Issues Paper

Inquiry into Tariffs of the Water Corporation, Aqwest and Busselton Water

4 August 2008

Economic Regulation Authority
WESTERN AUSTRALIA

A full copy of this document is available from the Economic Regulation Authority web site at www.era.wa.gov.au.

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Foreword

The State Government of Western Australia has requested the Economic Regulation Authority (**Authority**) to undertake an inquiry into the tariffs of the Water Corporation, Aqwest and Busselton Water.[1]

In accordance with the Terms of Reference, the Authority will examine and make recommendations on the appropriate charging structures and recommended tariff levels for the regulated services of each of the three utilities.

Particular areas of focus will include:

- the method used to determine the revenue requirements of each service provider;
- the operating and capital costs of providing services;
- the appropriate rate of return on each service provider's assets;
- the efficiency of demand management activities;
- the impact of the recommendations on each service provider's net financial position;
- the impact of the recommendations on the Government's net financial position; and
- the environmental and social impact of the recommendations.

This is the second time a major review of the tariffs of the three water utilities has been requested. The first major review was undertaken in 2005. Since that time the Authority has provided advice to the Government on an annual basis as input into the State Budgets. While the intent of annual advice is to inform the Government of the implications of the latest cost information on the tariff structures that had previously been decided by the Government, this major review is intended to be more wide-ranging and incorporates a reconsideration of tariff structures as well as analysis of each water utility's costs.

The purpose of this Issues Paper is to provide background information and outline the issues to be investigated. It is intended to assist stakeholders to understand the nature of the issues under review and to facilitate public comment and debate. The Issues Paper is in three parts. The first part provides an overview of the issues. The second part is more technical, and provides a detailed discussion of the technical issues that the Authority will be considering during the inquiry. The third part highlights issues of particular relevance to each of the water utilities. Throughout this Issues Paper questions are raised, highlighted in boxes, that may be of particular interest to stakeholders.

Submissions on any matters, including those raised in this Issues Paper, should be submitted no later than 4.00 pm 12 September 2008 to watertariffs@era.wa.gov.au or addressed to:

Inquiry on the Tariffs of the Water Corporation, Aqwest and Busselton Water
Economic Regulation Authority
PO Box 8469
Perth Business Centre
PERTH WA 6849

[1] The Water Corporation provides water and wastewater services in many areas of the State. Aqwest provides water services in Bunbury. The Busselton Water Board provides water services in Busselton.

Section 1.5 of this Issues Paper provides further information regarding the process for making a submission.

Interested parties and stakeholders will have a further opportunity to make submissions following the release of the Authority's Draft Report. The Final Report for the inquiry is scheduled to be delivered to the State Government by 15 June 2009 following which the Government will have 28 days to table the report in Parliament.

I encourage interested parties to consider the Terms of Reference and the matters raised in this Issues Paper and prepare a submission to the inquiry.

LYNDON ROWE
CHAIRMAN

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1 Introduction

The Treasurer of Western Australia gave written notice to the Economic Regulation Authority (**Authority**), on 9 July 2008, to undertake an inquiry into the tariffs of the Water Corporation, Aqwest and Busselton Water.

The inquiry has been referred to the Authority under Section 32 of the *Economic Regulation Authority Act 2003* (**Act**), which provides for the Treasurer to refer the Authority inquiries on matters related to regulated industries (i.e. water, gas, electricity and rail industries).

1.1 Terms of Reference

The Terms of Reference for the inquiry are provided in Appendix 1.

In accordance with the Terms of Reference, the Authority is to consider and report on:

- the appropriate charging structures and recommended tariff levels for the Water Corporation, Aqwest and the Busselton Water Boards' water supply services;
- the appropriate charging structures and recommended tariff levels for the Water Corporation's wastewater services;
- the appropriate charging structures and recommended tariff levels for the Water Corporation's drainage services; and
- the appropriate charging structures and recommended tariff levels for the Water Corporation's other regulated services.

The Authority must give consideration to, but will not be limited to, the following:

- the method used to determine the revenue requirements of each service provider;
- the operating and capital costs of providing services, with a focus on:
  - cost effectiveness in the supply of services; and
  - resources necessary to meet the required service standards.
- the appropriate rate of return on each service provider's assets;
- the efficiency of demand management activities;
- the impact of the recommendations on each service provider's net financial position;
- the impact of the recommendations on the Government's net financial position, in particular, net debt, dividends, tax equivalent payments and the level of Government funding (through Community Service Obligation Payments); and
- the environmental and social impact of the recommendations.

In undertaking the inquiry, the Authority recognises section 26 of the Act, which requires the Authority to have regard to:

- the need to promote regulatory outcomes that are in the public interest;

- the long-term interests of consumers in relation to the price, quality and reliability of goods and services provided in relevant markets;
- the legitimate business interests of investors and service providers in relevant markets;
- the need to promote competitive and fair market conduct;
- the need to prevent abuse of monopoly or market power; and
- the need to promote transparent decision making processes that involve public consultation.

1.2 Background

This inquiry follows a number of other inquiries carried out by the Authority into water-related issues in Western Australia; i.e.

- Water Corporation's tariffs for water and wastewater services in the Perth metropolitan area, and water tariffs set by Aqwest and the Busselton Water Board. This inquiry, in 2005, was the first independent inquiry into urban water and wastewater tariffs in Western Australia;
- Water Corporation's country water and wastewater tariffs (2006);
- the cost of supplying bulk water to Kalgoorlie-Boulder from Perth, either from Perth via the existing network, or transporting desalinated seawater from Esperance along a new pipeline (2005); and
- the bulk water supply agreement between Harvey Water and the Water Corporation (2007).

In addition to the major reviews of urban and country water and wastewater tariffs, the Authority has also carried out annual reviews of Water Corporation's tariffs (in 2007 and 2008). These annual reviews provided advice to the Government on the implications of the latest cost increases on the tariff structures that had previously been decided by Government. The Authority also undertook an annual review of the tariffs charged by Aqwest and Busselton Water in 2008.

The Authority has also recently completed inquiries into:

- competition in the water and wastewater services sector; and
- developer contributions to the Water Corporation.

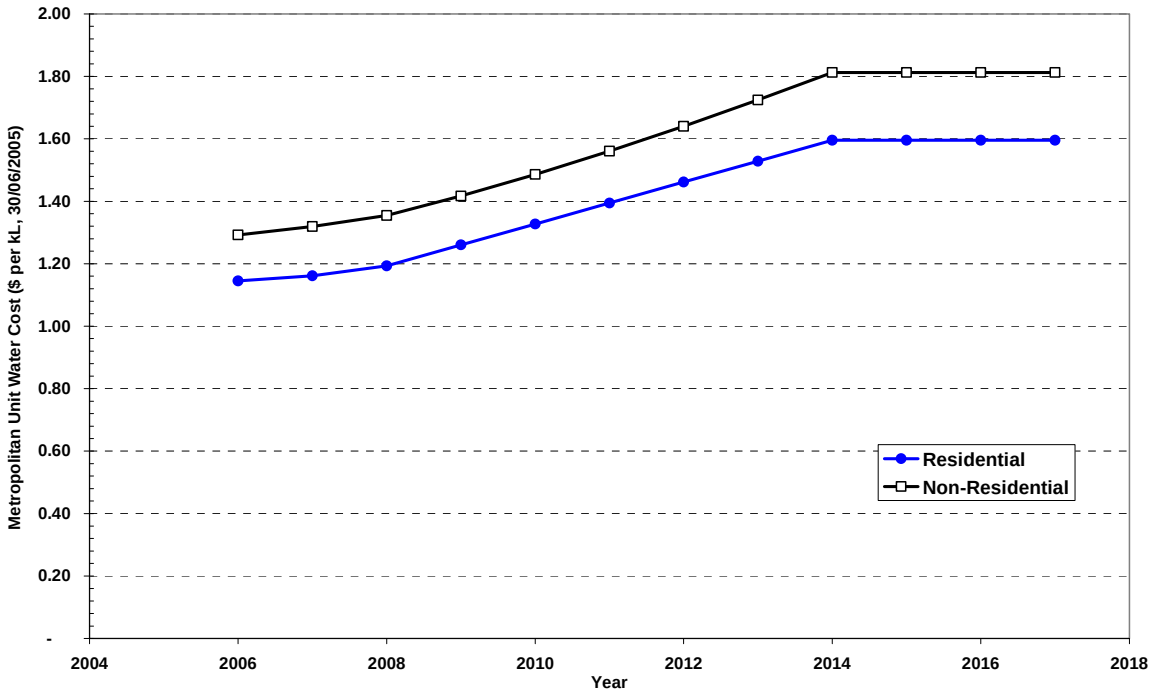
As a result of previous water and wastewater pricing inquiries:

- Metropolitan water usage charges are moving towards long run marginal cost, which is the marginal cost of future water sources (and at the same time, the fixed charge is adjusted to ensure full cost recovery).
- The number of steps in the water tariff schedules for the Corporation (both residential and non-residential) are being reduced over time.
- Charges in country towns for water usage above the uniform threshold will be more closely related to the costs of providing the water service.

