

Melbourne Water forecasts capital expenditure for waterway and drainage services of approximately \$589.5¹ million over the 2008 regulatory period.

This investment is directed to meet the needs of urban growth, accelerating works to restore waterway health, reducing flood risk in areas where flooding results in high economic and social costs, and removing a range of pollutants from stormwater and catchment run off.

This large capital program is capable of being delivered by adopting a range of communication and contract and delivery strategies, increasing internal project management resources and skills, and enhancing critical processes and IT systems.

Melbourne Water seeks to maximise capital efficiencies and minimise lifecycle costs through innovative approaches to planning, design and delivery.

This chapter presents Melbourne Water's proposed capital investment forecast for waterways and drainage services over the 2008 regulatory period.

These forecasts are used to determine the revenue requirements in Chapter 11 based on obligations and demand forecasts and actions described in Chapters 5 and 6. The forecasts have been developed through the planning framework, processes and strategies described in Chapter 7 which ensures expenditures are linked to business strategy and stakeholder requirements as well as optimising operating and capital expenditures over asset lives. Appendix 1 provides a summary of obligations, activities and expenditures for each major program area. Details of the top ten projects over the 2008 regulatory period are provided in Appendix 2.

8.1 Capital expenditure forecasts

8.1.1 Waterways and drainage

Planned waterways and drainage investments total \$589.5 million over the 2008 regulatory period. This includes an allocation of corporate investments of \$33.7M (5.7% of planned investments) associated with business as usual information technology to replace hardware and software to maintain levels of performance. Figure 8.1 shows historical and proposed expenditures for each program.

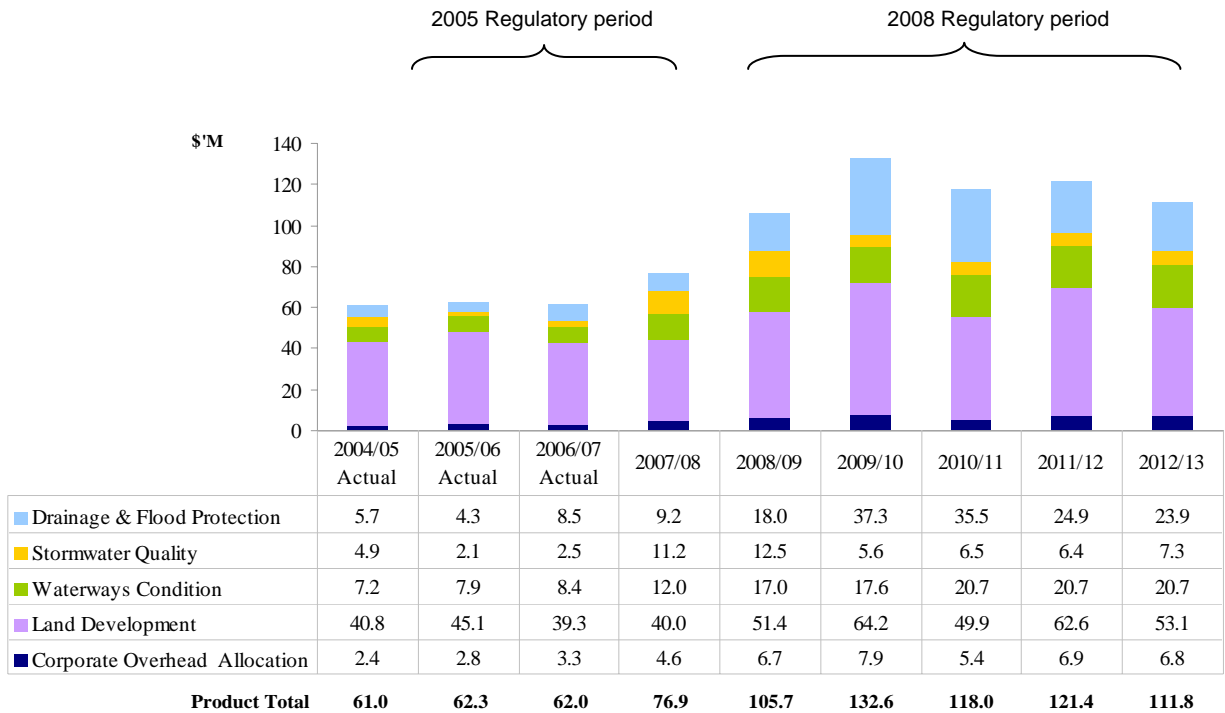
¹ All expenditures in this chapter have been expressed in 2006/07 dollars.

