Sewer, numerous stakeholders were involved in the development of the project. Melbourne Water developed a communications strategy to ensure to prioritise and concentrate on key target stakeholders.

Following Preliminary Project Approval, concept designs were prepared which identified and evaluated these options in greater detail. Options were assessed using a Triple Bottom Line (TBL) evaluation technique. Options were scored against a set of criteria, which were weighted, and compared to Do Nothing (base case). A probabilistic sensitivity assessment using Monte Carlo simulation methods was carried out to test the robustness of the option ranking by considering variability applied to the weightings and scores. The analysis found that the option involving the replacement of the MMS, with discharge to Hobsons Bay Main was the only clear preferred option apart from the Do Nothing option, which was not considered to be feasible.

Following the TBL evaluation, the preferred option was further developed. A concept review was completed in June 2006 and a functional design process undertaken based on this concept was completed in early 2007. The functional design phase included the carrying out of geotechnical investigations, liaison with third parties, option assessment and development of the optimum scope. Detail design was completed in November 2007, and was used as the basis for the construction cost estimate. The construction cost estimate was significantly greater than the earlier functional design and concept estimates due to a better understanding of the scope and project risks.

The business case for the project was submitted to the DTF in April 2008, and approval was granted in June 2008. The approved funding for the project is \$221.3 million. In accordance with the DTF Gateway Policy, the project has also been subject to an independent Gateway Review.

A tendering process took place in mid 2008, and a construction contract was awarded in July 2008.

On the basis of the information provided by Melbourne Water it is evident that the planning process for the project has been robust and that significant investigation and analysis has been undertaken to identify the preferred solution. The solution is consistent with Melbourne Water's strategic framework and has the support of the DTF.

The objective of the project as stated in the business case is to provide a sewage outlet for the Melbourne Main Sewer catchment, which replaces the existing sewer, adopting the best value solution for the community. The project objective aligns with Melbourne Water's

Strategic Framework - Sustainable Water, which is set out in its Corporate Plan 2006/07 to 2008/09.

Deliverability over the regulatory period

Construction of the scheme commenced in September 2008. Initial delays in gaining signoff from stakeholders resulted in a re-phasing of the initial project program, with the start of construction on the Yarra River Crossing pushed back two months. Melbourne Water avoided potential delay to the project by bringing forward the start of the shaft excavations. Elements of the construction program have now been completed earlier than originally planned.

According to the most recent project status report (December 2008) the project is currently on schedule and Melbourne Water is forecasting that Practical Completion will be achieved by May 2012, which is consistent with the original project plan and the Water Plan.

Cost estimate

The total cost estimate for this scheme when approved, in June 2008, was \$221.3 million. The cost estimate represents the 94th percentile risk adjusted nominal estimate (RANE) assessment. The project costs are broken down in the following table.

Table 7.18 Melbourne Main Sewer Augmentation Project Capital Cost Estimate (\$m, 2008/09)

Item	Cost
Project preliminaries – spent prior to Board Approval of Business Case in May 2008.	11.4
Melbourne Water costs – including external superintendent and design management fees	20.6
Construction costs – as tendered	148.4
Community impact mitigation costs	0.4
Construction performance fees – this is an estimate of the maximum performance fees payable. Fees payable in addition to this are offset by savings generated by John Holland	■
Designer performance fees – estimate of maximum payable	■
Project Management performance fee - estimate of maximum payable	■
Escalation – allowance of 4.4% of non John Holland Costs	0.5
	186.6
Subtotal	(RANE P50 estimate)
Contingency (15% of Melbourne Water costs, John Holland Costs and community costs)	16.6
Provisional sums for specifically identified project risks	18.1
	221.3
Total Project Cost	(RANE P94 estimate)

As shown above, the majority of the expenditure on this project relates to construction costs which are committed. The construction cost is per the agreed tender, and as indicated above,

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contingency allowances and provisional sums are excluded. We note that the construction costs (\$148.4 million) include an allowance of approximately \$12.65 million for 'escalation, FX and project financing'.

This is broken down as follows:

- escalation costs for labour, plant, materials and subcontracts (\$12 million). This is broken down as:
 - labour \$3.5 million (~9.8% labour costs)
 - plant \$1.2 million (~5% plant costs)
 - materials \$2.6 million (~8.8% materials costs)
 - subcontracts \$7.7 million (~8.8% subcontracts costs)
- foreign exchange hedge fees (\$0.15 million)
- non-John Holland costs (\$0.5 million).

Melbourne Water has indicated that the materials escalation includes additional allowances on items such as the 1.8m diameter glass fibre reinforced plastic pipeline, vitrified clay reticulation pipes, and sleepers for the tunnel trail. Of the \$2.6 million escalation of materials, steel accounts for approximately \$130,000 (5% of the materials escalation allowance).

As discussed in chapter 5, material prices (including steel) have fallen sharply in recent months. In addition, given the current economic climate, we consider it unlikely that expenditure on staff and labour will escalate at the rates assumed in the Target Total Cost (TTC). As these costs have been factored into the TTC, savings on materials, labour, the purchase of plant and subcontractors (i.e. below that assumed in the TTC) will result in a lower outturn cost, with savings shared between Melbourne Water and the contractor according to its pain/gain arrangement.

On the basis that these escalation allowances are unlikely to materialise, we do not consider that they should be included within the forecast capital expenditure for the next regulatory period. However, we note that as this is performance based contract, the contractor will be entitled to 50 percent share of any savings made. As such, we accept that Melbourne Water may be obliged to pay 50 percent of the escalation allowance. However we recommend that the remaining escalation allowance (\$■ million) be excluded from the allowed capital expenditure. As the pain/gain payment is likely to be made at the end of the project, we recommend that this allowance be excluded from the capital expenditure forecast for the last year of the project, 2009/10.

As the escalation applied to non-John Holland costs relates mostly to third parties (insurance, VicRoads costs etc), we have not made any deductions to the \$0.5 million allowance.

The construction contract is structured as a cost reimbursable performance incentive arrangement whereby the majority of John Holland's profit margin is expected to come from performance fees. The Water Plan includes an allowance of \$■ performance fees payable under the construction contract. This represents an estimate of the maximum performance fees that will payable to the construction company. According to Melbourne Water's May 2008 Board Approval document, the total overall fees payable to John Holland will range between ■ per cent of the target direct cost and ■ per cent of its Tendered Target Direct Costs. In addition, Melbourne Water has included an allowance of \$■ for the maximum performance fees payable to the companies responsible for the design and project management.

While we note that Melbourne Water has reported success with one of its previous Cost Reimbursable Performance Incentive (CRPI) contracts, whereby all of the projects KPIs were met and the performance incentive was paid in full, we consider it unlikely that all projects structured as CRPI contracts will achieve full target performance. As such, we do not consider it appropriate to factor into prices the full performance incentive allowance. On the basis that performance fees for the project are yet to be confirmed, and given the inherent uncertainty with forecasting future performance, we recommend only ■ per cent of the performance allowance be included within price increases. We consider that this better reflects the current uncertainty surrounding the payment of the performance bonus, and represents an equitable split of the pricing risk between Melbourne Water and its customers. Hence, we recommend that \$■ million be excluded from the capital expenditure forecast in the Water Plan.

Melbourne Water's costs during construction phase of the project are expected to be \$20.6 million. This includes an allowance of \$10.3 million for external Project Management and Superintendent Services during construction. Other allowances include internal project management, insurance, leases, design management, surveying and community relations.

According to Melbourne Water's aggregated list of capital projects in the Water Plan expenditure on the project is expected to be \$193 million, with capital expenditure of \$134.9 million included within the Water Plan over next regulatory period.

Adjusting for actual and assumed CPI increases over the period to 2011/13, the RANE P50 is \$182.5 million (2008/09 real). Hence, the difference between the RANE P50 estimate (\$182.5 million) and the project estimate in the Water Plan (\$193 million) is approximately \$10.5 million. Melbourne Water has indicated that this difference is principally due to a \$10.5 million (5%) cost increase, to be incurred in 2011/12, which is principally associated with issues such as hydraulic design issues and costs associated with works near other authorities' assets and community impact considerations.

As of February 2009, the current project forecast is \$185.3 million, which is \$7.7 million below the project estimate of \$193 million. The report indicates that the 2008/09 expenditure forecast as been revised downwards from \$40.5 million to \$38.2 million. Given the complexities of the project and that construction is still within the early phases, it is likely that this latest forecast will be subject to change as construction progresses.

Melbourne Water has indicated that the profiling of the expenditure over the period to 2011/12 reflects the annual tender expenditures and was derived by aggregation of the tender profiles provided by the contractor, the designers and the project managers.

On the basis that the expenditure on this project is committed, and that it is based on a competitively tendered fee estimates, we generally consider the allowance included in the Water Plan for this project reasonable and well supported. However, we recommend that the \$■ million allowance for performance fees be excluded from the capital expenditure allowance on the basis that these fees are not yet certain. In addition, we recommend that the \$■ million escalation allowance be excluded from the project capital expenditure forecast.

Table 7.19 Overview of recommended changes to the Melbourne Main Sewer Augmentation project (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
Melbourne Main Sewer Augmentation	Water Plan	40.50	48.40	54.60	31.90	-
	Revised forecast	40.50	48.40	54.60	23.25	-
	Net change	0.0	0.0	0.0	-8.65	-

7.3.5 Project 5 – ETP Mechanical and Electrical Renewals

Project Description

Background

During the current regulatory period, Melbourne Water underestimated its Mechanical and Electrical (M&E) renewals expenditure requirements, both generally and at the ETP, over the three years from 2005 by an annual average of \$14.8 million.

Melbourne Water explained the overspend arose because its previous model under-estimated the level of M&E renewals that was required. While Melbourne Water considers the previous model good for generally predicting all renewals required in one to two years, the model does not accurately predict the level of renewals required for three or five year regulatory periods. Nor can the model predict the renewals required for a twenty year renewals plan.

The approach traditionally relied upon to determine renewals expenditure requirements utilised the annual output from the State of the Assets process that is based on a condition and risk assessment of the assets. The process relies on specific observed condition data from condition assessments, which is unable to predict the future condition of the assets as evidenced by the predicted declining expenditure allocation this regulatory period that underestimated the actual investment need. The declining expenditure forecast coincided with 50% of the asset base nearing the end of its asset life. Further discussion of the renewals program overall has been made in section 7.4.2. Melbourne Water has predicted that its annual M&E spend should be in the order of \$25 million per annum, which compares similarly with an asset depreciation value for M&E assets of \$30 million per annum. Melbourne Water notes that historically, actual M&E asset renewal expenditure has been well below such levels.

M&E Renewals Planning Methodology

Melbourne Water has developed an M&E renewal planning methodology which is based on the UK Common Framework approach utilising risk analysis with respect to the probability and consequences of asset failure. The approach is designed to consider historical levels of maintenance expenditure and service indicator trends and to identify the future maintenance activities required to meet regulatory objectives in order to make the case for the forecast level of maintenance in future.

Melbourne Water's approach to M&E renewals planning included the following six steps:

- historical view
- asset optimisation
- asset failure predictor and solutions (costs)
- reality check
- linking consequence to dollars
- investment authorisation.

Melbourne Water's approach differs from Yorkshire Water's leading six-step process based on the Common Framework in that the three steps involving market research & willingness to pay, economic optimisation and assessment of the impact on customer bills have not been included. Melbourne Water feels these elements to be more appropriate for the retail water companies to apply to their businesses.

The first step is to look at historical expenditure profile for an asset type over the last 10 years worth of data available. Data from the historical cost register is used for this purpose and factored up to the present day cost base for comparison purposes. The resulting graph showing asset expenditure and cumulative expenditure over time provides an indication of the potential for future asset renewals investment. Asset parameter details including name or type, installation date, number of units, estimated life etc. are also updated at this stage.

The asset optimisation stage is simply intended to ensure that renewals are not promoted for assets that do not, or will not, in the near future service customer needs. The identification of planning synergies (growth or compliance for example) with renewals investment needs ensures that abortive work is not progressed. Other asset planning considerations include the transfer of asset(s) to the water retail business, asset decommissioning due to system configuration modifications or new assets superseding the asset's function.

The model is suitable for a significant number of similar asset types e.g. flow meters or booster pumps, however it is not suitable for large sites with a limited number of similar assets that are not commonly in use elsewhere. In the latter case, Melbourne Water has developed a large site analysis approach for the ETP and WTP sewerage pumping stations, and two water pumping stations for Yering Gorge and Sugar Loaf Reservoir. A total of twenty-four individual models have been developed, with two base model templates available to create more if required.

To implement the Asset Failure Predictor and Solutions stage of the methodology, the number of assets in the case of large sites has been substituted with their respective replacement values. Using the same process as for similar assets, the replacement value obtained from various sources is then distributed using the Weibull distribution method to predict the failure of the assets and hence the costs of replacement over time. This technique predicts both the first replacement and subsequent replacements over time.