- All of the Corporation's water and wastewater tariffs are moving towards being set as closely as possible to the costs of delivering the service (subject to the uniform tariff policy and caps on wastewater charges).
- There has been no change in the water boards' pricing structures (the Government has deferred decisions on the water boards' pricing structures until the recommendations of this inquiry have been provided).[2]

Figure 1.1 shows the projected average per kilolitre water charges (including fixed and usage charges) for Perth metropolitan customers for the period 2006 to 2017. Non-residential prices will transition to $1.81 per kL (in 2005 dollars) by 2014, while residential prices will rise to $1.60 per kL (in 2005 dollars) over this period.

Figure 1.1 Projected Metropolitan Unit Water Prices ($ per kL, in dollars of 30 June 2005)



Source: Economic Regulation Authority

The inquiry fits in with the National Water Initiative process which requires State Governments to use independent bodies to either set or review prices or price setting processes for water storage and delivery by government water service providers.[3] Prices must be consistent with the pricing principles set out in the NWI, including the requirement to remove or at least make transparent any cross subsidies. While the Authority does not have a formal function as a price regulator for water and wastewater services, it has indirectly performed this role through inquiries which result in recommendations to the Government on tariffs.

Other jurisdictions have established independent water and wastewater price regulators (the Independent Pricing and Regulatory Tribunal (**IPART**) in NSW, the Essential Services Commission of South Australia (**ESCOSA**), the Essential Services Commission (**ESC**) of Victoria, and the Independent Competition and Regulatory Commission (**ICRC**) in the

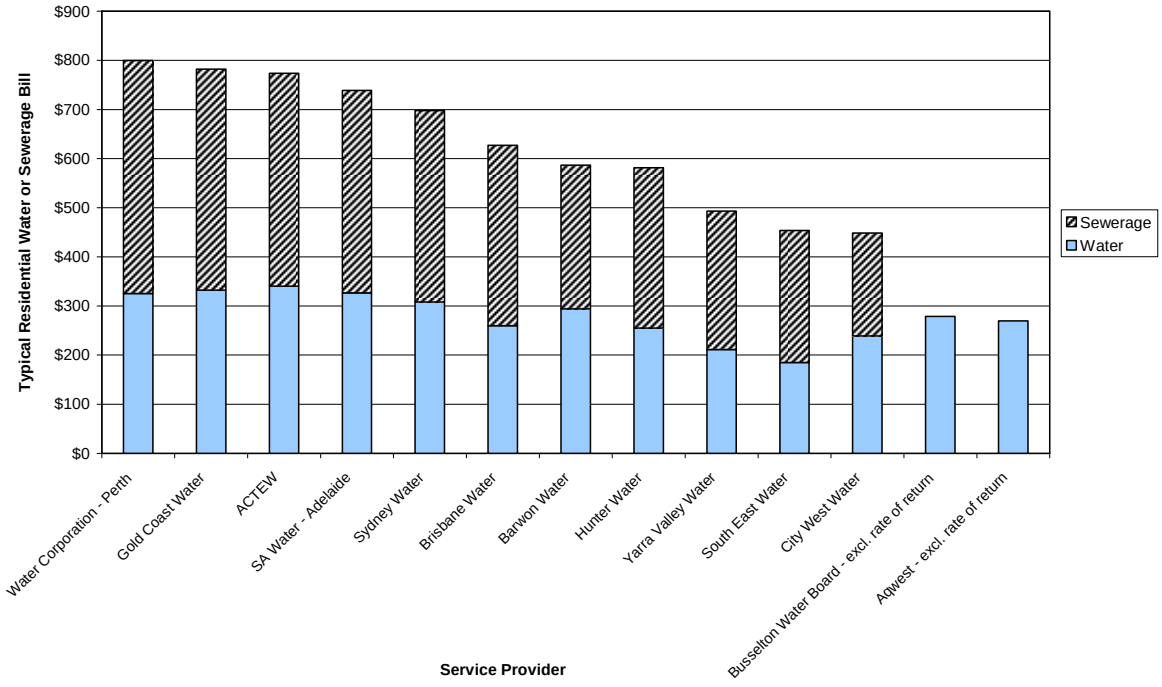
[2] Water boards refers to Aqwest (or the Bunbury Water Board) and the Busselton Water Board.

[3] Section 77 of the Intergovernmental Agreement on a National Water Initiative.

ACT). These regulatory bodies set the maximum prices that can be charged by water and wastewater utilities for their services.

As further context for this inquiry, Figure 1.2 shows the typical residential bills for customers in Perth, Bunbury and Busselton in comparison to the bills paid by residential customers of other utilities in Australia. The Corporation's Perth customers pay higher total bills (water and wastewater combined) than do customers elsewhere. While Aqwest's and Busselton's water bills are shown in the figure, they are not directly comparable because they do not charge their customers a return on assets. Nor do they provide wastewater services.

Figure 1.2 Typical Residential Bills for Water and Sewerage Services for Urban Water Utilities with > 100,000 Customers (2006-07), and Aqwest and Busselton Water Board[4]



Source: Water Services Association of Australia Ltd, National Water Commission and NWI Parties (2008), National Performance Report 2006-2007: Urban Water Utilities.

1.3 Structure of the Report

The Authority has identified a range of issues that it is intending to analyse as part of this inquiry. The report consists of three parts.

Part 1 discusses issues of a general nature such as:

- an overview of the approach taken to calculate tariffs;
- service standards;
- water usage charges;
- wastewater charges;

[4] Aqwest and the Busselton Water Board provide water services only.

- drainage charges; and
- other matters including:
  - social objectives;
  - demand management; and
  - environmental externalities.

Part 2 deals with technical matters such as:

- The approach adopted to calculating tariffs including:
  - the revenue requirement; and
  - tariff structures.
- Scope for efficiency gains with respect to:
  - operating expenditure; and
  - capital expenditure.
- The rate of return.
- Cost allocation between residential and non-residential customers.
- The treatment of inflation.
- The treatment of underground assets.
- The treatment of developer contributions.

Part 3 address matters specific to each of the utilities and the appendices contain additional detail.

1.4 Review Process

The recommendations of this inquiry will be informed by the following public consultation process:

- This Issues Paper invites submissions from stakeholder groups, industry, government and the general community on the matters in the Terms of Reference. Submissions are due by 12 September 2008.
- Following consideration of submissions received on the Issues Paper, the Authority intends to publish a Draft Report towards the end of 2008. Public submissions on the Draft Report will be invited.
- The Authority will consult its Consumer Consultative Committee during the course of the inquiry.
- The Final Report for the inquiry is to be delivered to the Treasurer by 15 June 2009 and the Treasurer will, in accordance with the Act, have 28 days to table the report in Parliament.

The Authority is intending to engage engineering consultants to examine the cost effectiveness of the three utilities, including reviewing their capital expenditure programmes and level of operating expenditure.

In accordance with section 45 of the Act, the Authority will act through the Chairman and members in conducting this inquiry.