2008 Waterways Water Plan

Chapter 8

Capital Expenditure

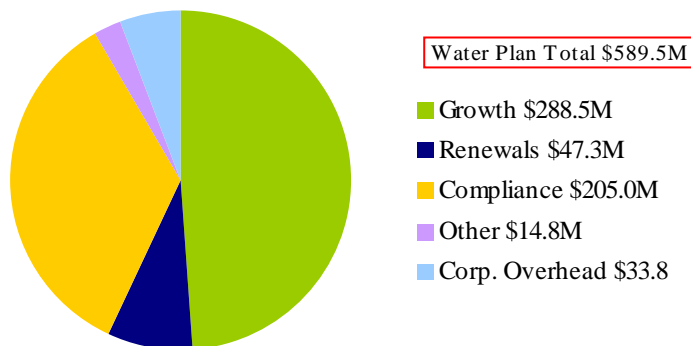
Figure 8.1: Actual and forecast capital expenditure by program – 2004/05 to 2012/13 ²



Capital investment is expected to increase over the 2008 regulatory period, on average, by approximately 8% per year relative to 2007/08. A key driver of the increase in capital expenditure is due to meeting new obligations (see section 8.1.2).

Figure 8.2 summarises the major drivers of investment for the 2008 regulatory period.

Figure 8.2 Waterways and drainage capital drivers – 2008/09 to 2012/13

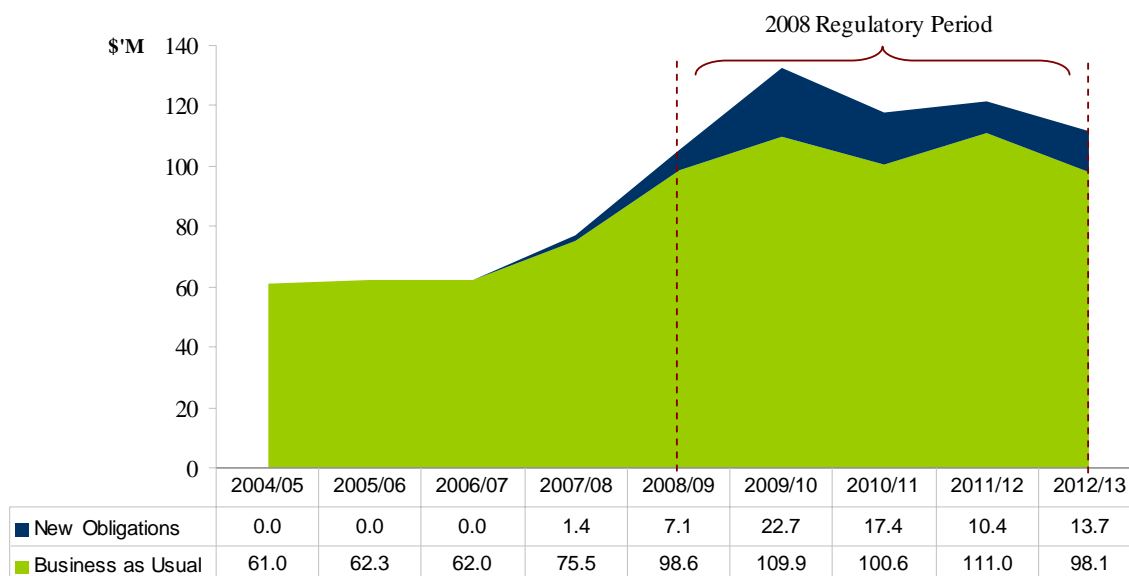


² Appendix 1 provides a summary of obligations, activities and expenditures for each major program area.