Unit costs to determine replacement value are based on (a) the 2002 Replacement Register (escalated by 3% per annum), (b) latest historical cost register for assets not in the replacement register, and (c) Latest tender/design information where available. Where possible the latest information from tenders or construction out-turn costs is preferred.

For large sites, larger plant asset types are split down into replaceable components and the replacement value from the historical cost databases/recent projects and the estimated asset lives are reviewed and challenged in workshops with key stakeholders. The agreed replacement values and estimated life of the assets are grouped by actual asset age based on the respective installation dates and run through the Weibull distribution model to predict the future investment profile.

The Reality Check stage is undertaken through a workshop environment involving asset management, planning, operations, maintenance and program planning personnel. The outputs from the model are verified including:

- the existing asset base and asset lives
- new assets not included in model that are currently being constructed
- review the assumed synergies with growth and linkages to compliance with respect to asset decommissioning
- sanity check of renewal predictions to check for inadvertent omissions.

Using the latest State of the Assets information provided annually through Asset Management, a list of projects prioritised by risk is then allocated to the annual renewal expenditure predicted by the model to determine the likely M&E renewals investment planned in each year, in particular for the next regulatory period and up to 20 years in the

future to provide the '20 Year View'. This process acts to double-check that the predicted annual investment allocation for the next Water Planning cycle can be realised.

The resulting list of M&E renewals projects that are likely to be required during the next Water Plan then has the key consequences linked to the replacement value for each project. This categorisation process is noted in the M&E Asset Renewals Planning Discussion Paper (2006) but does not form part of the Corporate Asset Management Planning Procedure (CORP AM P003) that we reviewed. We believe that this step is useful however in allocating M&E renewals investment allocation by the three standard corporate classifications (product, program and driver), and importantly by the fourth (consequence) which links the impact of asset failure to the customer or regulatory requirements. For example, disinfection of water supplies, EPA discharge licence compliance or sewage spills to name three of the seven sub-categories.

The final stage of the methodology is the Internal Authorisation process which defines the 2-year rolling M&E renewals program based on the list of deliverable projects derived from the State of the Assets process. The projects identified for delivery over two years will have Preliminary Project Approvals and Functional requirement statements developed for them ready for authorisation as outlined in the Capital Planning and Delivery Guidelines. If project prioritisation is required for the renewals in the plan, then the risk-based State of the Assets process is utilised.

Key drivers and obligations

The regulatory driver for renewals is related to the provision of existing service standards by extending asset life or replacing the asset. In this case, the driver applies to the renewal of M&E assets at the ETP.

We queried whether Melbourne Water had experienced a rise in M&E asset failures that supports the large rise in actual over planned M&E renewals expenditure over the current regulatory period. In response, Melbourne Water indicated that a number of its key assets are ageing closely together, including ETP and Winneke Water Treatment Plant. Increasing growth has meant that asset redundancy, through multiple units at asset type level, has become fully utilised. The redundancy shortfall and corresponding risk to maintaining levels of service requirements has coincided with M&E component obsolescence becoming an increasingly more prevalent problem. Melbourne Water's ability to tolerate M&E asset failure or prolonged downtime due to parts obsolescence has therefore reduced. At the same time, the compliance risk to the business of asset failure has increased, particularly in the case of multiple asset failure.

Solution development and fit with overall business strategy

In December 2007, the 2006 models (including for the ETP) were refined to update the Reality Check and account for any planning considerations for growth or compliance, and to incorporate an update of the most recent data from State of the Assets process including condition assessments.

Some changes were recommended for the ETP including the inclusion of two types of compressor replacements based on condition assessments raising reliability concerns. Three M&E renewals were brought forward due to reliability considerations based on condition, high consequence of failure or compliance enabling works in preparation for the tertiary treatment upgrade project.

As stated above within the methodology the list of projects is indicative only and is still required to go through the project capital approvals and investment authorisation process.

A random check on a number of the outputs from the model show that the assets types predicted for renewal in each year of the next Water Plan appear to be consistent with the specific process/sub-process units prioritised (for renewal) from the State of the Assets process. This provides a degree of confidence in the process identifying potential investment needs that support the strategy of the business.

Limitations of the approach

From the information provided we have not been able to see evidence of all of the steps in the process. This includes the results of the workshops verifying the underlying model data and any resulting changes to the outputs. While these stages are referred to in the ETP M&E 20 Year Renewal Plan (2006) document, the detail behind it, with respect to changes made to original model assumptions including asset lives/other details/costs within the model, is not evident. Melbourne Water has acknowledged that its documentation could be improved but confirmed that it did in fact undertake 'reality check' workshops and update the models accordingly. We would expect to see the original asset install date and expected life and any agreed changes as a result of the workshop reviews to be clearly identified within the model spreadsheets or supporting documentation. We suggest that this would assist with future model runs and provides an audit trail of assumptions and changes to asset details made.

As a minor point, the step in the methodology of linking the consequence to dollars was not evident in the model provided, nor was this step included within the Development of the 20 Year M&E Renewal Program Procedure (CORP AM P003). However, results of work on this were included within a table in the ETP Renewal Planning document.

We have focussed attention on the renewal model in determining the level of ETP M&E renewals required for the next 20 years, but particularly during the next regulatory period. The output from the ETP M&E renewal plan provides a list of deliverable projects that may be required to be implemented in the year allocated subject to the investment need passing through the capital approvals process. Solution development depends on the Functional and Detailed design steps within the implementation process.

Melbourne Water indicated that overall approximately 76% of the cost information used in the M&E renewal models is based on 2002 Replacement Register values (indexed at 3% per annum). We note that if the cost data is not based on up to date unit cost models, costing of the planned investment in the renewals may not be accurate. Melbourne Water has stated that in many instances the replacement values in the register are likely to be understated as many M&E costs have increased since 2002 due to commodity price increases /exchange effects e.g. copper (which may have abated recently) or because many renewals involve equipment which has not undergone significant technology improvements (such as pump motors). We agree with Melbourne Water's assertion that despite the inconsistency that multiple sources of cost estimates can potentially bring, it is indeed more accurate to use a combination of sources of relevant information to determine the replacement value of M&E assets, rather than relying solely on historical costs.

Melbourne Water indicated that during the workshops, the nominal asset lives for each ETP M&E asset were challenged and agreed, based on the estimated asset life (remaining) as indicated by historical/performance data. We did not see evidence of this challenge in the detailed data of the model or the documentation provided by Melbourne Water, although we understand from our discussions that this exercise occurs. Data from condition assessments undertaken in-house or by specialist consultants as required is used to infer the likelihood of asset failure requiring renewal. The frequency of failure has not been linked directly to serviceability indicators related to determining levels of service requirements or asset performance. It is a risk-based process used to determine the funding allocation and the projects required within the expenditure envelope allowed in the Water Plan.

Deliverability over the regulatory period

With respect to delivering the proposed increase in M&E renewals expenditure both generally and at ETP, Melbourne Water indicated that it is implementing two methods of delivery as follows:

- major program alliances (e.g. STaPS for ETP) for high risk/high value projects
- existing M&E Renewals Service Provider for lower value projects (< \$500,000) with less risk e.g. 'like for like' replacements.

Discussions with the existing M&E renewals service provider have resulted in the previous contract agreement being restated two weeks before Christmas 2008. The contract does not guarantee an increase in M&E renewals but has made provision to resource any increase when needed following the project approval and authorisation process.

Such a 'twin-track' approach seems sensible, continuing to involve the most recent expertise in delivering more frequent lower risk and lower value M&E renewals, while utilising the new Alliances to deliver more complex higher value and higher risk projects with an incentive to deliver ahead of time and under budget. In this regard, we believe that Melbourne Water can deliver on the forecast increase in M&E renewals at ETP, particularly in maintaining the levels of renewal over the current regulatory period, and most likely at the increased level forecast; resource availability permitting.

Cost estimate

The costs for the proposed ETP M&E Renewals allocation are shown in the following table.

Table 7.20 ETP M&E renewals cost profile comparison (\$m, 2008/09)

Forecast M&E Renewals Expenditure	2008/09	2009/10	2010/11	2011/12	2012/13	Total	% variance from Water Plan
July 2006 ETP 5-year M&E Renewal Plan (Real \$2008/09)	9.1	10.6	12.1	12.9	12.4	57.1	-17%
December 2007 Refined ETP 5-year M&E Renewal Plan - Actual Model Outputs (Real \$2008/09)	9.5	11.8	14.8	16.7	15.9	68.7	0%
Water Plan ETP M&E Renewals Allocation (Real \$08/09)	9.5	11.8	14.8	16.7	15.9	68.7	-
Water Plan – All Renewals Expenditure Allocation (Real \$2008/09)	27.7	31.4	36.8	39.0	38.6	173.4	-
ETP M&E Renewals as a percentage of All M&E Renewals Expenditure in Water Plan	34%	38%	40%	43%	41%	40%	-

The table shows that although the 2006 ETP five year M&E renewal plans was 17% lower than the Water Plan, the Water Plan is consistent with the refined profile values (actual

model output costs) for ETP M&E renewals. The proportion of ETP M&E renewals to all M&E renewals expenditure forecast over the 5-year period ranges from 34% to 43%.

Further discussion about the renewals program and the prudence and efficiency of the overall allocation included for M&E renewals expenditure within the Water Plan may be found in section 7.4.2. Any adjustment recommended to the ETP M&E renewals expenditure in future is considered to be proportional to any adjustment(s) recommended for the M&E renewal program allocation as a whole.

7.3.6 Project 6 – WTP Wet Weather Capacity Upgrade

Project Description

This project involves upgrading the capacity of WTP to accommodate wet weather volumes resulting from a 1 in 5 year return interval rainfall event. Peak flows to WTP are forecast to increase post 2010/11, following the completion of the Northern Diversion Sewer project. The project involves upgrading the Main Southern Carrier (MSC), upgrade of the intra-pond transfer structures and inlets into two lagoons (55 East and 25 West), upgrading the 15 East Outlet Drain and Flow Measurement Structure.

Key drivers and obligations

Melbourne Water has identified two drivers for this project namely, growth and compliance. The Preliminary Project Approval for this project indicates that the upgrade of the Main Southern Carrier is in accordance with the SEPP requirement to contain peak sewage flows received by the WTP from up to 1 in 5 year return interval rainfall event. The EPA considers non-compliance with these requirements a breach of the WTP operating licence.

Works to the 25 West inlet structure and 15 East Outlet Drain are driven by a separate SEPP objective that requires existing sewerage treatment works located on floodplain to be ‘managed in a manner that prevents the entry of floodwater and avoids impacts on beneficial reuse’. The upgrade will provide Melbourne Water with the opportunity to minimise by-passing of flows within the WTP lagoon systems, which adversely impacts on Class A recycled water quality.

The upgrade works to the inlet to the 55 East Lagoon will provide capacity to pass through and contain peak sewage flows at the WTP, and will provide additional operational flexibility. Melbourne Water indicated that the primary driver for upgrading the inlet to the 55 East Lagoon is to provide the necessary wet weather hydraulic capacity in accordance with the decommissioning of the Main Eastern Carrier (MEC). The need to decommission the MEC is part of the 55E cover replacement and associated works. This is a separate project and is driven by the need for cover renewal and treatment efficiency, and will have an added benefit of providing significant odour reduction at the plant boundary. The opening of the planned River Park development during 2010 places extra importance on the decommissioning of the MEC and provides the opportunity for integration with the wet weather upgrade project.

The results of flow modelling indicate that the upgrade to the existing system will be required to be completed by 2010, to coincide with the increase in sewage flows transfer to the WTP. Melbourne Water proposes to time the upgrades so that they are integrated with approved works to renew the 55 East Lagoon cover and associated decommissioning of the Main Eastern Carrier for non-emergency use.

We understand that Melbourne Water has consulted the EPA at senior and operating level of the proposed works and they have confirmed the need to undertake the works.

Solution development and fit with overall business strategy

The project has obtained preliminary project approval to proceed and the functional business case is to be prepared in the coming months.

Solution development for this project was carried out by an external design consultant. At preliminary project approval stage, a total of four options were considered. The Do Nothing option was not considered a viable option as it would not provide sufficient capacity to meet SEPP requirements and avoid sewage spills. The options ranged from a high risk 'minimum works approach' to a 'balanced approach' which was deemed low to medium risk. The options involved a number of combinations of works to the inlet and transfer structures, and the MSC. From the information provided by Melbourne Water it is not possible to identify the full list of assessment criteria, although the assessment appears to have involved a Triple Bottom Line analysis which considered compliance with SEPP requirements, risk, cost and a number of other criteria. Melbourne Water undertook a review of the project in March 2008. This review endorsed the preferred upgrade approach for the next stage of planning.