1.5 How to Make a Submission

Submissions on any matters raised in this Issues Paper or in response to any matters in the Terms of Reference should be in written and electronic form (where possible) and addressed to:

Inquiry on Tariffs of the Water Corporation, Aqwest and Busselton Water
Economic Regulation Authority
PO Box 8469
Perth Business Centre
PERTH WA 6849

Email: watertariffs@era.wa.go.au
Fax: (08) 9213 1999

Submissions must be received by 12 September 2008.

In general, submissions from interested parties will be treated as in the public domain and placed on the Authority's web site. Where an interested party wishes to make a confidential submission, it should clearly indicate the parts of the submission that are confidential. For more information about the Authority's submissions policy, see the Authority's web site, www.era.wa.gov.au

The receipt and publication of a submission shall not be taken as indicating that the Authority has knowledge either actual or constructive of the contents of a particular submission and, in particular, whether the submission in whole or in part contains information of a confidential nature and no duty of confidence will arise for the Authority in these circumstances.

Further information regarding this inquiry can be obtained from:

Mr Greg Watkinson
Director, References and Research
Economic Regulation Authority
Ph (08) 9213 1900

Media enquiries should be directed to:

Mr Paul Byrne	Ph (08) 9336 2081
Byrne & Byrne Corporate Communications	Mb (0417) 922 452

PART ONE: GENERAL ISSUES

2 General Issues

2.1 Introduction

This section focuses on some general issues which impact on the tariffs of each of the service providers. These general issues relate to:

- **Overview of tariff calculation.** This section describes briefly the approach taken to calculating tariffs.
- **Service standards.** In considering the levels of service, there is the question of whether the utilities have sufficient resources to meet the levels of service that are currently required.
- **Water usage tariffs.** In assessing the methods used to calculate tariffs, a key consideration is whether the current method of using long run marginal cost to calculate water usage charges is the best approach, or if other approaches, such as the use of scarcity prices, could improve the price signals to customers. Another issue is how charges to country water customers are determined.
- **Wastewater usage tariffs**. For wastewater charges, the use of gross rental values for residential wastewater customers, compared to alternative approaches, will be examined. Another issue is the way in which wastewater charges to commercial customers are set, and the extent to which these are cost reflective.
- **Drainage issues.** The matters considered here relate to whether or not country customers should pay for drainage services provided by the Corporation and the most appropriate charging regime for metropolitan customers.
- A range of other matters including:
  - **Social issues.** There are a range of social issues which also need to be considered. Currently, the costs of some Government policy objectives (for example, the Uniform Tariff Policy, pensioner discounts, drainage services to country customers) are met through CSO payments. The effectiveness of these subsidies at meeting their underlying social objectives will be reviewed.
  - **Demand management.** Demand management includes initiatives such as water restrictions and rebate programs for the adoption of water efficient appliances. The appropriateness of demand management programs for the metropolitan area following the completion of the second desalination plant should be considered. In addition, consideration should be given to whether, if required, demand management programs should be implemented on a scheme-by-scheme or regional basis.
  - **Environmental externalities.** There is debate regarding whether tariffs should be adjusted to take into account environmental externalities.

2.2 Overview of Tariff Calculation

Water and wastewater services are generally provided by monopoly service providers. As such, there is a need for oversight of prices to ensure the businesses do not overcharge and make excessive profits. The approach taken in Western Australia has been for the Government to issue a Terms of Reference to the Authority to undertake an inquiry and provide recommendations on appropriate tariffs.

In making these recommendations, the Authority first establishes the efficient costs of the businesses. For a given forecast of demand, tariffs are then calculated such that efficiently-incurred costs are recovered. This approach is adopted individually for water, wastewater, drainage and other regulated services such that water tariffs reflect the costs incurred in providing water services, wastewater tariffs reflect the costs incurred in providing wastewater services and so on.

A more detailed discussion of the methodology adopted by the Authority is contained in Section 3.1.

2.3 Service Standards

The provision of services by the three water utilities is regulated under the *Water Services Licensing Act 1995*. This Act establishes a licensing scheme whereby the Corporation is granted an operating licence for provision of water supply services, sewerage services, irrigation services and drainage services and the water boards are granted licences for provision of water supply services.

Licences are granted subject to terms and conditions that establish standards and requirements for the provision of services in respect of:

- processes for dealing with customer complaints;
- a requirement to establish a customer charter;
- establishment of committees of consumers for the purpose of obtaining consumer opinions on the service provider's prices and service standards;
- obligations to customers in respect of the availability and connection of services;
- reporting of customer complaints and incidents in the provision of services including non-compliance with water quality standards, overflows from wastewater infrastructure and interruption of water services;
- standards for the provision of services including standards for customer service, health-related aspects of water quality, water pressure and flow, interruptions to water services, overflows of sewerage systems, and design criteria and performance requirements for drainage schemes;
- reporting of compliance with standards for the provision of services;
- maintenance of an asset management system; and
- performance of operational audits, being audits of the effectiveness of measures taken by the service provider to maintain quality and performance standards.

Licence conditions are implemented to ensure certain public health and safety standards are achieved. In addition, licence conditions are implemented to ensure customers receive a prescribed level of service.

The need to mandate service standards is a result of the monopoly nature of the businesses. No effective market exists for the products or services provided by these businesses, and as a result, customers are unable to choose an alternative provider offering a different level of service. As such, the businesses do not face any pressure from competitors to offer appropriate levels of service that meet customer expectations and for which they are willing to pay.

Compliance with the terms and conditions of operating licences cause the water utilities to incur certain costs that in some cases may not necessarily be incurred in the absence of the specific licence requirements. These are costs legitimately incurred in achieving the required levels of service and prices should be set at a level sufficient to ensure that these costs are recovered. Given the Authority's licensing function, it is aware that all three utilities are providing services in accordance with their licence requirements.

The Terms of Reference for the current inquiry require the Authority to consider whether the utilities have sufficient resources to meet the levels of service that are currently required.

Issues

- Are the current levels of service appropriate?

2.4 Water Usage Charges

This section discusses water usage charges in the Perth, Bunbury and Busselton regions. It then discusses water usage charges in country areas.

2.4.1 Water Usage Charges for Perth, Bunbury and Busselton

Historically, water prices were either charged on a fixed annual basis or determined under a 'rates-based' approach. The price charged bore no relationship to the volume of water used. In addition, the revenue raised typically bore little resemblance to the cost of providing the service.

The introduction of water meters allowed customers to be charged on the basis of usage. Prices were also set to reflect more accurately the cost of service provision.

However, prices were typically set with little reference to efficient pricing principles. One such principle is to set usage charges with reference to the marginal cost of providing the service. In this way the value to consumers from consuming the last unit of water, as represented by the price, is just equal to the costs of the inputs in their best alternative use, as represented by marginal cost.

Marginal cost has three components.

- The first, often referred to as marginal production cost, is equal to the costs of the utility's inputs in their best alternative use.
- The second, often referred to as marginal user cost, is equal to the cost of depleting storages, which is measured by the cost of bringing forward additional supplies. At times when additional capacity is not immediately available, the marginal user cost increases to the level that equates supply and demand.
- The third is the cost imposed on third parties as a result of consuming more than is optimal for society as a whole (these costs are referred to as externalities, which are discussed in section 2.7.3).

Under marginal cost-based pricing, the price would rise in times of shortage, representing the fact that any water consumed would not be available for later use. The rise in price

would be such that it would avoid the need for non-price restrictions. Conversely, price would fall when water was plentiful.

The task of identifying a price for a water utility that matches marginal cost is complicated by two factors.

- First, intermittent capacity expansions create difficulties in the estimation of marginal production cost. As a capacity constraint emerges, the marginal production cost would be based on the per unit cost of the augmentation. Immediately following the augmentation, the marginal production cost would drop to a level that reflects only variable costs.
- Second, uncertainty about the responsiveness of consumption to price (the price elasticity of demand) creates difficulties in the estimation of marginal user cost. For example, at times of scarcity, how high would the price need to go to clear the market?[5]

An additional complication is that pricing principles need to take into account the potential for trade. For example, Aqwest could trade its water to Water Corporation, in which case the usage charge in Bunbury should be the marginal cost of water in Perth less any transportation costs. In an open market, trading opportunities would maintain price differentials at levels that reflect relative transportation costs.