8.1.2 New obligations and business as usual expenditures

Increases are forecast for business as usual investments early in the regulatory period and additional investment is required to comply with new obligations and service standards. Figure 8.3 shows the profile of business as usual (88%) and new obligations (12%) investments over the 2008 regulatory period.

Figure 8.3: Business as usual and new obligations/service standards capital – 2005/06 to 2012/13



As discussed in Chapter 4, the Commission has defined new obligations as those that come into effect from 1 July 2008. Melbourne Water considers that an alternative approach is to identify new obligations which came into effect within the 2005 regulatory period and which were not included in the 2005 Water Plan.

New obligations coming into effect from 1 July 2005, and which were not included in the 2005 Water Plan, were outlined in Chapter 3. Over the 2008 regulatory period, capital expenditure on new obligations is \$71.3 million. In particular, significant capital expenditure is planned to meet the following new obligations:

- Investment in flood protection works to meet the new Operating Charter requirement of reducing intolerable flood risks in areas where flooding results in high economic and social costs (\$63.9 million)
- Program of load reduction works to remove a range of pollutants from stormwater and catchment run-off to meet new requirements in the Waterways Operating Charter and targets set out in the Waterways Water Quality Strategy (\$4.4 million)
- Managing environmental flows in line with newly established Environmental Entitlements (\$0.7 million) and works to improve estuary environments in line with new responsibilities as caretaker of river health in the Port Phillip and Westernport region (\$2.3 million).

Planned investment in Melbourne Water's extended areas totals \$55.1 million over the 2008 regulatory period.

Increases in business as usual investments over the 2008 regulatory period, relative to 2007/08 are primarily driven by:

- Acceleration of works to restore waterway health to meet the objectives in the Regional River Health Strategy and Waterways Operating Charter (\$18.5 million)
- Increased developer-funded growth works to meet industry and Government land development projections (\$77 million).

8.1.3 Approach to cost estimation

The Commission requires capital expenditure forecasts to be adequate to efficiently deliver the service levels required by customers and to meet all regulatory obligations. The accuracy of cost estimates in the Capital Plan varies for each project according to its maturity when the plan is formulated.

In its 2005 Water Plan, Melbourne Water did not include contingency for projects in the Capital Plan without formal project approval, because the compounding effect of contingency estimates in every project would overstate the budget required on an annual basis.

To improve the accuracy of project cost estimates in this 2008 Water Plan, Melbourne Water has taken explicit account of project risk and uncertainty. Cost estimates for high value/high risk projects were developed using a risk-based, probabilistic analysis. This analysis was applied to 'one-off' projects at the early feasibility and design stages with expenditures greater than \$5.0 million.

A risk-adjusted cost estimate defines the range of costs for a project in probability terms, based on a rigorous assessment of the risks that might cause the actual costs to change when the project is implemented. A risk-adjusted cost estimate is developed by applying a risk factor (likelihood and consequence) against each significant 'raw' cost element of the project and then using a probabilistic analysis to combine the risk-factored cost estimates into a total project cost. The combined estimate is then expressed as a cost distribution with the most likely cost at the mean (P50) and the extremes at the 5th percentiles (P5 and P95) on the distribution curve.

The statistical mean for each high-value/high-risk project (P50) is included in the 2008 Waterways Plan. Accuracy levels are shown as a range between the upper (P95) and lower (P5) percentiles i.e. there is a 90% chance that the project final cost will fall within this range.

Accuracy levels for project estimates not developed using the risk-adjusted analysis reflect the different stages of planning:

- Investigation: +/- 30% to +/- 50%
- Functional design: +/- 30%
- Detailed design: +/- 10% to +/- 20 %
- Construction: +/- 5%.

The accuracy bands for major waterways and drainage capital projects are given in Appendix 2.

In developing the Capital Plan, Melbourne Water also gave consideration to adjusting proposed capital expenditures to take account of differences between forecast increases in construction cost and the consumer price index (CPI). The metropolitan water businesses jointly engaged independent economic forecaster, Econtech, to forecast movements in construction costs over the 2008 regulatory period.