The options report prepared by the consultant was used as the basis for preliminary project approval, which was granted in August 2008. Approval was based on the P50 (50th percentile risk based probabilistic cost estimate) estimate of \$23.5 million (2006/07 real), and a P95 (95th percentile risk based probabilistic cost estimate) of \$30.7 million (2006/07 real). An additional provisional sum of \$24.6 million (2006/07 real) was identified for duplication of the MSC however this was not included within the P50 or P95 estimates. The provisional sum related to an alternative option of duplicating the existing MSC by installing a parallel open channel.

Following preliminary project approval, the options were further developed by the STaPS Alliance. The STaPS Alliance conducted a technical review of the options in order to add value to the options already considered and consider any other options not previously put forward. This review resulted in preparation of a Project Options Report dated 18 December 2008. The options were investigated with consultation from key suppliers and the STaPS Alliance team members. According to the report this enabled a more informed review of the cost of the MSC. The cost estimates were based on concept estimates and quantities, which will be subject to review as the design is developed and a detailed risk analysis is carried out.

The review of options considered whether it was necessary to increase the size of the MSC, thereby confirming whether the provisional sum of \$24.6 million (2006/07 real) for the duplication of the existing MSC should be released. The review by the STaPS Alliance concluded that a duplicate channel be constructed next to the existing MSC. The functional business case for the project is now in the process of development.

Based on the information provided, the project appears robust. Melbourne Water has undertaken a number of investigations in order to explore and optimise the options for the wet weather upgrade. In addition, Melbourne Water has identified that the project is consistent with the principles and goals underpinning its approach to sustainable operation (Sustainable Water – A Strategic Framework); its No Spills Policy; Environmental Policy; and Risk Management Policy. The project is also consistent with Hazard and Critical Control Point (HACCP) requirements for the WTP and the supply of 'fit for purpose' recycled water off-site.

Deliverability over the regulatory period

A preferred option for the scheme has been identified and the functional design is currently being prepared. The project delivery timetable indicates that the functional design will be completed by the end of March 2009 while detailed design for the project commenced at the end of November 2008. This indicates that the functional design and detailed design are

currently running in parallel, with the detailed design started prior to approval of the functional business case.

According to the preliminary business case for the project, the upgrade works to the MSC are required by June 2009 while completion of the remaining works is required by June 2011, in accordance with the increase in wet weather flows to be transferred to the plant. In order to meet these project deadlines, construction was forecast to commence at the end of March 2009, and the Water Plan expenditure forecast was developed and phased on this basis.

Since the preliminary business case was developed, the timing of the project has changed. The current project delivery date for the implementation of all wet weather upgrade works at WTP is now May 2011, including the upgrade to the MSC. Construction is now scheduled to commence in June 2009, which is three months later than originally planned. We note that the delivery timetable is time constrained, and it would appear that there is a significant risk that the project will run behind schedule.

Cost estimate

The Water Plan cost estimate for this project is \$46.7 million, with expenditure incurred over the period 2007/08 to 2010/11. Of this, \$42.8 million is within the Water Plan period. Melbourne Water indicated that the Water Plan estimate is based on the Preliminary Project Approval (\$23.5 million, 2006/07 real) with an additional allowance of the provisional sum for the MSC (\$24.6 million, 2006/07 real). Taking into account indexation, this is \$51.4 million (2008/09 real), which is greater than the estimate reported within the Water Plan (\$46.7 million). Melbourne Water indicated that it did not include the full provisional sum in the Water Plan cost estimate as further detailed investigation indicated that the project objectives could be achieved at a lower cost.

Melbourne Water provided a copy of the July 2007 report prepared by the design consultant in support of the cost estimate in the Preliminary Project Approval. The cost estimate is risk adjusted and has been developed by estimating a base cost (with variances for significant line items). Probabilistic analysis was used to combine the risk-factored cost estimates into a total project cost. The report indicates that a risk workshop was held with key members of the design team and representatives from Melbourne Water (planning, operations, asset management and capital delivery) in order to identify key project risks, and also, the likely variance of base cost line items. Risks were considered in a number of categories including social, technical, environmental, economic, political, and construction. The Preliminary Project Approval indicates that the total cost estimates are expected to have an accuracy of $\pm 30\%$, and that this was allowed for in the contingency, which Melbourne Water has excluded from the Water Plan forecast.

The Water Plan forecast for the total project is greater than the most recent cost estimate of \$44.1 million, which was developed by Melbourne Water's STaPS Alliance as part of the technical review it completed in December 2008 (i.e. after submission of the Water Plan). The STaPS Alliance cost estimate has been developed using Melbourne Water's cost RANE estimation guidelines, and it is equivalent to the statistical median cost estimate (P50). The STaPS Alliance indicated that costs were developed in consultation with key suppliers and the STaPS Alliance team members. According to the technical report, this enabled a more informed review of the cost of the MSC. The cost estimates were based on concept estimates and quantities, which will be subject to review as the design is developed and a detailed risk analysis is carried out.

A review of the RANE cost estimate (\$44.1 million) prepared by the STaPS Alliance indicates a significant expected variation in some of the key line items of the base cost, in some cases ranging from 0% to 75%. In addition, the likelihood for a number of risks has

been assessed as 100%. The expected cost of these risks totals \$3.82 million, and includes service relocation, wet weather break-in works, un-scoped items, inclement weather and fuel price increases. We challenged Melbourne Water on the inclusion of risks at 100%, and in response it has accepted that it would have been more appropriate to include some of the above costs in the base cost. In addition, Melbourne Water indicated that due to the preliminary nature of the estimate, an allowance of 100% was added for general risks such as unscoped items, inclement weather and fuel price increases, which ‘will occur and could typically be represented as a percentage of total costs’. We challenge the inclusion of these risks at 100%, although we note that Melbourne Water has indicated that the 2008 RANE analysis is currently in the process of being reviewed by internal stakeholders, and that these items will be considered further in future RANE assessments prior to finalising the TOC.

In any case, based on a review of the STaPS Alliance cost estimate, it is apparent that significant uncertainty remains in relation to some cost items. Given the early stages of planning, this is not unexpected. While we note that the latest cost estimate is lower than that used by Melbourne Water in its Water Plan, the difference between costs is within the likely accuracy band of the cost estimates at this stage of planning ($\pm 30\%$).

Given the delays to the project, the profile of the capital expenditure in the Water Plan has now changed, and the 2008/09 expenditure will be re-phased downwards from \$3.5 million to \$1.2 million.

Table 7.21 Overview of recommended changes to the WTP Wet Weather Capacity Upgrade (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
WTP Wet Weather Capacity Upgrade	Water Plan	3.54	35.44	7.40		
	Revised forecast	1.20	37.79	7.40		
	Net change	-2.34	2.34			

7.3.7 Project 7 – Water mains renewal between Preston and North Essendon

Project Description

The Water Mains Renewal scheme between Preston Reservoir and North Essendon Service Reservoir involves the renewal of approximately 10km or 59% of the combined length of three trunk mains including the M9, M70 and M102. The trunk mains are between 80 and 114 years old and are considered to be at the end of their service lives. According to a risk assessment undertaken using Melbourne Water’s Asset management Condition and Risk Assessment procedure (2007), the M9 and M70 trunk mains are at very high risk of asset failure, with the M102 trunk main being assessed at a high risk of failure. Assets with such a high risk rating must be subject to the implementation of a level of treatment within 12 months or as soon as practicable.

The M70 trunk main was not returned to service after a long outage period since 2005 when a 2km section was shut down due to a failure on the M9. Due to delays in starting the repair works, the M70 remained shut down for 10 months and hence could not be recharged due to the risk of leaks and masking of the cement lining from wall pitting of the old jointed pipe.

The likelihood of failure of the M70 was assessed as being too large a risk, so Melbourne Water relied on the secondary supply from Greenvale in the event of a failure of the M009 main failed. This was an expensive mitigation option, notionally costing between \$500 to \$1,000 per day over the demand period. This created an additional risk that Greenvale may have fallen below its minimum operational level by the end of the summer.

At the Functional Design stage, the current scope of works for the project is as follows:

- construct an 8.5km pipeline of new 1200mm diameter MSCL pipe and 2.1km of 1400mm MSCL pipe including all associated vales and fittings
- abandon 7km of 900mm pipe through filling with cement or similar
- install corrosion control mitigation system.

Four key tasks included within the project are:

- account for three creek crossings
- negotiate crossing of major roads including Pascoe Vale Road
- extend railway culverts under three railway lines
- cross the tram lines at Gilbert Street.

Key drivers and obligations

The water mains renewal project between Preston and North Essendon is clearly defined as having a renewal business driver according to the Planning Framework and Capital Investment Policy.

The Condition and Risk assessment rated the current operation of the M9 as posing a high security of supply risk in the event of failure that would compromise Melbourne Water's ability to meet the requirements of the Bulk Water Supply Agreement with water retailers.

The key drivers for undertaking the works over the Water Plan are:

- frequency of burst analysis indicating an increase in the number and severity of bursts particularly for the M9 and M102 pipelines. Melbourne Water reports that although the current frequency has returned to a level previously experienced prior to cement lining of the pipelines some decades ago, the intervening years have compromised the integrity of the pipes as corrosion thins the metal. Bursts of greater intensity through larger holes are common and the risk of tears or wholesale failure of the pipe at the point of a burst has reached critical levels. The deterioration in the pipes has been confirmed via visual inspections
- greater difficulty is being encountered in effecting repairs. Attempts to weld plates over failure points often burns holes through the thinned metal of the pipe, necessitating more extensive repair work
- When major failures occur, lead times are required to plan and then undertake renewal works which impact on services to retail customers and other parties affected by flooding, loss of supply, disruption to access, inconvenience, etc. An example a relatively recent major failure of the M9 pipe occurred at Pascoe Vale and interrupted train services. While, such inconvenience may have been tolerated in the past, Melbourne Water now believes that community expectations have increased to the point where it is unacceptable to plan renewals work on the basis of waiting until major failures begin occurring.

Solution development and fit with overall business strategy

The main three options considered included the status quo (do nothing), complete replacement and internal structural lining of the trunk main.

The 'do nothing' option was not considered feasible on the grounds of Melbourne Water not being able to fulfil its Bulk Water Supply Agreement requisite level of water supply in the event of asset failure.

The structural lining option was also considered unviable due to the lower transfer capacity that would result from implementing the remedial works and the low expected design life.

The preferred option was therefore to implement a full replacement scheme.

Deliverability over the regulatory period

Some critical assumptions and constraints were devised to ensure that the project would be able to meet the proposed delivery program, including:

- pipes and fittings for stages 1 - 3 were to be ordered by the 12th November 2008 due to long lead times for these items and procured under Melbourne Water's existing supply agreements
- in order to prevent asset failure due to vibration from boring machine related to delivering the Northern Sewerage Project, Stage 1 works were to proceed before TOC
- staging of the delivery to reflect the condition of the asset starting in the western reaches of the network where the trunk main experienced the high failure rate
- delivery including design, construction and procurement to be undertaken through the Water Supply Alliance
- replace some sections during low demand periods i.e. winter
- revise the project staging in the event of a major burst on the M9, M70 or M102.

A TBL analysis of the most suitable procurement and construction options for the preferred trunk main alignment was undertaken. Economic factors including costs/timing/risks, social considerations such as recreational and visual amenity and environmental impacts were taken into account.

The preferred strategy for procurement was to stage procurement of pipes over the 3 year duration of the project to coincide with the levelling off of steel prices or the likelihood that the price will reduce. The added cost of storage over time from upfront purchase of pipes and materials will also be avoided.

The Functional Business Base outlines the progressive replacement of the water mains between Preston and North Essendon in eight stages over three years duration between November 2008 and January 2011. The key milestones for the project are outlined as follows:

Table 7.22 Water Mains Renewal – Preston to North Essendon key project milestones

Milestone	Target Date
Business Case approval from Government via DTF & DSE	17/11/2008
Long lead items procurement for stages 1-3	12/11/2008
Completion of Detailed Design for Stage 1	07/11/2008
Site Establishment for Stage 1	28/11/2008
Commence consultation with community	02/08/2008
Commence construction of Stage 1 – Merri Creek Crossing	02/02/2009
Complete consultation of Stage 1 – Merri Creek Crossing	06/04/2009
TOC Approval	30/03/2009
Commence construction of Stages 2 – 8	06/04/2009
Complete construction of Stages 2 – 8	30/06/2011

Cost estimate

The November 2008 Functional Business case details the expected out-turn costs (excluding contingency) for the project to be \$53.5 million in 2008/09 dollars, which represents a 56% (\$19.1 million) increase on the Corporate Plan/draft 2008 Water Plan project value of \$34.4 million. The latter figure was close to the original projected project value of \$31.7 million outlined in the June 2007 Preliminary Business Case (excluding \$6.3 million for contingency and a \$0.52 million provisional sum).

According to the Water Plan, the total projected cost of the project from 2007/08 to 2010/11 will be \$52.6 million (2008/09 dollars), including \$37 million within the Water Plan period.