Partly due to the difficulties referred to above, regulators have increasingly favoured a method for setting water usage charges which bases pricing policy on the average incremental cost of augmenting supply (referred to as "long run marginal cost (**LRMC**)" pricing). Regulators including the Authority, the ESC in Victoria and IPART in New South Wales have adopted LRMC pricing for usage charges.[6]

The Government has decided to implement LRMC pricing for the Corporation's metropolitan customers but, following advice from the Authority, has not done so for the water boards' customers pending consideration of the Authority's advice from this inquiry. For the Corporation's metropolitan customers, however, the implementation is over a period of eight years, concluding in 2013/14.

In addition, the Government has recently announced that commercial metropolitan customers will have their usage charges phased-in by 2013/14 to a more recent (and higher) estimate of LRMC, following the Authority's advice to the Government preceding the 2008 Budget.

The major pricing issue for this inquiry is whether the LRMC-based pricing approach should be continued or whether an alternative more economically efficient pricing approach could be developed.

In the event that LRMC-based pricing is considered preferable, the issues for the inquiry include:

- What is the latest estimate of LRMC for Perth customers?

[5] On the other hand, immediately following an augmentation, how low would the price need to go to 'soak up' all of the available capacity?

[6] It should be noted that the reference to LRMC pricing in this context is different to the theoretical concept of LRMC. Theoretical LRMC refers to a situation where all factors of production are variable in the production of a given quantity. LRMC pricing in the sense that regulators have adopted is actually an incremental cost associated with the introduction of additional sources of supply.

- Should the transition to LRMC pricing for Perth customers occur more quickly (rather than by 2013/14)?
- Should usage charges for Busselton and Bunbury water customers be set on the basis of the LRMC of servicing Perth customers less any costs associated with transportation?

The Authority outlined a possible alternative to LRMC pricing in its Draft Report on the Inquiry on Competition in the Water and Wastewater Services Sector, which it referred to as scarcity-based pricing. Water usage charges could be set with specific reference to not only the direct cost of production but also actual storage levels (and potentially externalities), effectively incorporating into the assessment the opportunity cost of current consumption.

Pricing on this basis would tend to lie below LRMC for much of the time, but to rise above LRMC at times when the system is stressed, and especially as this translates into a higher likelihood of needing to trigger new infrastructure investment. Prices would rise gradually as storage levels fell. The rise in price would reduce demand – providing scope for avoiding the need to implement water restrictions. However, following inflows to dams or an augmentation, prices would fall to reflect the falling opportunity cost of consumption.

As an illustration of the potential variation in prices under a scarcity-pricing approach, a study by IPART found that residential tariffs would need to rise by between 62 per cent and 143 per cent to match the demand reduction achieved by level 3[7] water restrictions.[8]

However, variation in pricing under a scarcity-based pricing approach would not need to apply to all customers. Rather, the water utility could offer customers a range of possible price plans. The range of plans could include:

- a scarcity-based approach where customers could consume as much as they wished as long as they were willing to pay the scarcity-based price. The price would be relatively low in times when water is plentiful but relatively higher during times of drought, and might apply only to volumes above some determined socially appropriate base level of supply;
- a 'locked-in' price for all consumption determined independently of storage levels. This price would likely be at a premium to the average price determined under the scarcity based approach as it would reflect the guarantee of supply at the given price; and
- the purchase of a given entitlement, say 250 kL per year, at a relatively reduced price but with significant penalties should consumption exceed this amount. This plan is analogous to the current arrangements where restrictions (instead of price) are used to limit consumption during times of shortage. It would approximate drought pricing, as was used for a period in Gladstone in Queensland.

Under this approach, customers would be provided with price signals that more accurately reflect the true cost of consumption – or would pay a premium to insure the system

[7] Sydney is currently on Level 3 restrictions, which permits hosing of lawns and gardens only on Wednesdays and Sundays before 10am and after 4pm. Residential customers are permitted to wash cars, boats and caravans at home with a hose as long as a trigger nozzle is fitted. They are also able to clean the windows and walls of their house with a hose as long as a trigger nozzle is fitted. However there is to be no hosing of hard surfaces, no sprinklers or watering systems, and no filling of new or renovated pools over 10,000L except with a permit from Sydney Water.

[8] O'Dea, G. and Cooper, J. (January 2008), *Water Scarcity: Does it Exist and Can Price Help Solve the Problem?* IPART Working Paper.

against their demands at times when water was scarce. In addition, customers' choice of plan as well as their actual consumption would provide the market with greater guidance regarding their willingness to pay for additional sources.

The concept of scarcity pricing has also been considered recently by the Productivity Commission. The Productivity Commission concluded that one of the sources of inefficiency in current approaches to urban water prices is the failure of prices to signal the scarcity value of water.[9] The Commission noted that:

> Allowing water prices to reflect both costs and scarcity would provide more timely investment signals to suppliers. This would help avoid the 'feast or famine' approach to augmentation investments. It would also provide signals to private sector investors about water investment choices such as building a desalination plant, recycling water and investing in water saving technology.[10]

In addition, a recent recommendation contained in the National Water Commission assessment of the implementation of the National Water Initiative (recommendation 3.2.4) called for 'pricing regulation that encourages more flexible or market-driven pricing approaches to emerge in response to water scarcity'.[11]

Issues

- What pricing principles should guide the setting of water usage charges?

2.4.2 Country Water Usage Charges

The Water Corporation will be commencing reforms to country water usage charges from 1 July 2008. These reforms follow a recent decision by Government which was based on earlier advice from the Authority as part of the Inquiry on Country Water and Wastewater Pricing and advice from an implementation committee. The new pricing arrangements will be more cost reflective than previously (see Section 3.1.2 for a detailed explanation of the new pricing arrangements in the country). As part of the changes, the threshold amount of annual water usage below which uniform tariffs apply will be reduced by 50 kL (e.g. from 350 kL per year in the South of the State to 300 kL per year).

One of the main issues relating to country water usage charges for this inquiry will be as a result of any change to Perth charging arrangements. For example, if Perth usage charges are increased to reflect a higher estimate of LRMC, this will flow through to country water usage charges as a result of the uniform tariff policy. This may result in some towns being charged more for water than is warranted (e.g. towns that are unlikely to require significant source expenditure in the coming years) and could inefficiently dissuade customers in those towns from making use of their existing infrastructure. For other towns, particularly those experiencing significant growth and requiring additional water, it may be that the new uniform tariff is appropriate or even understates the appropriate price.

This issue highlights the problem of not having usage charges in the country set on the basis of the marginal cost of expanding supplies on a scheme-by-scheme basis. While it

[9] Productivity Commission (March 2008), *Towards Urban Water Reform: A Discussion Paper.*

[10] Ibid,. page xxviii.

[11] National Water Commission, *National Water Initiative – First Biennial Assessment of Progress in Implementation,* August 2007.

may be too administratively burdensome to implement some form of marginal cost pricing in all country towns, there may be some towns for which this is appropriate.

Commercial usage charges in the country will not be impacted by higher Perth usage charges because the Uniform Tariff Policy does not apply to commercial customers. Instead, commercial usage charges are calculated independently for groups of towns (see Section 3.1.2 for more details).

Issues

- Should country water usage charges be set in relation to marginal cost?

2.5 Wastewater Charges

This section examines wastewater charges for residential and then non-residential customers.

2.5.1 Residential Wastewater Charges

Residential wastewater tariffs in Western Australia are currently set as a fixed charge each year, based on the estimated Gross Rental Value (**GRV**) of the property. As relative property values vary, the wastewater charges are adjusted to maintain the required amount of revenue for the wastewater service. In Perth, residential wastewater charges are set to recover the cost of the service (by assuming that the cost share between residential and commercial customers is maintained at its existing level). In the country, residential wastewater charges are set to recover the costs of wastewater service provision in each scheme and are subject to minimum and maximum charges.