Econtech's forecast annual increases in construction costs for various categories of work are:

- Water distribution 4.3%
- Sewerage transfer 3.5%
- Treatment 3.4%

This compares to forecast CPI for Australia of 2.6% per year.

These forecasts were applied to the various categories of works in Melbourne Water's Capital Plan resulting in a weighted index of 3.4%, about 0.8% above forecast CPI. Applying this price differential would increase total Waterways capital expenditure over the 2008 regulatory period by \$18 million (about 3%).

Whilst Melbourne Water considers that the principle of indexing capital expenditures for forecast increases in construction costs above CPI is important, it has not adjusted capital expenditures in the 2008 Water Plan given other cost pressures on customer bills for water, sewerage and waterways drainage services.

8.1.4 Capability to deliver large capital program

The Commission has indicated that deliverability of capital expenditure within the regulatory period is a key issue that it wishes to assess.

Melbourne Water recognises the challenge of delivering a larger investment program (not only for waterways and drainage services but also for its water and sewerage services) in a highly competitive contracting market.

Melbourne Water has consulted waterways, water and construction industry consultants, developers and contractors on its planned water, sewerage and waterways and drainage capital expenditure over the 2008 regulatory period. The feedback is that the proposals are ambitious, but achievable. This view is supported by industry data that shows the recent rapid growth in construction activity has been absorbed by industry growth and therefore capacity will exist to service Melbourne Water's capital program.

To deliver a significantly larger total business (including waterways and drainage) capital program, Melbourne Water is making changes to the way projects are planned, contracted, resourced and delivered. Melbourne Water is confident that successful delivery of the capital program can be achieved based on:

- Its successful track record in delivering its capital expenditure program over the past 5 years during which time capital expenditure has nearly doubled
- Approaching the market early and publicising the upcoming work widely to assist contractors and consultants with their business planning and recruitment and training of industry specialists. This is important in both attracting the right contractors and consultants with specialised skills for the projects and in ensuring that Melbourne Water establishes arrangements that have the appropriate allocation of risk and resources
- Choosing contract and delivery strategies appropriate to the size, complexity and risk of projects. A decision matrix will be used to select the delivery model best suited to each project, group of projects or program
- For the Waterways and Stormwater Program, medium scale projects will be delivered through collaborative contracts. For minor capital works, service provider contracts will deliver both day to day maintenance and high volume, low risk capital works

- Continuing the current panel arrangements for consultants and spreading the workload across a number of firms to underpin and assist the expansion of the water sector consulting industry in Victoria
- Considering the ‘bundling’ of smaller projects to improve efficiency
- Improving working relationships with key stakeholders to negotiate optimum solutions and timing for projects
- Identifying the skills required to deliver the capital program and implementing human resources initiatives to attract and retain the requisite skills. Operations and asset management teams will be supplemented with additional staff to facilitate appropriate input to the program
- Enhancing the processes and information technology systems that support the capital planning and delivery process.

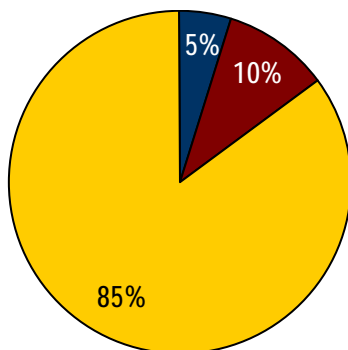
8.2 Efficiency gains and initiatives

Melbourne Water is a capital-intensive business. The majority of opportunities to achieve efficiency gains are captured through the planning process by focussing on strategies to achieve cost-effective solutions for capital and operating expenditure.

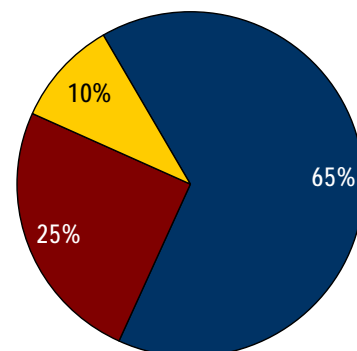
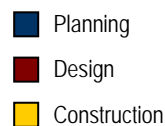
Engineering studies of investment in water infrastructure have analysed opportunities for achieving capital efficiency by comparing actual project expenditure to the factors which influence final project cost. Figure 8.4 shows how the planning and design stages offer the most significant opportunity to influence final project cost. The delivery stage represents the majority of project expenditure. However, innovations at this stage have the least influence on final project cost.