Melbourne Water recognises that the cost has escalated in the Water Plan since the concept design project estimate was derived. The disparity has been attributed to greater clarity around the scope from the functional design, an increased understanding of the risks involved (not included as contingency), an underestimation of the steel pipes/components required for the job at concept design stage and the escalation of labour prices since 2006. Consequently Melbourne Water has indicated the difference of \$19.1 million between the forecast cost in the Corporate and draft Water Plans is expected to be funded from efficiencies, innovations and the reprioritisation of the Water Supply Program from which this scheme will be delivered.

The Preston to North Essendon water main renewal scheme is one of the twelve projects within the 2009 Water Plan capital program that has had the RANE technique applied. These twelve projects account for approximately 42% of the capital expenditure in the next regulatory period from 2009/10.

The RANE cost estimate was prepared in August 2008, and it includes allowances for the escalation of steel prices over three years, with the steel price increasing on average at 50% per year to reflect future market volatility. The expected 'MSCL pipe procurement' included in the RANE base cost estimate is \$10.735 million. Assuming that steel contributes 50% to the ordering price of the pipes (as assumed by Melbourne Water in its RANE estimate), approximately \$5.37 million of the base cost is directly impacted by the purchase price of steel.

In addition to this allowance Melbourne Water has included as a risk (with 100% likelihood) that the prices for materials (steel) and labour will escalate \$3 million beyond that included within the expected (base cost) estimate.

Given the downturn in global economic conditions since August 2008 and the falling steel price we consider it unlikely that the price of steel will escalate significantly in the coming years. In addition, the allowances for steel in the base cost (\$5.37 million) were estimated at a time when the price of steel was at its peak. Since August 2008, steel prices have approximately halved.

We queried Melbourne Water about the reasons for including allowances for the escalation of steel prices in its Water Plan. In response, Melbourne Water provided evidence that the current pipe cost taken from the successful tender for Stages 1-3 of the project was at a rate of \$1,012 per metre. This rate is similar to the pipe cost of \$1,000 per metre assumed for the MSCL pipe procurement (\$10.735 million per the P50 estimate). As this information is based on the successful tender rates, we agree with this assessment.

However, given that the successful tender rates are commensurate with the P50 estimate of \$10.735 million, we believe that there is no justification to include the \$3 million (P50 expected cost) escalation amount in the RANE for increases in the price of materials (steel)

and labour. We therefore recommend that \$3 million for escalation allowances be removed from the total project expenditure forecast in the Water Plan.

From the information provided, it is not possible to determine the phasing of expenditure on the procurement of the pipework although we note that the procurement strategy for Stage 1 has been initiated with an order for \$5 million of steel pipes and associated valves and fitting already placed.

The following table shows our recommendations in relation to this scheme. In the absence of the detailed procurement plan, we have assumed the phasing of steel pipes over the period 2008/09 to 2010/11 so that the majority is purchased in 2008/09.

Table 7.23 Recommended adjustment to capital expenditure forecast for Renewal between Preston and North Essendon (\$m, 2008/09)

Capital Expenditure	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Water Plan Expenditure (2009/10 to 2012/13)	Total Project Expenditure
Water Plan	0.5	15.1	22.8	14.2			37.0	52.6
Revised Forecast	0.5	13.1	22.3	13.7			36.0	49.6
Net change	-	-2.0	-0.5	-0.5			-1.0	3.0

7.3.8 Project 8 – Water main renewal between North Essendon and Footscray

Project Description

At Preliminary Project Approval Stage, The North Essendon to Footscray water main (M102) renewal scheme was recommended for a staged renewal over three years commencing in 2010/11.

The 1150mm diameter mild steel trunk water main is 14km long and supplies the Footscray, Altona and Werribee areas and extends from the reservoir at North Essendon to Williamstown Road in Yarraville.

The project was originally initiated by growth demands outlined in the Western Suburbs Strategy, however the implementation timeline was revised to 2020/21. Replacement has now become the primary driver, however the scope of works are designed to meet the requirements of the Western Suburbs Strategy by incorporating the necessary bulk water supply improvements over the next 20 years. Issues that were considered included demand growth, water quality, transfer system hydraulics and asset structural conditions over the next 20 years.

The trunk main underwent a condition assessment in 2003, the details for which were not available for review, indicating that the main was nearing the end of its service life and it was likely that the original design life had already been exceeded.

Replacement is forecast to be required by 2014/15.

Key drivers and obligations

The M102 North Essendon to Footscray water mains renewal project is defined by the renewals business driver. However, the proposed scope addresses the applicable growth requirements of the Western Suburbs Strategy. This may be regarded a secondary (strategic)

driver of the project as appeared evident in the Preliminary Project Approval document. As a result, the proposed installation of a booster pump for demand growth has been deferred from 2013/2014.

Solution development and fit with overall business strategy

The outcome of the 2003 condition assessment, indicated the status quo or 'do nothing' option was not considered viable and hence renewal of the asset was deemed necessary.

Eighty-four perforations of the total of three hundred and twenty have occurred since 1980, amounting to three per annum on average. Hence, the rate of deterioration pointed to renewal being completed within the next regulatory period. Analysis of survey/perforation data for the remaining sections of the trunk main confirmed the deterioration of the approximately 80 year old asset with a risk rating of A3.

Three main solution options were considered within the Preliminary Project Approval, details for which were not provided. It was evident from the information that the cost of the options was similar in both capital expenditure and NPV terms. However, the risks with respect to maintaining continuity of supply during construction were deemed too high for Option 1 as construction of the Northern Sewerage project would be taking place concurrently from 2007/08 to 2010/11.

As a result, the second least cost option was preferred (option 3) for implementation and delivery as it balanced the need to stage the works for operational reasons, while renewing the asset over three years by 2012/13 in keeping with the current and forecast pipe condition.

Deliverability over the regulatory period

Since the Preliminary Project Approval was issued in June 2007, Melbourne Water has issued a Capital Program Variance for the project to bring forward the proposed capital expenditure of approximately \$2 million for design and stakeholder consultation from 2010/11 to 2008/09. Consultation will seek to resolve matters arising from the route alignment near residential and industrial areas and it is thought that the early start will provide enough lead time to address potential issues arising from Essendon airport. The project construction will also be deferred by a year to allow sufficient time for the consultation and design process to be undertaken. This seems a sensible and proactive planning initiative that will help ensure that the project is delivered by 2013/14.

Community consultation tasks are to be delivered through the Water Supply Alliance to identify project risks and guide functional and detailed design scope prior to Business Case Approval and construction start in 2011/12. Depending on the outcome of the consultation efforts, the cost of the project may change and possibly increase slightly to reflect community input.

Cost estimate

The Preliminary Project Approval cost in June 2007 for the preferred trunk main renewal option was \$47.04 million in 2006/7 dollars. This includes \$38.4 million for construction, \$7.76 million for contingency, \$0.384 million for internal project management and a \$0.5 million provisional sum. Capital expenditure is assumed to be spread over three years starting in 2010/11. Following a review of the project in October 2008, Melbourne Water decided to defer the project by one year, with community consultation and design costs brought forward to 2008/09. This resulted in consequential changes to the expenditure forecast. The capital variance document, which summarises the results of the 2008 review, stipulates that the project costs had not yet been subject to a RANE assessment due to the fact that construction was not commencing until 2010/11 and given that the project is similar to others that have been completed.

A comparison of costs from the Preliminary Project Approval stage, the October 2008 review, and the 2009 Water Plan is shown in the following table.

Table 7.24 North Essendon to Footscray Water Mains Renewal project cost profile (\$m, 2008/09)

Expenditure (exclude contingencies)	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	Total
Preliminary Project Approval (\$2006/07) ¹			15.60	13.20	9.60		38.40
Preliminary Project Approval (\$2008/09 real)			16.66	14.10	10.25		41.00
Capital Program Variance (\$2007/08) ²	0.50	1.50		15.81	13.63	8.21	39.65
Capital Program Variance (\$2008/09) ¹	0.52	1.56		16.48	14.21	8.56	41.33
Water Plan ³	0.52	1.56		16.48	14.21	8.56	41.33

Notes: (1) Construction cost, excluding contingencies and provisional sums. (2) Costs cited from the Draft Water Plan and the Corporate Plan (08/09 – 10/11) sourced from the Capital Program Variance for the project submitted in October 2008. (3). Costs in Real \$2008/09 based on the supporting capital projects spreadsheet list for the Water Plan.

The capital expenditure reported in the Water Plan is consistent with the Capital Program Variance, which is an approved variation to the PPA. The variation relates to costs associated with bringing forward some aspects of the scope and deferring other aspects.

Melbourne Water provided a detailed breakdown of the PPA cost estimate. The breakdown indicates that the cost estimates were based on rates derived from a completed pipe replacement project (Calder Interchange completed in 2005/06). This project pre-dated the significant increase in steel prices that occurred in recent years. Hence it is unlikely to reflect escalations in steel prices.

Costs for the North Essendon/Footscray renewal have been estimated by breaking down the water main into six renewal sections. The diameter and length of the pipe for installation, the design costs, pipe and fittings costs, costs for pipe laying and crossings for roads/creeks/railways were provided for each section. In calculating the PPA cost estimate, Melbourne Water has factored up the unit rates by an average of 19% for all six sections of the scheme. Given that the cost estimates for this scheme are based on a recent project that was not located in the centre of Melbourne, such escalations are not unreasonable. A similar delivery cost for mains renewals has been experienced in the CBD by one of the Melbourne retail water companies.

Given the current stage of project development, we consider it reasonable to the use of unit rates developed from the Calder interchange project as the basis for developing the cost estimate.

7.3.9 Project 9 – Sewerage transfer Mechanical and Electrical renewals

Project Description

Melbourne Water has proposed an increase in its renewals spending on sewer transfer M&E assets. The specific projects are indicative only and are still required to go through the project capital approvals and investment authorisation process.

As noted earlier, Melbourne Water's 2005 Water Plan underestimated renewals expenditure in the current regulatory period.

The development of Melbourne Water's M&E renewal planning methodology is discussed under the ETP M&E renewals section 7.3.5 and is not to be repeated here. Suffice to say that of the sewerage transfer M&E asset types, penstock and flow meter renewals have applied the conventional renewal methodology, whereas sewage pumping stations require the application of the modified version for large sites.

Key drivers and obligations

The regulatory driver for renewals is related to the provision of existing service standards by extending asset life or replacing the asset. In this case, the driver applies to the renewal of Sewerage Transfer M&E assets.

We asked Melbourne Water whether they had experienced a rise in M&E asset failures that supports the large rise in actual over planned M&E renewals expenditure over the current regulatory period. In response, Melbourne Water indicated that a number of its key assets are ageing closely together such as at the ETP and Winneke Water Treatment Plant. Since commissioning, growth has caught up and asset redundancy provided by multiple units has become fully utilised.

The redundancy shortfall and corresponding risk to maintaining levels of service requirements has coincided with M&E component obsolescence becoming an increasingly more prevalent problem. Melbourne Water's ability to tolerate M&E asset failure or prolonged downtime due to parts obsolescence has therefore reduced. At the same time, the compliance risk to the business of asset failure has increased, particularly in the case of multiple asset failure.

Solution development and fit with overall business strategy

In December 2007 prior to the submission of the Water Plan, the 2006 renewal models (including Sewerage Transfer assets) were refined to update the Reality Check and account for any planning considerations for growth or compliance and to incorporate an update of the most recent data from State of the Assets process including condition assessments.

Some changes were recommended for sewage pumping stations including the re-phasing of ventilation and pump renewals at Kew Pumping Station over two years rather than in the first year (2009/10) as originally recommended. Recent failures causing a redundancy shortfall and coinciding with a lack of spares availability meant that PLC system replacements were brought forward for both Kew and Hoppers Crossing pumping stations. Due to condition assessment data indicating a high risk of failure, the fire system pipework at Brooklyn pumping station has been brought forward. No spares availability and the frequency of failure experienced have brought forward the renewal of the high voltage protection relays and circuit breakers for North Road Pumping Station. No changes were recommended for penstocks and flow meters as a result of the reality check.

A random check a number of the outputs from the model show that the assets types predicted for renewal in each year of the next Water Plan appear to be consistent with the specific process/sub-process units prioritised (for renewal) from the State of the Assets process. This provides a degree of confidence in the process identifying potential investment needs that support the strategy of the business.

Limitations of the approach

As discussed in Section 7.3.5, from the documentation provided, we have not been able to see evidence of all the steps of the process taking place, in particular the results of the workshops verifying the underlying model data and any changes to the outputs resulting

from it. While these stages are referred to in the Sewerage Transfer M&E 20 Year Renewal Plan (2006) document, the detail behind it with respect to changes made to original model assumptions including asset lives/other details/costs within the model were not evident. Melbourne Water has acknowledged that its documentation could be improved and has stated that it did undertake a reality check of the models during workshops, and update the models accordingly. We would expect to see the original asset install date and expected life and any agreed changes as a result of the workshop reviews to be clearly identified within the model spreadsheets or supporting documentation. This would assist with future model runs and provides an audit trail of assumptions and changes to asset details made.