South Australia, some parts of Tasmania, and WA are the only jurisdictions in Australia that charge for residential wastewater services on the basis of property values. Most other jurisdictions apply fixed uniform wastewater service charges for residential customers. Melbourne is an exception where, in addition to the uniform fixed service charge, residential customers pay a sewage disposal charge based on estimated sewage disposal volumes.[12]

In the 2005 Inquiry on Urban Water and Wastewater Pricing, the Authority recommended a transition away from GRV-based prices to a four block inclining annual fixed charge. However, the Government did not accept this recommendation.

The rationale for linking wastewater charges with property values is one of income redistribution, in that high property values are seen as a proxy for high income. This correlation is weak, and in many instances will be reversed (with low income households in expensive suburbs paying high wastewater bills). However, any move away from GRV-based pricing would result in households with low valued properties facing higher wastewater charges (on average) while households with high valued properties would pay less (on average).

[12] Sewage disposal volumes are estimated on the basis of winter water consumption volumes and estimated discharge rates to the sewerage system.

On the other hand, there are a number of arguments for decoupling residential wastewater charges from property values.

- Under property-based pricing, there is little if any relationship between the price charged and the cost of the service. The cost of providing a sewerage service does not vary much between households, as the infrastructure required is similar for each household, and treatment costs depend on the contaminant load rather than volume of discharge. A common fixed charge is more likely to reflect the costs of the standard wastewater service provided to residential households.
- There are considerable administrative costs associated with property value-based pricing, arising from the need to determine property valuations each year, and to manage customer responses to changes in property valuations and wastewater charges. A less complex system of wastewater charges would result in some administrative savings.

Impacts on households arising from any move away from property value-based charging may be minimised through appropriate transition arrangements.

Issues

- Should residential wastewater charges be decoupled from property values?

2.5.2 Non-Residential Wastewater Charges

Non-residential wastewater charges are the same for commercial customers in Perth and in the country and consist of a service charge and a usage charge. The service charge is based on the number of major sewerage fixtures. The usage charge is based on the estimated volume discharged to the sewerage system, which is calculated on the basis of water usage multiplied by a discharge factor.

The Authority will examine whether the current tariff structures for non-residential wastewater services are reflective of the costs of service. For example, is the number of sewerage fixtures the best basis for setting the service charge, rather than other measures such as an estimate of water usage (potentially based on water meter size)?

Table 2.1 summarises approaches used by other water utilities in Australia.

Table 2.1 Non-Residential Wastewater Charging Methodologies in Other Jurisdictions

Wastewater Service Provider	Charging Approach for Non-Residential Wastewater Customers
Victorian water businesses	Generally two-part tariffs, with service charges (where these are used) based on the number of cisterns and usage charges based on estimated discharge to the sewers.
Sydney Water	Service charge based on water meter size, and a usage charge based on estimated volume discharged to the sewers. There are no usage charges for the first 500 kL of discharge.
ACTEW (Canberra)	Fixed sewerage charge, based on the land classification of the property and the number of cisterns.
Brisbane Water	Fixed service charge and a charge based on the number of cisterns.

Source: ERA

A further matter to be considered is whether there is merit in calculating tariffs on a class basis as occurs for country water tariffs or possibly a scheme-by-scheme basis.

Issues

- Do interested parties have any concerns with the current approach to charging non-residential customers for wastewater services?

2.6 Charging for Drainage

In the Perth metropolitan area, the Water Corporation provides the main drainage services across 40 per cent of the Perth metropolitan area. The Water Corporation owns and manages a system of around 830 kilometres of main drains (generally piped drains larger than 700 mm, as well as open channels). Other infrastructure includes compensating basins, and gauging stations to measure flows and rainfall. Main drains which cross more than one local area boundary are provided and maintained by the Water Corporation, if local authorities request this. There are around 325,000 homes and businesses connected to the Water Corporation's drainage network. Water that goes into drains ends up in either rivers, wetlands or the ocean. Under its licence, the Water Corporation is required to provide drainage services in the metropolitan area to accommodate a one-in-five year rainfall event in residential areas, and a one-in-ten year rainfall event for commercial areas and compensating basins.

Local councils own and maintain the local drainage infrastructure over the remainder of the metropolitan area (around 3,000 kilometres of local drains, generally with pipes less than 700 mm).

The Water Corporation recovers its costs from metropolitan customers through drainage charges based on GRV (see Section 3.1.2 for the current charges).

Local councils recover their costs through council rates, or in some cases, specific drainage charges.

The Water Corporation also provides drainage services in a number of rural areas. However, the costs of these services are currently met through a CSO, so rural customers do not pay for drainage.

For new developments, the developers provide smaller pipes, as well as landscaping of developments to minimise additional runoff and inflows into the main drains. In addition, developers pay a headworks charge.

To date, the Authority has not been involved in determining whether the rates per dollar of GRV applied by the Water Corporation for drainage are appropriate (i.e. set to recover the efficient costs of drainage service provision, and no more).

An issue is whether the tariff structure for drainage is appropriate or whether it should be changed from its current GRV basis to an alternative approach. For example, in NSW, Sydney Water and Hunter Water provide trunk drainage services, which are funded through a standard stormwater drainage charge. However, other States base their charges on local government rates:

- In Queensland and South Australia, drainage services are provided by local government and funded through council rates, which are based on land values, and through developer charges.
- In Victoria, Melbourne Water is responsible for drainage infrastructure provision and planning, which is funded through a developer charge levied by Melbourne Water. Local councils maintain the infrastructure and recover their costs through rates.

A further matter is whether additional obligations should be imposed on drainage service providers to improve the quality of drainage and stormwater, and if so, how these obligations should be funded.

- In NSW, local councils have the option of levying a separate charge, in addition to their standard rates, to recover the costs of additional stormwater management activities to meet obligations under the NSW Government's Urban Stormwater Program.
- In Melbourne, drainage developer charges have two components:
  - a drainage scheme charge, to recover the cost of drainage infrastructure; and
  - a stormwater quality charge, to cover the cost of stormwater quality initiatives in each scheme. In developments that do not meet specified stormwater quality targets, a charge is applied to the mass of nitrogen discharged above a minimum standard.

The funding of drainage services in Western Australia is currently being reviewed by the Department of Water.[13] It is understood that this review will involve consideration of governance and institutional arrangements, the roles of service providers, service standards, the level of funding required, and funding mechanisms.

[13] http://portal.water.wa.gov.au/portal/page/portal/WaterManagement/Stormwater

In relation to country drainage services, the pricing issue for this inquiry is whether country customers should pay for drainage services provided by the Corporation.

Issues

- What is the most appropriate charging basis for metropolitan customers for drainage services?
- Should customers in country towns pay for drainage services provided by the Water Corporation?

2.7 Other Matters

This section looks at:

- social objectives;
- demand management issues; and
- environmental externalities.

2.7.1 Social Objectives

2.7.1.1 Community Service Obligation Payments

The Government achieves a variety of social objectives through its Community Service Obligation (**CSO**) payments to the Water Corporation.[14] In 2006/07, CSOs were estimated at $370 million. A key consideration of this inquiry is whether each CSO represents value for money in terms of the underlying objectives.

The Water Corporation's Statement of Corporate Intent for 2006-07 estimates the breakdown of the CSOs it receives as:

- country services ($232 million);
- revenue concessions ($80 million);
- infill sewerage ($32 million); and
- CSOs for new services ($24 million).

Country Services

This category of CSOs comprises:

- Expenditure relief for residential water customers in the country.

[14] Aqwest and the Busselton Water Board provide concessions for pensioners and seniors for which they do not receive a CSO. However, neither Aqwest or Busselton pay a dividend to the Government.

  - Uniform tariffs apply for a set level of water usage irrespective of where you live in Western Australia (uniform tariffs apply for water usage up to a threshold 300 kL for country customers in the south and 500 kL for country customers in the north);
  - Caps on country residential water usage prices.
- Expenditure relief for commercial water customers in the country, via a cap on commercial usage charges.
- Expenditure relief for residential wastewater customers in the country. There is a cap on residential wastewater charges in country towns, with a maximum charge per residence.
- Free drainage services for country customers (Perth metropolitan customers pay for drainage services on the basis of property values).