Figure 8.4:

Actual project expenditure



Influence on final project cost



The *planning stage* in the capital process identifies needs, potential solutions, scope, relative priority and timing of projects. Innovative solutions and prioritisation will have the most significant impact on costs.

The *design stage* includes the detailed definition and design for projects. Project design is contracted out through competitive tender processes. Emphasis is placed on maximising value from investments through processes such as value engineering studies at the early stages of project planning and design and by incorporating learnings from post-implementation reviews.

The *delivery stage* in the capital process includes materials purchase and construction of assets. Effective project management, contract management and strategic purchasing arrangements can improve capital efficiency at the delivery stage.

The following section discusses Melbourne Water’s approach to achieving efficiencies in planning, design and delivery of assets and gives examples of where significant savings have been and will continue to be achieved.

8.2.1 Planning

The opportunity to influence capital efficiency through planning and prioritisation will depend on the project driver and stakeholder requirements. Table 8.1 describes Melbourne Water’s prioritisation considerations and stakeholder involvement in the planning process. Managing risk is an integral part of the efficiency equation, measured through the probability and consequence of not doing or deferring investment.

Table 8.1: Planning and prioritisation considerations

Driver	Planning and prioritisation considerations	Stakeholders
Meeting existing services standards	Not if but when	
Renewals	<ul style="list-style-type: none"> • Maintenance opportunities optimised? • Consequences of deferral (residual risk) 	<ul style="list-style-type: none"> • Internal • Local government
Growth	<ul style="list-style-type: none"> • Can demand/peaks be influenced? • Consequences of deferral (residual risk) 	<ul style="list-style-type: none"> • Community • Developers
Meeting new services standards	Do we have to do it? If so, when?	
Compliance	<ul style="list-style-type: none"> • Can timing/standard be negotiated? • Consequences of deferral (residual risk) 	<ul style="list-style-type: none"> • Technical regulators
Other	<ul style="list-style-type: none"> • Can it demonstrate positive efficiency gains? • Will it meet environmental and social strategic objectives? • Will it mitigate risk? • Is the community willing to pay? 	<ul style="list-style-type: none"> • Community • Board

Renewals

Melbourne Water conducts a comprehensive condition assessment as part of its asset management planning. This is reflected in a Condition Assessment Report prepared each year making planning for renewals timely, targeted and relative to other priorities. The risk matrix (Figure 8.5) used by Melbourne Water is consistent with the Australian Standard and best practice for risk management. Projects with high likelihood and consequence of failure are prioritised.

2008 Waterways Water Plan

Chapter 8

Capital Expenditure

Figure 8.5: Risk management matrix

	Criticality (Consequences of Failure)			
	AAA	A	B	C
5	5	4	3	2
4	4	3	2	1
3	3	2		
2				
1				

Growth

Drainage infrastructure is planned for the whole of the catchment in a greenfield situation. By undertaking the whole of the catchment planning investment in assets to be owned by Melbourne Water and local governments is optimised.

An example of this is provided by Melbourne Water’s significant role in developing Clause 56 of the Victoria Planning Provisions for residential subdivision which directs local government to implement requirements for stormwater treatment, assess treatment design, and ultimately manage distributed treatments. Melbourne Water supports Clause 56 as it will see increased treatment at source and reduce reliance on Melbourne Water funded regional wetlands (which are becoming increasingly expensive as land and construction costs increase). To assist implementation of Clause 56, Melbourne Water has employed a Local Government Liaison Officer who assists local government in technical issues and training regarding application of the clause for urban runoff management. Melbourne Water has also initiated a number of local government capacity building initiatives (as discussed in Chapter 5).