As a minor point, the step in the methodology of linking the consequence to dollars also was not evident in the model provided nor was this step included within the Development of the 20 Year M&E Renewal Program Procedure (CORP AM P003). However, results of work on this were included within a table in the Sewerage Transfer Renewal Planning document.

We have focussed attention on the renewal model in determining the level of Sewerage Transfer M&E renewals required for the next 20 years, but particularly during the next regulatory period. The output from the Sewerage Transfer M&E renewal plan provides a list of deliverable projects that may be required to be implemented in the year allocated subject to the investment need passing through the capital approvals process. Solution development depends on the Functional and Detailed design steps within the implementation process.

Melbourne Water indicated that overall approximately 76% of the cost information used in the M&E renewal models is based on 2002 Replacement Register values (indexed at 3% per annum). We note that if the cost data is not based on up to date unit cost models, costing of the planned investment in the renewals may not be accurate. Melbourne Water has that in many instances the replacement values in the register are likely to be understated as many M&E costs have increased since 2002 due to commodity price increases /exchange effects e.g. copper (which may have abated recently) or because many renewals involve equipment which has not undergone significant technology improvements (such as pump motors). We agree with Melbourne Water's assertion that despite the inconsistency that multiple sources of cost estimates can potentially bring, it is indeed more accurate to use a combination of sources of relevant information to determine the replacement value of M&E assets, rather than relying solely on historical costs.

When queried about the asset lives used, Melbourne Water advised that it questioned the nominal asset lives for each Sewerage Transfer M&E asset and agreed the estimated asset life (remaining) based on historical/performance data. We did not see evidence of this challenge in the detailed data of the model or the documentation provided by Melbourne Water, although we understand from our discussions that this exercise occurs. Data from condition assessments undertaken in-house or by specialist consultants as required is used to infer the likelihood of asset failure requiring renewal. The frequency of failure has not been linked directly to serviceability indicators related to determining levels of service requirements or asset performance. It is a risk-based process used to determine the funding allocation and the projects required within the expenditure envelope allowed in the Water Plan.

Deliverability over the regulatory period

With respect to delivering the proposed increase in M&E renewals expenditure both generally and for Sewerage Transfer assets, Melbourne Water indicated that it is implementing two methods of delivery as follows:

- major program alliances (e.g. STaPS for Sewerage Transfer) for high risk / high value projects

- existing M&E Renewals Service Provider for lower value projects (< \$500,000) with less risk e.g. 'like for like' replacements.

Discussions with the existing M&E renewals service provider have resulted in the previous contract agreement being restated two weeks before Christmas 2008. The contract does not guarantee an increase in M&E renewals but has made provision to resource any increase when needed following the project approval and authorisation process.

Such a 'twin-track' approach seems sensible, continuing to involve the most recent expertise in delivering more frequent lower risk and lower value M&E renewals, while utilising the new Alliances to deliver more complex higher value and higher risk projects with an incentive to deliver ahead of time and under budget. In this regard, we believe that Melbourne Water can deliver on the forecast increase in M&E renewals for Sewerage Transfer assets, particularly in maintaining the levels of renewal over the current regulatory period, and most likely at the increased level forecast; resource availability permitting.

Cost estimate

The costs for the proposed Sewerage Transfer M&E Renewals allocation are shown in the following table.

Table 7.25 Sewerage Transfer M&E renewals cost profile comparison (\$m, 2008/09)

Forecast M&E Renewals Expenditure	2008/09	2009/10	2010/11	2011/12	2012/13	Totals	% variance from Water Plan over Water Plan Period
July 2006 Sewerage Transfer 5-year M&E Renewal Plan (Real \$2008/09)	5.9	6.9	7.7	7.7	7.7	36.0	-5%
December 2007 Refined Sewerage Transfer 5-year M&E Renewal Plan - Actual Model Outputs (Real \$2008/09)	6.3	7.4	8.1	8.3	7.9	38.1	0%
Water Plan Sewerage Transfer M&E Renewals Allocation (Real \$08/09)	6.3	7.4	8.1	8.3	7.9	38.1	-
Water Plan – All M&E Renewals Expenditure Allocation (Real \$2008/09)	27.7	31.4	36.8	39.0	38.6	173.4	-
Sewerage Transfer M&E Renewals as a percentage of All M&E Renewals in Water Plan	23%	23%	22%	21%	21%	22%	-

The table shows that the M&E renewals reported in the Water Plan are consistent with the refined profile values (actual model output costs) for Sewerage Transfer M&E renewals.

The proportion of Sewerage Transfer M&E renewals to all M&E renewals expenditure forecast over the 5-year period ranges from 21% to 23%.

Further discussion about the renewals program and the prudence and efficiency of the overall allocation included for M&E renewals expenditure within the Water Plan may be found in Section 7.4.2. Any adjustment recommended to the Sewerage Transfer renewals expenditure in the future should be proportional to any adjustment(s) recommended for the M&E renewal program allocation as a whole.

7.3.10 Project 10 – ETP Fine Screens – Grit and Screening Upgrade

Project Description

The Fine Screen Replacement project involves the replacement (including design and construction) of the existing screens, screenings and grit handling and associated improvements to pre-aeration tanks and the addition of grit classifiers to the ETP.

According to the program for the Water Plan 2009 and supporting notes from Melbourne Water, the project is scheduled for completion by 2011/12.

The key components of the Fine Screen Replacement project have been separated into four separate process areas. These are:

- screens
- pre-aeration (grit) tanks
- screenings handling
- grit handling.

The scheme is currently at the Functional Design stage.

Key drivers and obligations

While the inlet fine screens and screenings/grit removal project is not listed specifically as a key obligation in the Water Plan, we understand it to be complementary to the upgrade of the ETP to tertiary standard by 2012 and the odour reduction and wet weather containment works outlined in Melbourne Water's SoO. These initiatives follow considerable consultation with the EPA and are consistent with *Our Water Our Future: the Next Stage of the Government's Water Plan*.

During the interviews, Melbourne Water provided to us the range of projects being undertaken at the ETP over the next regulatory period. Further documentation has been reviewed detailing various drivers that are applicable to this project including mainly renewals (64%) and business efficiency (32%), with very minor allocations to environmental/social, strategic intent/risk mitigation and compliance making up the balance of the total cost.

We have been informed that the works were deemed necessary following extensive options assessment and review / challenge processes, including by external consultants, as well as consultation with the EPA and the retailers.

Of the main two drivers for the ETP fine screens – grit and screening project, renewals comprises almost two thirds of the estimated total project expenditure, the majority of which is attributable to the new screens (52% of the total expenditure), with the remainder of screens expenditure attributable to business efficiency (17% of total). The majority of the remaining balance of the cost is related to the screenings handling and grit tanks/handling amounting to 11% and 15% of the total cost for the renewals and business efficiency drivers respectively.

The concept/functional design for the project undertaken by consultants for Melbourne Water assessed the appropriateness for driver allocations, attributing the majority of spend to renewals due to capacity and serviceability related issues with the existing inlet screens and grit/screenings handling systems. The original level of service not was being met in providing effective screening and screenings handling to the full 20.4kL/s design flow (overall average capture efficiency 42%).

Solution development and fit with overall business strategy

Prior to scheme proposal, investigation work was conducted in 2005 to trial minor modifications to the existing band screens to understand whether it would meet expected functionality requirements, where the main requirement related to capacity to pass the flow while effectively capturing and removing the majority screenings. Results showed that the modified band screen did not meet the desired functionality under normal operating conditions, nor under steady state conditions during extended periods. Excessive screen blinding caused inlet pumping station constraints and exacerbated the solids build up behind the screen, leading to reduced flow rates (to prevent bypassing) until the screen cleared.

The second part of the inlet screens replacement related to the screenings and grit removal systems. Concept design work using best practice principles was conducted by consultants in 2006 confirming that the appropriate screenings/grit removal system was the same regardless of the screening option chosen (i.e. fine screen replacement or coarse screen retrofit). The only consideration was the capacity of the screenings handling unit depending on the screen aperture size chosen.

Following an assessment of advantages and disadvantages of the main two options and a TBL analysis, the environmental, social and economic criteria were weighted and scored indicating that the Fine Screen Replacement option was the best option, while the coarse screen retrofit was found to be marginally worse.

A total risk cost analysis of the options was also conducted which showed that the best option under TBL analysis, the fine screen replacement, had the lowest total risk cost of all the options including the status quo. The coarse screen replacement option was assessed to carry ten times the risk of the fine screen replacement option.

Deliverability over the regulatory period

Project milestones have been provided within the Preliminary Project Approval document. The project is currently in the Functional Design stage, which was scheduled for completion in late 2007, with Detailed Design to be completed by late 2008 and construction starting in mid-2009 and ending in late 2011.

The expenditure profile forecast in the Water Plan appears to reconcile with the original milestones, with \$3.7 million allocated for 2008/09, \$7.6 million for 2009/10, \$16.7 million in 2010/11 and \$1.3 million in 2011/12 (all in real 2008/09 dollars).

Given the relationship that this scheme has with the tertiary treatment upgrade to be progressed in parallel, there is a large incentive for Melbourne Water to ensure that it is implemented on time and within budget.

No specific delivery information was provided, but we expect that delivery will be consistent with Melbourne Water's delivery strategy and approach and the project could be assigned to a preferred supplier under the Sewage Treatment and Pump Station Alliance (STaPS). For example, procurement of key items for this project, such as screens, will be considered for fast-tracking where appropriate.

Cost estimate

The Preliminary Project Approval (2006) estimated the cost of the preferred project option for installing fine screens and screenings/grit handling and removal to be broken down as follows:

Table 7.26 Cost estimate for ETP Fine Screens – Grit and Screening Upgrade (\$m, 2006/07)

Process Element	Capital Expenditure
Fine Screens Replacement	18.2
Screenings Handling	4.8
Grit tank improvements	0.6
Grit handling	2.4
Sub-total	26.0
Contingency (5%)	1.3
Provisional sum for power upgrade	0.1
Total Project Cost	27.3
NPV	13.9
Asset write-off	0.8

The total project cost (without rounding and including contingency and provisional sums) estimated at the Preliminary Project Approval stage was \$28.1 million in 2006/07 dollars.

The Water Plan forecast is for \$29.4 million in 2008/09 dollars (from 2006/7 to 2011/12), of which \$25.6 million falls within the Water Plan period.

We note that the scheme expenditure includes a 5% contingency and \$0.1 million provisional sum (in 2006/07 dollars). Melbourne Water has indicated that it has excluded contingency from its cost estimates. However, we have included these amounts in our assessment on the basis that the project is currently at functional design stage.

We recommend that the 2009 Water Plan forecast project expenditure profile as detailed in the table below remain unchanged.

Table 7.27 Overview of recommended changes to ETP Fine Screens – Grit and Screening Upgrade expenditure (\$m, 2008/09)

Expenditure item		2008/09	2009/10	2010/11	2011/12	2012/13
ETP Fine Screens – Grit and Screening Upgrade	Water Plan	3.7	7.6	16.7	1.3	
	Revised forecast	3.7	7.6	16.7	1.3	
	Net change	0.0	0.0	0.0	0.0	

7.4 Other comments on capital expenditure

In addition to the top 10 projects, we offer the following observations and recommendations.

7.4.1 Renewals program

We have reviewed two Mechanical and Electrical (M&E) allocations within the overall renewals program. Melbourne Water's M&E renewals program as a whole has been built up from 24 individual renewal models using a methodology based on the Common Framework
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approach adopted by the UK water industry, with specific focus on Yorkshire Water's LEADA model. We will not discuss the methodology in detail here, but note that the limitations of the models utilised to determine ETP and Sewerage Transfer M&E renewals are common to all the models used to derive the overall renewals program.

When asked whether there were any improvements to be made to the M&E renewals models in the future, Melbourne Water indicated that once 12 months of data is available later in 2009 recent project work and implementation costs will be fed back into the model. In addition, the model will be subject to ongoing continuous improvement through progressive updates of the model over time as new cost and asset life information becomes available. The next review of the model will be conducted in 2009 (and in subsequent years). Cost and asset life data from the water industry and relevant data from the mining industry is also being sought for the review. The models are then to be calibrated at the end of the 2008/09 financial year using the review of information as the basis for any changes to the improved model.

We note that the review exercise could change the value and timing of projects and hence expenditure, particularly as more information from the scope of works for existing projects such as ETP tertiary treatment becomes available. It was identified that civil works expenditure is not included within the renewals profile. Such expenditure is likely to cause spikes in the forecast expenditure profile, particularly from 2025 onwards for particular structures.