Revenue Concessions

This category of CSOs comprises:

- a rebate of up to 50 per cent on the annual service charge for holders of a Pensioner Concession Card or State Concession Card and up to 50 per cent concessions on water usage charges up to a threshold amount (150 kL for Perth customers, 400 kL for country customers in the south, and 600 kL for country customers in the north);
- a rebate of up to 25 per cent (capped) on the annual service charge for State Seniors Card holders;
- a rebate of up to 50 per cent on the annual service charge for holders of both a State Seniors Card and a Commonwealth Seniors Health Card.

Infill Sewerage

The costs of the Infill Sewerage Program in the Perth metropolitan area and some country towns (around $800 million over a ten year period) are covered by a CSO. However, customers must pay the costs of connecting to the sewerage system.

In addition, the following social matters will be considered in detail during this inquiry:

- uniform tariff threshold;
- discounts for low water usage; and
- higher usage charges for very high volume users.

2.7.1.2 Uniform Tariff Threshold

In relation to the Uniform Tariff Policy, one issue is whether the thresholds for the uniform tariff are set appropriately. As part of the Inquiry on Country Water and Wastewater Pricing, the Authority recommended lowering the threshold by 50 kL per household per year, to 300 kL for towns in the south of WA and 500 kL for towns in the north of the State. This recommendation was made on the basis that these amounts still exceed the average in-house consumption of a large residential household, and so would not compromise the Government's objective of providing all households with affordable water to meet basic needs. This assumption may be re-examined to determine whether the threshold could

be lowered further (with a corresponding reduction in the CSO), without compromising the affordability objective.

- For example, "optimal access" is defined by the WHO as 100 litres per capita per day and above, supplied through multiple taps continuously.[15] At this service level, all basic needs for drinking water, hygiene, bathing and laundry are met, and the level of health concern is very low. Other authors support a basic water requirement of 100 litres per capita per day (which is the typical household demand in water-scarce regions) to provide for a minimum acceptable quality of life.[16] This quantity is equivalent to an annual per capita consumption of just under 150 kL for a four-person household.

2.7.1.3 Discounts for Low Water Usage

As usage charges increase to reflect either long run marginal cost pricing or scarcity-based pricing, an issue is whether there are reasons for maintaining a lower usage charge for, say, the first 150 kL of annual water usage, for all residential customers.

A discount could be applied for two reasons. The first reason is that marginal cost pricing might lead to an over-recovery of revenue and an adjustment to either the fixed charge or usage charges that apply to non-discretionary usage might be considered appropriate to ensure the water utility does not over recover revenue. Whether or not such an adjustment is needed is an empirical issue, which will depend on each water utility's updated cost projections and marginal cost estimates.

The second reason is that there might be social objectives associated with maintaining water for basic needs at an affordable level (see discussion above). This social objective could be achieved by either reducing the fixed charge or by reducing the usage charge. Adjusting the fixed charge will be of greater benefit to those customers using very low amounts of water while adjusting the usage charge will be of greater benefit to those customers using amounts of water closer to the threshold (e.g. 150 kL).

2.7.1.4 Higher Usage Charges for Very High Volume Users

Following the 2005 pricing Inquiry on Urban Water and Wastewater Pricing, the Government decided to retain a tariff for usage above 950 kL per year at a level that was, at the time, almost twice as high as the (then) estimate of LRMC. The Government indicated that households using very large amounts of water should pay a penalty rate. The issue for this inquiry is whether penalty rates for very high volume users are appropriate as they are unlikely to achieve an efficiency objective (assuming usage charges are set in relation to marginal cost).

[15] World Health Organization (2003), "Domestic Water Quantity, Service, Level and Health".

[16] Falkenmark, M. (1991), "Approaching the ultimate constraint: water-short Third-World countries at a fatal cross-road", Study Week on Resources and Population, Pontifical Academy, 17-22 November 1991, Vatican City.

Issues

- Are current CSOs consistent with the objectives sought by government?
- Are current CSOs value for money or should they be modified in some way?
- Should the uniform tariff threshold be changed?
- Should discounts be provided for non-discretionary water usage, such as the first 150 kL of annual water usage?
- Should very high volume water users pay a penalty rate?

2.7.2 Demand Management

Demand management includes initiatives such as water restrictions and rebate programs for the adoption of water efficient appliances.

In the Perth metropolitan area, water restrictions limit sprinkler usage to two days per week. These restrictions were introduced in response to supply concerns in 2001 and were made permanent in October 2007. Bore owners in the Perth metropolitan area are allowed one additional day of garden watering per week.

In regional Western Australia, customers in towns south of Kalbarri and Kalgoorlie are allowed two days per week of garden watering. Customers in towns north of Kalbarri and Kalgoorlie are allowed to water their gardens on alternate days. Unlike in Perth, there are no restrictions on bore usage in regional areas.

There are also a range of rebate programs. These are generally overseen by the Department of Water and funded by the Water Corporation. These include:

- swimming pool covers;
- greywater re-use systems;
- rain sensors;
- subsurface irrigation systems;
- washing machines rated 4 ‘stars’ (4.5 ‘stars’ from January 2008) or better;
- waterwise garden assessments;
- domestic rainwater tanks with a capacity of 600 litres or greater;
- domestic garden bores; and
- flow regulators rated 3 ‘stars’ or better.

A major issue for this inquiry is whether demand management programs are effective in reducing demand relative to the cost incurred by the Corporation (in the case of rebates) or cost imposed on consumers (in the case water restrictions).

A further major issue for this inquiry is that given the imminent construction of the second desalination plant, should demand management programs continue in the metropolitan area, and if so at what level?

It may be appropriate to develop a better rule for demand management, whereby as the likelihood of having to commit to another significant source increases, demand management programs are gradually increased. Once the decision is made to commit to the source, demand management measures could be reduced given that the shortage will soon be averted.

A further issue is whether the current demand management programs (predominantly water restrictions) in the country are appropriate. For example, there may be areas with sufficient supplies, in which case, demand management activities would be unnecessary.

As part of this inquiry the Authority intends to examine the latest research into the cost of demand management programs. It is understood that the Corporation has engaged consultants to undertake analysis of this kind in the metropolitan area. Recent research on the costs of water restrictions in Perth have indicated that the welfare losses associated with twice-a-week limits on sprinkler use are in the order of $100 per household per year.[17] Another study has estimated the costs of level 2[18] water restrictions in Sydney over a 12 month period in 2004/05 to be around $150 per household.[19]

Issues

- Should demand restrictions and other demand management measures continue in the metropolitan area given the construction of the second desalination plant?
- Should demand restrictions be determined on a scheme-by-scheme basis as opposed to North and South of the State?

2.7.3 Environmental Externalities

The provision of water and wastewater services can potentially cause substantial environmental impacts through, for example, impacts of dams and reservoirs on catchments and aquatic environments, environmental impacts of groundwater abstraction and impacts of wastewater disposal practices. In the context of this inquiry, externalities are costs (or benefits) borne by people other than the individuals who make water supply, water consumption and wastewater disposal decisions.

[17] Brennan, D., Tapsuwan, S. and Ingram, G. (2007), "The welfare costs of urban water restrictions", *Australian Journal of Agricultural and Resource Economics*, 51:243-261.

[18] Level 2 water restrictions in Sydney include no hosing of hard surfaces, no sprinklers or watering systems, no hosing of lawns and gardens except hand-held hosing before 9am and after 5pm on Wednesdays, Fridays and Sundays and no filling of new or renovated pools over 10,000L except with a permit from Sydney Water. Sydney is currently in Level 3 restrictions, which permits hosing of lawns and gardens only on Wednesdays and Sundays before 10am and after 4pm. However, from 21 June Sydney Water residential customers were permitted to wash cars, boats and caravans at home with a hose as long as a trigger nozzle is fitted. They were also able to clean the windows and walls of their house with a hose as long as a trigger nozzle is fitted.