Compliance

Melbourne Water undertakes major research to inform decisions by government and regulators on environmental standards. It also invests in monitoring and modelling to develop cost effective solutions for meeting standards.

Compliance can be costly and often requires the application of evolving technologies. Melbourne Water remains abreast of international developments and technology transfer through membership of international water associations and participation in international study tours relevant to Melbourne Water regulatory issues.

An example of investigations being undertaken through monitoring and modelling to reduce costs or improve targeting of resources in future planning include the purchase and use of probes that measure the quality of runoff water in the piped drainage system. Sewage entering into the stormwater system and discharged into rivers and creeks creates health risks to recreational users of waterways. Special probes can detect the poor quality that is characteristic of sewage contamination. Detections allow the tracing of contamination to its source where problems can be rectified. Public health risks decrease and river health improves.

8.2.2 Design

Melbourne Water has typically out-sourced its design work through competitive tendering processes. Value is maximised at the design stage through design processes and contracting arrangements that provide incentives for innovation (captured through the Value Engineering process), minimise lifecycle costs and capture learning's from past experience.

Melbourne Water has appointed a panel of eight engineering consultants through a tender process. Projects are assigned based on relevant individual experience and skill. A formal annual performance evaluation is conducted for each firm on the panel to identify opportunities that enhance innovation and improve value.

In addition to minimising costs, innovative design delivers broader community benefits. For example, collaboration between City of Frankston and Melbourne Water has seen a skate park integrated into the embankment of the proposed Samuel Sherlock Reserve retarding basin.

Design process and contract incentives

Melbourne Water is increasingly using relationship agreements for large investments to improve project deliverables and reduce lifecycle costs. Compared to traditional lump sum contracting, relationship agreements:

- Allow Melbourne Water to better manage risk and scope changes
- Provide commercial incentives for parties to minimise costs and achieve key performance indicators
- Discourage disputes by encouraging cooperative behaviour and effective management of resources and efficient allocation of risk.

Post implementation reviews and adaptive management

Post Implementation Reviews are conducted for projects greater than \$1.0 million, projects over budget, or where the potential for learning has been identified. A summary of key learnings is reported annually to the Board and shared with relevant planning and operational people to ensure the transfer of learnings.

Examples of key changes adopted since the last annual review include:

- Adopting risk methodologies when estimating project cost
- Improved stakeholder management and approaches to achieving statutory approval processes
- Promoting co-location of project teams.

8.2.3 Construction

The opportunities to capture capital efficiencies at the delivery stage become more limited as the majority of capital costs are dictated by the adopted solution and design. Delivery costs are minimised through effective project management and contract management.

Project management

Project and contract management is outsourced where necessary, providing flexibility and access to competitive processes to select specialised skills. Internal resources are focussed on the project initiation stage and development of delivery strategies.

The key benefits of project management are gathered up-front through the delivery planning. A contract delivery strategy developed for both large and complex projects and project programs can avoid significant costs by considering:

- Form of contract to be adopted
- Risk allocation decisions
- Contract interface risk and packages where there are multiple contractors
- Industrial relations strategies
- Time, cost and scope control.

Contract management and strategic purchasing

The relationship agreements and value engineering concepts previously discussed have flow-through benefits to the delivery stage. Melbourne Water's contract strategy further enhances capital efficiency and management of risk at the delivery stage.

The non-standard nature of projects related to trunk infrastructure means that design-and-construct forms of contract commonly used by other utilities are less attractive to Melbourne Water. These forms of contracts often lead to poor performing assets in the short to medium term and do not minimise lifecycle costs.

The use of benchmark unit costs used by network utility businesses with standard pipes or wires to demonstrate capital efficiency is not usually applicable to Melbourne Water investments where individual assets tend to be unique or infrequently acquired.

Strategic purchasing contracts have been identified where it is more cost-effective for Melbourne Water to undertake purchasing of equipment outside of individual contracts.

Melbourne Water's standard contracting arrangements prioritise issues such as safety, industrial relations and environmental management to avoid risks and adverse public perceptions associated with these delivery issues. These benefits are real but difficult to quantify as savings.