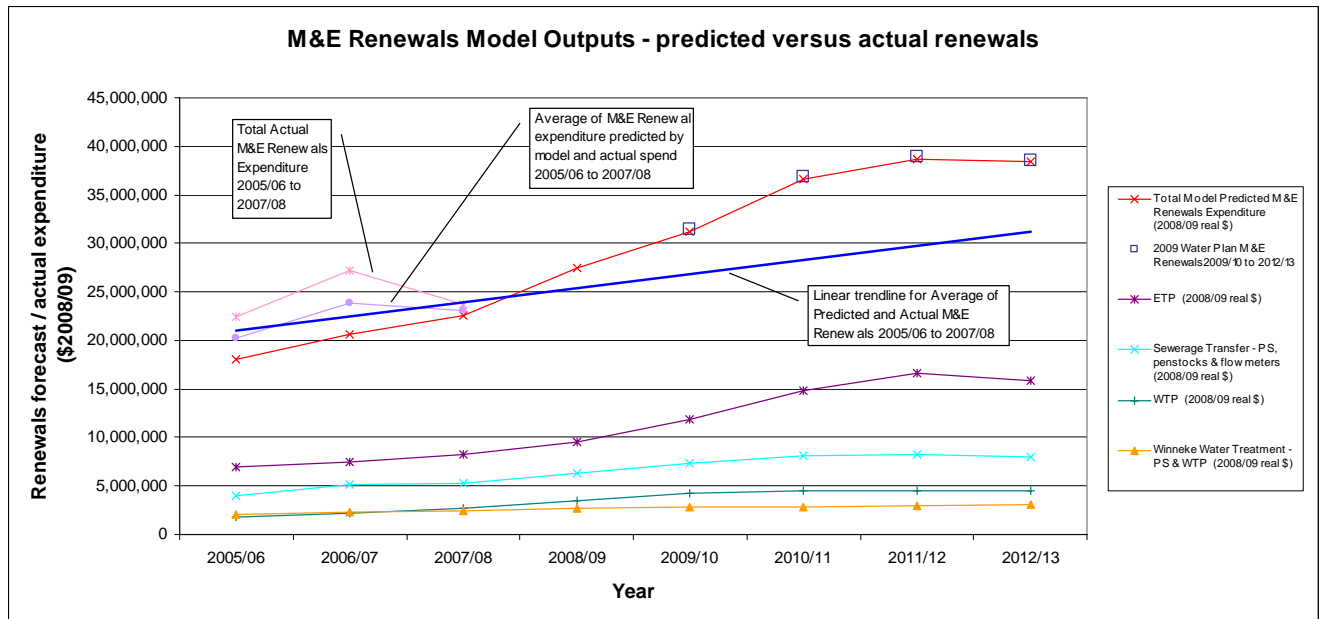
Since 2005/06 Melbourne Water has experienced an increase in its renewals program above planned levels. We acknowledge that growth in many instances may have caught up with some assets or groups of assets at a time when the asset base is ageing (ETP and sewer pumping stations account for 39.8% and 21% of the proposed M&E renewals expenditure over the next Water Plan) and consequently Melbourne Water's tolerance to asset failure has decreased and their risk (of failure) has increased. We note the foresight in trying to devise a forward predicting tool such as the M&E renewals models to forecast M&E renewals expenditure beyond the short term (one to two year) view up to the five and twenty year planning horizons.

However, as the model is in its early stages of development and is due to be calibrated later in 2009 with more recent renewals costs and asset life data, we believe that there is a degree of uncertainty around the accuracy of the forecast cost estimates. As proposed, the forecast M&E renewals expenditure represents a step increase of almost 70% from 2007/08 to 2011/12. Melbourne Water stated that 'on an assumed 35 year replacement cycle average yearly spend on [M&E] replacement should be in the order of \$25 million per year'. We note Melbourne Water's concern that existing levels of service cannot be maintained based on a continuation of historical expenditure levels.

Based on a high level assessment of Melbourne Water's model, we are satisfied that the total renewals expenditure predicted by the model corresponds to the total expenditure allowance made for M&E renewals in the Water Plan.

The following figure indicates the total renewals expenditure predicted by the model and compares it to the Water Plan estimates. Some major M&E renewals asset classes have been included for relative comparison. These include ETP, Sewerage Transfer (including pumping stations, penstocks and flow meters), WTP and Winneke Water Treatment Plant.

Figure 7.3 Analysis of M&E Renewals capital expenditure (\$m, 2008/09)



We averaged the predicted model output values and actual expenditure costs to provide an indicative expected M&E renewals value for the three years from 2005/06 to 2007/08. We then applied a line of best fit and trended this forward to provide an historical basis for comparison based on known and predicted expenditure values. We then compared this trend line with the predicted output of the model for the Water Plan period (2009/10 to 2012/13).

The result of this analysis shows that the variance between the trend line and model output ranges from -17.2% to -31% annually over the Water Plan period. The average variance is -25.65%. On the basis that the trend line is based on an average of past expenditure and the model, we recommend that the expenditure forecast for the M&E renewals be reduced by 25.65%. This translates into an average annual M&E renewals expenditure of \$27.1 million per annum over the four years of the 2009 Water Plan period. This figure represents an increase over past expenditure levels and is based on our analysis of the model outputs provided by Melbourne Water for all M&E water and sewerage asset categories and therefore applies to all allocations of M&E assets for renewal. Further justification for our recommendation is included in the following paragraphs. Table 7.28 details the adjustments for each project and the M&E renewals program as a whole (excluding the specific renewals projects already reviewed).

Table 7.28 Review of Renewals Program capital expenditure (\$m, 2008/09)

Expenditure item	Project Name / Type		2008/09	2009/10	2010/11	2011/12	2012/13	2009 Water Plan Expenditure 2009/10 to 2012/13
M&E Renewals Allocations – reviewed	Alloc - ETP M&E renewals	Water Plan	9.5	11.8	14.8	16.7	15.9	59.2
		Revised forecast	7.1	8.8	11.0	12.4	11.8	44.0
		Net change	-2.4	-3.0	-3.8	-4.3	-4.1	-15.2
	Alloc - sewerage transfer M&E renewals 2008-2012	Water Plan	6.3	7.4	8.1	8.3	7.9	31.7
		Revised forecast	4.7	5.5	6.1	6.2	5.9	23.6
		Net change	-1.6	-1.9	-2.1	-2.1	-2.0	-8.1
M&E Renewals Allocations – remainder	Balance of M&E renewals allocations in program – models not reviewed in detail	Water Plan	12.0	12.2	13.9	14.0	14.8	54.8
		Revised forecast	8.9	9.1	10.3	10.4	11.0	40.8
		Net change	-3.1	-3.1	-3.6	-3.6	-3.8	-14.1
Total Water Plan Renewals forecast			168.5	178.9	167.0	116.3	111.3	573.5
Total Renewals revised forecast			161.4	170.8	157.6	106.3	101.4	536.1
Net change			-7.1	-8.1	-9.4	-10.0	-9.9	-37.4
% Change			-4%	-5%	-6%	-9%	-9%	-7%

In explaining the difference between the average renewals spend to date (\$24 million) with the average per annum M&E expenditure forecast over the next regulatory period, Melbourne Water pointed to major capital projects influencing the long term M&E renewals expenditure that have occurred during the current regulatory period or are planned for this year and in the next period. Melbourne Water is of the opinion that the model accurately predicted the M&E renewals expenditures during the current Water Plan period. However, the expenditure predicted by the model was understated due to additional projects being added to the plan (e.g. 2006/07), some project over-expenditures and undervaluing of the costs generally, due to the use of 2002 cost estimates.

In future years, significant renewals of sub-components were cited as the main cause of the cost escalation within the model. One of the sites with major projects in this category is ETP. Upon inspection of the model, the major renewals projects identified were for equipment installed since 2005. The power generators installed as part of the Eastern Green Energy Project (EGEP) were predicted to be replaced in 2011 at a total (raw) replacement value of \$17.5 million (2007/08 dollars, not including the impact of the Weibull distribution). We do not believe that this frequency of replacement for such M&E assets is justified, particularly when there are seven generators listed which provide a degree of redundancy to maintain availability over time. We believe that many of the components that may make up the increased M&E renewals expenditure would be able to be replaced under the maintenance budget.

As such, we do not consider that the large increase in M&E renewals over the average expenditure experienced since 2005 has been substantiated. Based on our review of the models, we are not confident that the data is sufficiently detailed to accurately predict the expenditure required to maintain and meet the required levels of service. Melbourne Water informed us that asset lives and replacement values had been appropriately challenged and that a 'reality check' of renewals projects within the overall process had occurred. However no information was provided to substantiate this position and it was not apparent that the models had been updated or that material changes had been made to the base data.

In particular, Melbourne Water has informed us that its Asset Management group produced a maintenance plan for the EGEP generators in conjunction with the manufacturer, detailing minor and major overhauls and regular inspections, which was incorporated into the operational budgets and formed the basis for the M&E renewals model cost included within the model. The original plan indicated that the cost of an overhaul at the 5 year interval was comparable to the cost of a new engine. Hence the high renewals costs included within the model output. Melbourne Water has conceded that in five years, the engines have only run for 24,000 hours each (or half the time that the maintenance plan assumed), necessitating only an intermediate overhaul (rather than major) at the first 5 year interval. The major overhaul will be required at 48,000 hours within the 10 year operating window. By adopting this alternative approach in deferring expenditure to better reflect the maintenance need, the ETP model can be adjusted for the power generation assets by extending their assumed asset lives from 5 to 10 years. Adopting this change assumes that a cost effective market solution to the currently available 24,000 hour interval overhaul service costs will provide better value to Melbourne Water, and hence ensure a more efficient outcome overall in NPV terms. Melbourne Water reported that by adopting this strategy, the impact from the deferral of (generation) renewals capital expenditure would represent a \$13.6 million adjustment to the capital program. We can confirm this figure from our testing of the model asset lives to provide the same model output.

We have not sought to take this saving off the renewals budget forecast in the Water Plan, but merely point out that the M&E renewals models are sensitive to the input data, particularly the asset lives and cost information, which is to be improved over time. We therefore expect that further refinements to the detailed asset data used in the model will provide further savings. For example, deferral of the \$6.39 million replacement of the ETP Process Control System to the next Water Plan period in 2014 would save a further \$4.16 million.

We recognise that process control is critical, but these assets can and do last longer than the asset lives assumed in asset management plans. We suggest that a monitoring programme be put in place to test assumed asset lives as a mitigation measure to support the suggested deferral of renewals expenditure in this case.

It is for the above reasons that we recommend that the forecast expenditure for M&E renewals be revised down by 25.65%. We consider that this better reflects historical expenditure, but also accounts for the predicted expenditure need. This will provide Melbourne Water with the opportunity to improve its models, in particular the input costs and asset maintenance/renewal frequencies and asset life data. This should facilitate estimation of a more accurate forecast of expenditure in time for the next Water Plan.

Reductions to the M&E renewals programme forecast by the models will be possible by deferring expenditure where sensible (where asset life assumptions can be tested and monitored to ensure that compliance failure does not result). We have provided two high value examples of this with respect to the generators and process control assets at ETP, which indicates to us that such savings are achievable across the whole program.

We recommend that the assumed asset life and original replacement cost data be included within the model detail data sheet in the future and that agreed changes from the workshops are included in a separate column for quality control purposes and to ensure that future iterations or revisions of the model are consistent. This would provide a greater level of confidence in the basis for the model outputs whilst demonstrating the process of developing and running the model. Further improvements would include a regular review and update of cost data through the existing renewals contract for smaller value lower risk work (<\$0.5 million) and also from the Alliance for the larger higher risk and higher value renewals projects.

With respect to the other renewals allocations and projects (excluding M&E assets) within the renewals program, we have reviewed four projects, details for which may be found in section 7.3.

As the M&E renewals model was not applied to forecast expenditure allocations for other assets, we have not been able to review these to determine their efficiency. However, a brief review of the allocations included for non-M&E asset renewals suggests that they are prudent.

7.4.2 Commissioning dates

For the purposes of forecasting operating expenditures for the Water Plan, operating costs, including energy costs, have been calculated based on the month the project is expected to be commissioned. The following table, provided by Melbourne Water, indicates the estimated commissioning dates for its key major projects.

Table 7.29 Estimated commissioning dates of major capital projects

Project	Estimated Commissioning Date
Sugarloaf Pipeline	July 2010
ETP Tertiary Treatment	December 2010
Northern Sewerage	February 2012
Melbourne Main Sewer	May 2012
Tarago Water Treatment Plant	June 2009
Water Mains Renewal - Preston and North Essendon	June 2011
WTP Wet Weather Capacity Upgrade	May 2011
ETP Aeration Tanks – construction of new tanks	August 2009

Melbourne Water has indicated that although the completion date for the Sugarloaf pipeline of mid 2010 is referenced in the Water Plan (which aligns with the State Government’s announcement for the project), in light of ongoing water shortages it is working to complete this project earlier. It currently anticipates that if no significant delays are experienced, the Sugarloaf pipeline should be operational by February 2010. We note that the project report for Sugarloaf pipeline (dated February 2009) indicates that commissioning is currently on schedule for 12 July 2010. For this reason we have assumed operating expenditure will commence in 2010/11.