[19] Grafton, R. Q. and Ward, M. (2007), "Prices versus rationing: Marshallian surplus and mandatory water restrictions", Australian National University working paper.

For example, the effect of extraction of groundwater on local ecosystems is a common negative externality arising from the use of groundwater resources. Provision of water services may also result in positive externalities, such as where a water reservoir developed for water supply purposes provides a recreational resource or protects against flooding. On the other hand, water storage can have negative externalities, by directing water away from environmental flows. A justification for government intervention in the provision and pricing of services is to ensure that external costs are taken into account when people make water usage decisions.

There are two main classes of initiatives in Western Australia to manage the environmental impacts associated with water provision.

First, providers of water services are required to undertake activities in accordance with standards and regulatory frameworks that apply generally to business activities throughout the State. In undertaking a project, the water businesses would incur costs in complying with the relevant requirements, which would comprise part of the capital and operating costs of the businesses and be recovered in water prices. The regulatory requirements might also influence water businesses' future costs. For example, if the environmental indicators for a groundwater aquifer show that abstractions need to be reduced in order to meet environmental standards, and licensed allocations are modified accordingly, then other (more expensive) options for balancing water supply and demand would need to be brought forward. This would raise the LRMC and water usage prices under a LRMC pricing approach.

Second, the Department of Water in Western Australia undertakes a wide range of activities for the protection of aquatic environments and water resources. The Department has four main roles:

- resource characterisation – which involves investigating the resources, their relationship to environmental factors and sensitivity to withdrawal;
- water allocation – through its licensing role, managing the allocation of water to various uses while maintaining environmental values and sustainability of supply (access licences are issued for defined volumes of water and use licences impose obligations and conditions on use);
- protection and conservation of water quality; and
- waterways and catchment protection – protecting rivers and wetlands through land use planning, salinity management and floodplain management.

Some of the Department's activities are undertaken directly for the benefit of water users – for example, catchment protection. Users have a strong incentive to ensure that these activities are undertaken because they benefit directly. Other activities are principally undertaken for "public benefit" outcomes – such as the protection and conservation of water quality. The costs of the Department's resource management activities are not recovered currently from water users.

In 1994 the Council of Australian Governments agreed to a package of water reform pricing principles which included the need to signal to users a share of the costs associated with managing the resource and any environmental impact costs caused through extractive use. This principle has recently been reiterated by the 2004 National

Water Initiative. Sections 67 and 68 of the National Water Initiative relate to recovery of resource management costs:[20]

> 67. The States and Territories agree to bring into effect consistent approaches to pricing and attributing costs of water planning and management by 2006 involving:
>
> (i) The identification of all costs associated with water planning and management, including the costs of underpinning water markets such as the provision of registers, accounting and measurement frameworks and performance monitoring and benchmarking;
>
> (ii) The identification of the proportion of costs that can be attributed to water access entitlement holders consistent with the principles below;
>
> (a) charges exclude activities undertaken for the Government (such as policy development and Ministerial or Parliamentary services)
>
> (b) charges are linked as closely as possible to the costs of activities or products.
>
> 68. The States and Territories agree to report publicly on cost recovery for water planning and management as part of annual reporting requirements, including:
>
> (i) the total cost of water planning and management; and
>
> (ii) the proportion of the total cost of water planning and management attributed to water access entitlement holders and the basis upon which this proportion is determined.

Some States have taken the step of introducing resource management charges for urban water users. For example, urban water customers in the Australian Capital Territory pay a Water Abstraction Charge which covers certain catchment management costs and a notional value of the environmental costs associated with the removal of water from the river system. The New South Wales, Victorian and South Australian governments also recover some resource management costs from water users.

In Western Australia, the Government's 2003 State Water Strategy opted for a policy of continuing to fund resource management activities from consolidated revenue. However, it committed to investigating the applicability of implementing resource management charges in consultation with stakeholders, considering the possible timeframe, potential impacts and overall applicability of any possible implementation.[21]

In the 2005 Inquiry, the Authority recommended that costs of environmental impacts caused through the provision of water and wastewater services be passed through to users through the use of regulatory requirements and standards. However, the Authority also concluded that the extent to which water users are charged for water resource management activities undertaken by the Department of Water is a matter for the Government.

More recently, the State Government introduced charges that would recover the cost of administering water licences.[22] However, the State Parliament disallowed the charges.

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[20] Intergovernmental Agreement on a National Water Initiative, between the Commonwealth of Australia and the Governments of New South Wales, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory, 25 June 2004.

[21] Government of Western Australia, Water Task Force (February 2003), Securing Our Water Future: A State Water Strategy for Western Australia.

[22] Government of Western Australia (September 2005), *Government Response to the Report of the Irrigation Review Steering Committee*.

The State Government has indicated that it will be issuing a reference to the Authority to analyse the appropriateness of recovering from users the cost of administering water licences.[23] The Authority therefore considers that this issue should not be considered as part of this inquiry but be left to the other inquiry.

In relation to incorporating into water prices a component that reflects environmental externalities, the Authority notes that the Productivity Commission has released a working paper for the purpose of generating debate on methods to incorporate environmental externalities into decision making (for example by using an externality tax on water use).[24] An externality tax would be set at a level that corrects the level of water usage to the socially optimal level.[25] However, designing an externality tax is a challenge as it requires information about, for example, the external costs of water usage and the likely response to the tax.

The Productivity Commission also notes, in its discussion paper on urban water reform, that the adjustment of prices is one approach to the management of environmental externalities which could be considered against other possible approaches, on a case by case basis.[26] For example, in some situations, setting environmental standards for water utilities, funded by CSOs, may be more appropriate. In other cases, where water trading has been established, environmental service providers could compete against other water users to purchase water for environmental flows (this would have the effect of increasing the price of water to better reflect its value to the environment). Emissions trading schemes are another way in which some of the environmental externalities associated with the production and delivery of water could be incorporated into water prices.

Issues

- Should tariffs be adjusted to take into account any environmental externalities, and if so, how?

[23] Minister for Water, 2008 State Water Forum.

[24] See for example, Productivity Commission (March 2006), Irrigation Externalities: Pricing and Charges, Staff Working Paper.

[25] The externality tax would be based on the marginal cost of an externality.

[26] Productivity Commission (2008), *Towards Urban Water Reform: A Discussion Paper*, Productivity Commission Research Paper, Melbourne, March.

PART TWO: TECHNICAL ISSUES

3 Technical Issues

This section looks at:

- the approach to tariff calculation. This includes a discussion of:
  - how the revenue requirement is determined; and
  - how tariffs are calculated;
- the scope for efficiencies with respect to:
  - operating expenditure; and
  - capital expenditure;
- calculation of the rate of return;
- cost allocation between residential and non-residential customers;
- the treatment of inflation;
- the treatment of underground assets; and
- the treatment of developer contributions.

3.1 Approach to Tariff Calculation

This inquiry is the second major review of the Corporation's water and wastewater tariffs and the Water Board's water tariffs. It is the first major review of the Corporation's drainage tariffs. The requirement for external oversight of prices is a result of the Council of Australian Government's Water Reform Agreement (1994) and the National Water Initiative.

In advising the Government on tariffs, the Authority has two objectives. The first is to attempt to establish a more efficient allocation of resources. A recommendation that price be set in relation to marginal cost, for example, would be for the purpose of encouraging usage to move toward a point where the value to consumers from consuming the last unit of, say, water is just equal to the costs of the water in its best alternative use.

The Authority's second objective is to counter the absence of competitive pressure on the three water utilities. In this case, the Authority is pursuing productive efficiency in the three utilities by seeking that only 'efficient' actual expenditure would be recovered from customers.

In broad terms, this second objective may be achieved by determining a revenue requirement for the businesses based on an assessment of their costs. Average tariffs can then be calculated, for a given forecast of demand, to equate revenue and costs in present value terms.

The remainder of this Section investigates this process by looking at:

- how the revenue requirement is determined; and
- how tariffs are calculated.