According to the December project progress report for Tarago Water Treatment Plant (dated 3 December 2008) the original date for practical completion was 31 May 2009. Due to delays with completion of the design and inclement weather, the practical completion date is now expected to be 25 July 2009. This is one month later than the estimated commissioning date reported in the above table.

7.4.3 Depreciation rates

Consistency with project commissioning dates

Melbourne Water has indicated that it has not adopted the ESC’s preferred method for depreciating capital expenditure on major projects (i.e. calculated from the date the asset is commissioned) in the Water Plan. It has indicated that this was due to guidance received from the State Government directing Melbourne Water to defer \$135 million of depreciation until the 2013 regulatory period. This includes depreciation for all major projects. The effect of deferring the \$135 million of depreciation is that no depreciation will be recovered on Melbourne Water’s new capital expenditure over the 2009 regulatory period. We have not reviewed Melbourne Water’s information return to confirm this deduction.

Melbourne Water calculates its depreciation forecasts using a straight line depreciation method and accounting asset lives. As set out in Melbourne Water’s template, depreciation is calculated from the year in which the capital expenditure is incurred (starting half way through the year). Hence, for projects where construction takes place over a number of years, depreciation is charged before the commissioning date of the asset. In these instances, the first year where ‘full’ depreciation is charged is the year following commissioning of the asset.

The following table shows Melbourne Water’s latest estimate of the commissioning dates of projects with a value greater than \$40 million, together with the year that full depreciation is first charged (as reported in sheet g of Melbourne Water’s submission to the ESC).

Table 7.30 Commissioning dates and depreciation

Project	Estimated Commissioning Date	First year of full charge of regulatory depreciation
Sugarloaf Pipeline	July 2010	2014/15*
ETP Tertiary Treatment	December 2012	2013/14
Northern Sewerage	February 2012	2012/13
Melbourne Main Sewer	May 2012	2012/13
Tarago Water Treatment Plant	June 2009	2009/10
Water Mains Renewal - Preston and North Essendon	June 2011	2011/12
WTP Wet Weather Capacity Upgrade	May 2011	2011/12
ETP Aeration Tanks – construction of new tanks	August 2009	2010/11

Note (*) last year of spend on the Sugarloaf pipeline and pumping station is 2009/10.

We note that depreciation calculation for the Sugarloaf pipeline includes the depreciation of the \$50 million which relates to the desalination interface work (see below for more information on the integration works).

7.4.4 Not prescribed capital expenditure

Our review did not indicate any need to change Melbourne Water’s not-prescribed capital expenditure forecast.

7.4.5 Recent updates and other water capital expenditure

Melbourne Water has provided the ESC with an update of its actual and forecast capital expenditure for 2008/09 (as at March 2009). Due to its late receipt, it has not been possible to consider the updated information in any detail. However, we have provided some comments on the updates, and made amendments to our forecasts, as discussed below.

Tarago Water Treatment Plant Project

Construction of the Tarago Water Treatment Plant is nearing completion. The estimated cost for the project in the Water Plan is \$104.5 million however we understand from figures provided to the ESC that the actual cost will be approximately \$11.6 million less than this. We have adjusted Melbourne Water's 2008/09 forecast expenditure to reflect this difference.

Werribee Aqueduct Replacement Project

Melbourne Water has indicated that since submission of its Water Plan the forecast cost of the Werribee Aqueduct Replacement Project has increased from \$13.4 million (\$2008/09 August 2008 P50 estimate) to \$23.8 million (P95, in nominal terms). This compares to an estimated capital cost for the project of \$14.1 million (P95) that was approved with the Business Case at the August 2008 Board meeting, subject to DTF and DSE Approval.

Melbourne Water has explained the change arose as the cost estimate submitted to Board for approval in August 2008 was presented earlier than would typically occur, without significant constructor input or market testing. Melbourne Water decided to submit a formal request for Implementation Approval to DTF, DSE and its Board earlier than traditionally would occur. This was to ensure the newly established Pipelines Alliance was not delayed with government approvals processes by removing the approvals process from the critical path of project delivery. This approach contributed to developing an estimate without the proper proof engineering, market testing, risk assessment and construction methodology reviews.

Melbourne Water indicated that the increase in capital expenditure from the revised estimate will be incurred in 2009/10.

As we have not reviewed the project we have not included the increased expenditure in the forecasts. However, we have included a transfer of \$2.4 million from 2008/09 to 2009/10 based on data provided to the ESC by Melbourne Water.

Desalination Interconnection Project

Melbourne Water has forecast expenditure of \$79.9 million in relation to works to integrate the desalination plant to the system. Melbourne Water has indicated that the preferred water transfer strategy is to utilise available capacity in the existing Cardinia - Pearcedale pipeline to transfer desalinated water from the desalination pipeline delivery point to the Cardinia Reservoir site, and from the Cardinia Reservoir to the Silvan Reservoir. It has been estimated that use of the available capacity avoids additional capital expenditure on a new pipeline (approximately \$80-\$100 million) between the delivery point at Berwick and the desalinated water works at Cardinia Reservoir.

There are three components to the desalination integration works with the most significant by far being the works at Cardinia Reservoir. The three components are shown in the table below.

Table 7.31 Desalination integration works capital expenditure (\$m, 2008/09)

Expenditure item	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Desalinated water works at Cardinia	0.6	32.9	40.1			73.6
Interconnection and pressure reducing station works	0.1	4.2	0.8			5.1
Valve Replacement – Inlet Main	0.1	1.0	0.1			1.2
Total	0.8	38.1	41.0			79.9

A Preliminary Business Case for the Cardinia desalination project was completed early this year, and approved in February 2009. It identifies the key driver for the project which is to ensure that the current water supply and transfer system has sufficient capacity to cope with the additional water to be delivered from the new desalination plant. The project is to be completed by December 2010 to ensure it is ready before the commissioning of the desalination plant and pipeline. It involves:

- a 1700 mm diameter 2.2 kilometre pipeline from the existing Cardinia-Pearcedale pipeline off take at Cardinia to Cardinia Reservoir
- an inlet chute at Cardinia Reservoir
- a new pumping station at Cardinia to pump water from Cardinia Reservoir to Silvan Reservoir via the existing Silvan-Cardinia pipeline.

Melbourne Water provided a copy of the Preliminary Business Case and the concept design report for the project. An options analysis was undertaken by a consultant during the concept design stage. Five options were examined, with two options short-listed. Melbourne Water has indicated the decision on the final option is to be made on completion of functional design, in March 2009, when more specific information is available. We note that the cost estimate reported by Melbourne Water relates to the more expensive option (by approximately \$6.5 million).

The cost estimate for the desalination works at Cardinia in the Preliminary Business Case is \$76.6 million and it has been developed using Melbourne Water’s RANE methodology. The estimate is a 50th percentile cost estimate and is based on the estimate developed by consultants as part of the concept design (\$54.6 million). Melbourne Water has added allowances for an independent estimator (\$0.55 million) and overheads (\$10.05 million). The remaining allowance (\$11.4 million) is for risks identified as part of the RANE process.

A significant element of the base cost related to the Cardinia Inlet pipeline (\$22.9 million base cost), which is 1700mm diameter and 2.2 kilometres in length. The rates used to develop the cost estimate range from \$6,000/m (easy grade, no obstructions) to \$15,000/m (steep terrain, rock).²⁹ While we have not been provided with the basis for or a breakdown of these unit rates, they appear higher than we would expect. We note that the concept design report states that the pipeline cost estimate is based on the rates from ‘recent experience of steel mains’. Given that steel prices have fallen significantly since mid 2008,

²⁹ The rates are inclusive of pipe supply, delivery and installation, mobilisation, labour, equipment, minor service identification and relocation, excavation and removal of excess material, supply of bedding material and backfill

we consider that it is likely that the rates assumed in development of the options may be overstated.

Melbourne Water has not provided a breakdown of the \$10 million allowance for project overheads and hence we are unable to provide any comment on this inclusion.

A review of the project risk assessment indicates that Melbourne Water has included allowances for escalation in a number of risk items. These risks are:

- contractors require wage increase / site allowance (\$1 million allowance)
- standard inflation of materials, labour (2.5% assumed). (\$820,000 allowance)
- cost of imported goods increases - pumps/steel above and beyond that considered within certainty range (\$500,000 allowance)
- procurement of Long Lead items takes longer than that allowed in the program (\$400,000 allowance)
- project costs increase during plant selection and procurement (\$5 million allowance)
- market cost increases for engaging sub-contractors (\$2.5 million allowance).

As the cost estimate is probabilistic, it is not possible to identify how much of the above allowances are reflected in the \$11.4 million risk provision. However, it is likely that some elements of these risks are included within the provision.

In addition to the above, we note that the capital expenditure in the Preliminary Business Case of \$76.6 million which is different to the \$73.6 million figure shown in the table above and provided separately by Melbourne Water. Melbourne Water has indicated further work has been done since the Preliminary Business Case was submitted in January 2009 and the most recent expenditure profile is now considered to be more realistic.

We have included Melbourne Water's estimate of \$73.6 million in the capital expenditure forecast. However, as indicated above, this project is still in development with the preferred option to be selected in March. The cost estimate is therefore subject to change. Nevertheless, on the basis of our high-level review of the project some of the cost elements may be overstated. We recommend that the project cost be subject to review following the ESC's draft decision at which time there should be a greater degree of certainty over the estimate and a Target Outturn Cost (TOC) should be available.

We have included these estimates in our revised forecasts of Melbourne Water's expenditure but have not had the opportunity to review the costs.

Dandenong Treatment Plant

Melbourne Water has advised the ESC that its Water Plan financial templates include expenditure approved in the Commission's 2005 determination and not the actual/forecast expenditure. While we have not reviewed the expenditure forecasts, we have made adjustments to the capital program to correct this error as shown in the table:

Table 7.32 Dandenong treatment plant expenditure (\$m, 2008/09)

Expenditure item	2007/08	2008/09	2009/10
Water Plan	8.8		
Revised figures	13.8	16.0	6.3
Net change	5.0	16.0	6.3

In rolling forward the capital base the ESC will need to make adjustments of -\$14.7 million in 2005/06 and -\$12.6 million in 2006/07.

Other updates

Based on documentation provided from Melbourne Water to the ESC we have also made the following adjustments to capital expenditure set out in the table below. Given that the individual adjustments are small in nature relative to the overall capital program, do not change the overall project cost and have the effect of reducing the capital base (and hence prices) we have not subject the amendments to detailed review.

It is also important to note that we have not made the following adjustments set out in table 4 of Melbourne Water's advice to the ESC:

- Sugarloaf interconnector: 2008/09 increase \$12.2 million (no justification provided)
- ETP tertiary treatment: 2008/09 increase in 2008/09 \$2.5 million (no justification provided)
- Sugarloaf Pipeline – Winneke Treatment Plant: move of \$3.2 million from 2008/09 to 2009/10 (adjustment already made – see section 7.3.1)
- WTP 55E to 115E transfer system: move of \$2.3 million from 2008/09 to 2009/10 (we assume that the adjustment cited by Melbourne Water in its response to the ESC relates to the WTP wet weather capacity upgrade where we have already made the \$2.3 million adjustment sought – see section 7.3.6)

Table 7.33 Other adjustments to capital expenditure (\$m, 2008/09)

Proposed Projects	2008/09	2009/10	Note
Sugarloaf Pipeline – Downstream Transfer Works	-5.9	+5.9	New information - has not been incorporated into our assessment
Northern Sewerage Project	-7.1	+7.1	
Foul Air Removal System ETP Odour reduction	-5.3	+5.3	Project not reviewed
M9 Water main – Preston-Nth Essendon	-4.8	+4.8	New information - has not been incorporated into our assessment
Sugarloaf Pipeline – Mini Hydro	-3.9	+3.9	Project not reviewed
Sewerage Transfer Minor Capital Renewals	-3.5	+3.5	Project not reviewed
Sugarloaf Reservoir Pump Station upgrade – motors and drives	-3.3	+3.3	New information - has not been incorporated into our assessment
Sydenham tank – replace foundation/roof/floor	-3.2	+3.2	Project not reviewed
ETP Minor Capital Renewals ³	-2.6	+2.6	Project not reviewed
ETP Wadsleys drain catchment flood mitigation	-2.5	+2.5	Project not reviewed
Western Trunk Sewer – Werribee River Aqueduct Replacement	-2.4	+2.4	Project not reviewed
ETP WEHB augmentation	-2.2	+2.2	Project not reviewed
Total variances	-46.7	46.7	

7.5 Conclusions and recommendations

On the basis of our review of Melbourne Water's Water Plan and relevant supporting documentation we recommend a number of adjustments to the forecast capital expenditure. These adjustments are based on our review of the ten major capital projects and allocations, which account for 77% of Melbourne Water's forecast capital expenditure, and our review of renewals expenditure. Our recommended changes to Melbourne Water's major capital expenditure forecasts are listed below:

- Sugarloaf pipeline projects – a reduction of \$91.59 million
- ETP Tertiary Treatment Upgrade – a reduction of \$0.95 million
- Northern Sewerage Project – a reduction of \$3.6 million
- Melbourne Main Sewer Augmentation – a reduction of \$8.65 million
- WTP Wet Weather – a re-profiling of \$2.34 million
- Water Renewal between Preston and North Essendon – a reduction of \$1.0 million
- M&E Renewals Allocations – a reduction of \$37.4 million.

We have also made a number of changes to minor projects based on updated information provided by Melbourne Water and the ESC.

The changes are shown in the table below.

Table 7.34 – Overview of recommended changes to capital expenditure (\$m, 2008/09)

Expenditure item		2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Major Projects							
Sugarloaf pipeline projects	Water Plan	41.6	479.3	364.1	112.0	26.0	20.0
	Revised forecast	41.6	480.9	310.5	80.0	20.0	20.0
	Net change	-	1.7	-53.6	-32.0	-6.0	-
ETP Tertiary Treatment Upgrade	Water Plan	10.62	8.95	56.7	177.2	55.8	4.5
	Revised forecast	10.6	9.0	56.5	176.6	55.6	4.5
	Net change			-0.18	-0.6	-0.2	-0.0
Northern Sewerage Project	Water Plan	72.4	87.4	69.5	60.6	62.1	
	Revised forecast	72.4	87.4	69.5	60.6	58.5	
	Net change					-3.6	
Melbourne Main Sewer Augmentation	Water Plan	11.2	40.5	48.4	54.6	31.9	
	Revised forecast	11.2	40.5	48.4	54.6	23.3	
	Net change					-8.7	
WTP Wet Weather Capacity Upgrade	Water Plan	0.4	3.5	35.4	7.4		
	Revised	0.4	1.2	37.8	7.4		

	forecast						
	Net change		-2.3	2.3			
Water Renewal between Preston and North Essendon		0.5	15.1	22.8	14.2		
	Revised forecast	0.5	13.1	22.3	13.7		
	Net change	-	-2.0	-0.5	-0.5		
Renewals Program	Water Plan		168.5	178.9	167.0	116.3	111.3
	Revised forecast		161.4	170.8	157.6	106.3	101.4
	Net change		-7.1	-8.1	-9.4	-10.0	-9.9
Water Plan		368.5	1,016.1	805.3	564.4	277.3	127.0
Revised forecast		368.6	1,006.4	745.4	521.9	248.9	117.1
Net change			- 9.8	-60.0	- 42.5	-28.4	- 9.9
Other Projects – Net changes							
Tarago Treatment Plant			-11.6				
Desalination Interconnect			0.8	38.1	41.0		
Dandenong Treatment Plant		5.0	16.0	6.3			
Other adjustments			-46.7	46.7			
Net change – other projects		5.0	-41.5	91.1	41.0	-	-
Net change		5.0	-51.3	31.1	-1.5	-28.4	-9.9
Total recommended capital expenditure		373.5	964.9	836.4	562.9	248.9	117.1

Glossary

Key terms and acronyms used

CWW	City West Water
Current regulatory period	Regulatory period from 1 July 2005 to 30 June 2009
ESC	Essential Services Commission
GL	Gigalitre, or one billion litres
KPI	Key performance indicator
ML	Megalitre, or one million litres
MW	Melbourne Water
Next regulatory period	Regulatory period from 1 July 2009 to 30 June 2013
Not prescribed services	See prescribed services
Potable water	Water that is suitable for drinking
Prescribed services	Services as set out in section 6(a) of the WIRO, broadly relating to core water, wastewater and recycled water services which the ESC has responsibility for regulating. Differentiated from other areas of operation which are defined as ‘not prescribed services’ and are not regulated by the ESC
Recycled water	Water derived from wastewater systems or industry processes which is treated to a standard that is appropriate for its intended use
Reticulation	A network of pipelines used to deliver water to end users
SEW	South East Water
SoO	Statement of Obligations
Wastewater	includes Sewerage and Trade Waste services
Water retailer	Any one of, or a combination of, metropolitan Melbourne’s three water retail businesses – City West Water, South East Water and Yarra Valley Water
WIRO	Water Industry Regulatory Order
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant
YVW	Yarra Valley Water

Appendix A Mapping of conservation measures

	Our Water Our Future	Central Region Sustainable Water Strategy	Water Supply-Demand Strategy	Joint Water Conservation Plan Metropolitan Reuse & Recycling Plan 2008-2013
Demand management	<p>5.4 The Government will require all urban water authorities to introduce permanent water savings measures. These measures will be developed at the local level and will be suitable for local conditions.</p> <p>5.5 The Government and water authorities will undertake community education and information programs to encourage water saving.</p> <p>5.8 The Government and water authorities will develop, prior to 1 December 2004, uniform water restriction guidelines for drought response which will set out a recommended four-stage restriction policy for the whole of Victoria.</p>	<p>4.31 Metropolitan water authorities to maintain existing water savings (350,000 water-efficient gardens and work with 140,000 householders)</p> <p>Water authorities to work with the community to reduce total per capita water usage by at least 25% by 2015, increasing to 30% by 2020 (from 1990's average water use). Additional conservation measures will be implemented in Melbourne with a view to bringing forward the 30% target to 2015. (3.1)</p> <p>DSE and the water authorities to extend the metropolitan Our Water Our Future behavioural change program until 2015 (3.3)</p>	<p>Objective 1: Maintaining current water use at 331 litres per day through water conservation measures (\$12m a year) and behaviour change (\$9m a year), with an ongoing timeframe.</p>	<p>1.1 Continue existing water savings by maintaining existing programs e.g. water efficiency labelling, local government efficiency program, Savewater!, OWOF behavioural change, 5 star homes water efficiency, rebates for water conservation goods, Smart water Fund (save 42 GL p.a. by 2015)</p> <p>1.2 New program that focuses on garden watering (save 4.3 GL p.a. by 2015)</p> <p>1.3 Individualised behaviour change</p>

	Our Water Our Future	Central Region Sustainable Water Strategy	Water Supply-Demand Strategy	Joint Water Conservation Plan Metropolitan Reuse & Recycling Plan 2008-2013
		<p>DSE and the metropolitan water authorities to introduce on-the-spot fines for breaching water restrictions or permanent water saving rules (3.4)</p> <p>Continue to support the Smart Water Fund until 2008, at which time there would be a review (3.8)</p>		<p>programs (maintain current saving of 3.9 GL p.a. by 2015)</p> <p>1.4 PWSR and restrictions</p>
Household efficiency	<p>5.9 The Government, in partnership with the Commonwealth and other State and Territory Governments, is developing national mandatory water efficiency labelling for appliances, fixtures and fittings. Victoria proposes to introduce legislation to implement the national scheme by Autumn 2005.</p> <p>5.11 The Government will encourage use of water efficient washing machines and dishwashers through the water efficiency labelling scheme but does not propose to make them mandatory at this stage.</p> <p>5.10 The Government will introduce mandatory water efficient plumbing measures such as water conserving shower roses and taps (AAA equivalent) for all new houses and other buildings and for new fittings within existing buildings from 1 July 2004.</p> <p>5.12 The Water Smart Gardens and Homes Rebates Scheme will continue to support households to use water more wisely, over the next two years until 30 June 2006.</p>	<p>4.3.2 Metropolitan water authorities to implement conservation and efficiency programs (water-efficient showerhead program; water-efficient washing machine program; water-efficient evaporative air conditioners)</p> <p>Water authorities and Victorian Water Trust to extend the Water Smart Homes and Gardens Rebates until June 2011 (3.9)</p> <p>Ongoing until June 2009, the urban water authorities are to distribute around 160,000 water efficient showerheads (3.10)</p>	<p>Objective 3: Save more water at home: undertake new water conservation actions to achieve 21.9 billion water savings by 2015, 34.6 billion water savings by 2030 and 38.6 billion water savings by 2055, at a cost of up to \$25 million a year to 2015. Actions would include water-efficient showerheads, washing machines, evaporative air conditioners and Melbourne friendly gardens.</p>	<p>Program 2: Showerhead replacement: install 1,054,153 water efficient showerheads (save 12.6 GL p.a. by 2015)</p> <p>Program 3: Clothes-washer incentives - rebates for and installation over 400,000 4 and 5 star washers (save 8.5 GL p.a. by 2015)</p> <p>Program 4: Evaporative air conditioner compliance standards by 2015 (save 0.8 GL p.a. by 2015)</p>
Development efficiency	<p>5.13 The Government will set an aspirational target for new development to achieve at least 25% savings in water use.</p> <p>5.14 The Government will prepare Water Sensitive Urban Development guidelines to assist developers, industry and local government in achieving the target, further developing existing</p>	<p>4.3.4 Melbourne water authorities to expand the Pathways to Sustainability program to all water users within Melbourne that use 10 ML per year or more (and implement</p>	<p>Objective 4: Helping businesses achieve 13.0 billion water savings by 2015, 15.7 billion water savings by 2030 and 17.0 billion water savings by</p>	<p>Program 6: Businesses and industry water efficiency (save 8 GL p.a. plus 5GL for Altona Precinct by 2015)</p>

	Our Water Our Future	Central Region Sustainable Water Strategy	Water Supply-Demand Strategy	Joint Water Conservation Plan Metropolitan Reuse & Recycling Plan 2008-2013
	<p>work by Councils, water authorities, developers and others.</p> <p>5.15 The Government will provide funding to support smart urban water use initiatives which encourage innovative approaches to demand management, recycling and stormwater management.</p> <p>5.16 The Government will require the urban water authorities to plan for new growth areas in the development of their Water Supply- Demand Strategies.</p> <p>5.17 The Government will require improved water efficiency in new Government buildings.</p> <p>5.21 Funding will be provided to support the extension of local government water conservation plans across regional Victoria.</p> <p>5.22 The urban water authorities will be required to work with local government in the preparation of these plans.</p> <p>5.23 Local government will be eligible for funding support for water conservation and recycling demonstration projects including use of recycled water on sporting grounds and in parks.</p> <p>5.18 The Government will require all urban water authorities to work with industry towards improved water management outcomes, including opportunities for water conservation, recycling and waste minimisation.</p> <p>5.19 The Government will require all urban water authorities to report annually on their water conservation programs with industry and details of water saved.</p> <p>5.20 The Pathways to Sustainability program within metropolitan Melbourne will be extended by the water authorities to other industrial water users within the metropolitan area as soon as the initial program has been completed for the top 200 industrial water users.</p>	<p>additional actions to achieve the non-residential target and implement other programs to achieve the non-residential conservation target</p>	<p>2055, at a cost of up to \$4 million a year to 2015.</p>	

	Our Water Our Future	Central Region Sustainable Water Strategy	Water Supply-Demand Strategy	Joint Water Conservation Plan Metropolitan Reuse & Recycling Plan 2008-2013
Leakage		4.33 Metropolitan water authorities to continue to manage the water distribution system efficiently and reduce leakage	Objective 5: Saving 2.5 billion litres of water n a year through reduction in water leaks and wastage at a cost of \$1.2 million a year.	Program 7: Water infrastructure losses and waste – double the active leak control program to 6,000 km a year, and maintaining monitoring and pressure reduction programs. (save 2.5 GL p.a. by 2015)
Recycling	<p>5.25 The Government will require all urban water authorities to assess opportunities for the use of recycled water and other alternative supplies in the development of Water Supply-Demand Strategies. (note OWOFF states that the Government has previously announced a water recycling target of 20% by 2010).</p> <p>5.26 The Government will not place recycled water directly into the drinking water supply system. However, technical development and implementation elsewhere will be monitored.</p> <p>5.27 Over the next four years, the Government will consider investment in strategic water recovery and recycling programs that:</p> <ul style="list-style-type: none"> ○ are of State or regional significance; ○ deliver multiple benefits – social, economic and environmental; ○ involve a cooperative approach; and ○ are larger scale projects or initiatives. 	<p>Action 4.36</p> <p>Melbourne water authorities will invest in the voluntary uptake of a range of local water recycling and reuse schemes, including rainwater tanks, advanced greywater systems, dual pipe systems for recycled water in new residential and commercial developments and treatment plants for stormwater reuse.</p> <p>Action 4.37</p> <p>The Government will work with the metropolitan water authorities and stakeholders to investigate opportunities to reuse and recycle 30,000 ML of local water sources for non–drinking purposes within greater Melbourne by 2055.</p>		<p>13 priority projects identified under the MMRP.</p> <p>Three of these projects are YVW’s: Beveridge, Craigieburn West and Epping North total 0.5GL saved (p.18 Corporate Plan \$2.4m in 2008/09).</p>