3.1.1 Revenue Requirement

The approach adopted by the Authority to determine the revenue requirement is referred to as the 'building block' approach as each cost component is calculated individually to determine the total revenue requirement. This is the typical approach adopted in most regulated industries including water, wastewater, gas, and electricity.

The revenue requirement is calculated using the building-block method as follows:

Revenue requirement	=	return on capital *plus* return of capital (depreciation) *plus* operating and maintenance costs
where the return on capital	=	rate of return[27] *multiplied by* regulated asset base (which is rolled forward each year by adding capital expenditure and subtracting depreciation).

A return on capital is necessary to ensure that the business receives a return on its investment sufficient to provide it with an incentive to continue to invest. The return of capital, also referred to as depreciation, allows the business to recover capital invested over the life of the investment. Operating and maintenance costs are recurrent costs required for the ongoing operation of the business.

Those interested in the technical aspects of the financial modelling may wish to note that:

- The financial model equates revenue and costs over the longer term. The model commenced in 2004/05 and looks forward from the present ten years into the future (currently to 2017/18).
- For the Corporation, the Authority formulates seven sets of accounts: metropolitan water, metropolitan wastewater, metropolitan drainage, country water, country wastewater, country drainage and country irrigation. For the water boards, the Authority models one set of accounts (water) for each. Each set of accounts identifies the revenue requirement in the manner described above.
- In addition, for the Corporation, the Authority equates costs and revenue for each wastewater scheme and for each class of water schemes (towns are grouped on the basis of average cost).
- All demand risk is removed from the utilities on the basis that inflows and consequently the level of restrictions are beyond the control of the utilities. Any under or over-recovery of expenditure in the past is adjusted for in the future;
- Developer revenue and non regulated revenue is accounted for to ensure customers do not pay again for developer contributions already paid or gifted to the businesses.
- The model is in real dollar values of 2007/08.
- For the Corporation, the model is currently based on a smoothed transition to a set of target tariffs in 2013/14, then tariffs are held constant in real terms. The current transition period is based on the transition to full LRMC pricing for metropolitan customers.

[27] The calculation of the rate of return in discussed in Appendix 4.

- The rate of return is set in real terms and before tax.
- For the purpose of calculating depreciation, asset lives are assumed to be 30 years for desalination capital expenditure, 57 years for other new capital expenditure, and 41 years for existing assets.
- For the Corporation, cost projections are set using a base that is then adjusted for efficiency gains with level of service improvements allowed for.
- Customer number projections are based on population growth. Volume projections are based on customer number growth; per capita demand assumptions (assuming current water restrictions continue) and historical volume distribution.

3.1.2 Tariffs

This section explains how tariffs are currently set for water, wastewater, and drainage.[28] The tariffs listed are for the 2008-09 period.

Metropolitan Water

Method

- The metropolitan water accounts determine the cost of service to be recovered from metropolitan water customers.
- This cost is apportioned between residential and non-residential customers on the basis of the allocation that existed in 2005.

Tariffs

- For metropolitan residential customers, usage charges increase in four steps as usage increases (from $0.64 per kL to $1.71 per kL):
  - charges for volumes up to 950 kL per year are being phased-in to the estimate of LRMC that the Authority recommended to the Government in 2005 ($0.89 per kL). The phase-in will be complete by 2013/14. Charges for usage above 950 kL will remain at $1.71 per kL (adjusted for inflation).
- Residential customers also make an annual payment of $180.50.
- For metropolitan non-residential customers, charges are $0.98 per kL up to 600 kL, then $1.04 per kL up to 1,100,000 kL then $1.03 per kL.
  - These charges are being phased-in to $1.71 per kL by 2013/14.
- Non-residential fixed charges are based on meter size, ranging from $500 for a 20mm meter to $153,000 for a 350mm meter.

Country Water – Water Corporation Customers

Method

- The country water accounts determine the cost of service to be recovered from country water customers.
- Country towns are grouped into five groups for the purpose of residential charging.

[28] Other regulated tariffs of the Corporation are outlined in Appendix 3.

  - The grouping is done on the basis of net demand cost per kL of each town.[29]
- Towns are allocated to 15 groups for the purpose of non-residential charging. The reason for more groups for non-residential customers is to minimise the jump in charges that would otherwise occur when towns are reassigned to a higher group (residential customers are insulated due to the uniform pricing policy).

Tariffs

- Residential customers pay the metropolitan fixed charge and metropolitan usage charges up to 300 kL in the South (500 kL in the North).
- Tariffs are being transitioned to a four-tier structure:
  - tier 1 is the uniform tariff;
  - tier 4 is the lower of the net demand cost per kL for the group of towns or the cap, which is set at $5 in real dollars of 2006;
  - the tariff for tiers 2 and 3 are calculated on the basis that the percentage increase between tiers is constant.[30]
- Non-residential customers pay a single usage charge (equal to the Tier 4 charge). The Government decided to not have CSOs go to non-residential country customers. The fixed tariffs are the same as non-residential metropolitan fixed tariffs.

Country Water – AQWEST Customers

Method

- AQWEST's tariffs are currently set on the basis that their tariffs are maintained at constant values in real terms.

Tariffs

- Charges to residential customers increase in five steps as usage increases (from $0.42 per kL to $2.55 per kL).
- Residential customers also make an annual payment of $100.00.
- For non-residential customers, charges are currently $0.67 per kL up to 1000 kL and $1.00 per kL above that level of usage.
- Non-residential fixed charges are based on meter size, ranging from $299.20 for a 20mm meter to $16,830.00 for a 150mm meter.

[29] Net demand cost per kL = (gross cost of service – non-regulated revenue – fixed revenue) / (commercial volume + residential volume). The thresholds for allocating towns to groups are calculated as the average of two adjacent usage charges (which results in a town being assigned the tariff that most closely relates to its net demand cost per kL).

[30] The implication of this method is that tariffs will only change if either the uniform tariff changes or the cap changes. However, if a town's net demand cost per kL changes significantly (in real terms), then it would be reclassified to a different group.

Country Water – Busselton Water Customers

Method

- Busselton Water's tariffs are currently set on the basis that their tariffs are maintained at constant values in real terms.

Tariffs

- Charges to residential customers increase in five steps as usage increases (from $0.44 per kL to $2.65 per kL).
- Residential customers also make an annual payment of $113.20.
- For non-residential customers, charges are currently $0.81 per kL up to 1000 kL and $1.15 per kL above that level of usage.
- Non-residential fixed charges are based on meter size, ranging from $362.35 for a 20mm meter to $20,307.10 for a 150mm meter.

Metropolitan Wastewater

Method

- The metropolitan wastewater accounts determine the cost of service to be recovered from metropolitan wastewater customers.
- Cost increases are apportioned between residential and non-residential customers on the basis that the current relativity (that from 2004/05) is maintained.

Tariffs

- Residential wastewater charges:
  - Based on gross rental value and a rate in the dollar of GRV.
  - The current tariffs are 4.75 cents for each dollar of the first $12,400 of the rateable value and 1.62 cents for each dollar thereafter.
  - Range from a minimum of $275.90 per year. There is a maximum charge of $687.50 per year for country customers, but no maximum for metropolitan customers.
- Non-residential wastewater charges:
  - Fixed charge is based on number of fixtures (toilets and urinals) – assumed to grow at a certain rate. The fixed charge is cumulative with charges declining and then increasing per additional fixture.
  - Usage charge is based on estimated discharge of water consumption. The discharge factor is based on the average discharge for the year.

Country Wastewater

Method

- The country wastewater accounts determine the cost of service to be recovered from country wastewater customers.

- Costs are determined on an individual scheme basis.
- The costs are apportioned between residential and non-residential customers on the following basis:
  - non-residential revenue can be determined because the charges are set at the same levels as for metropolitan wastewater customers; and
  - the non-residential revenue is subtracted from the scheme cost to determine the revenue requirement for residential customers.[31]

Tariffs

- Residential wastewater charges:
  - there is a minimum and maximum charge;
  - there is a maximum rate in the dollar of GRV (12 cents per dollar of GRV); and
  - charges are being transitioned to be cost reflective (subject to the maximum charge and maximum rate in the dollar of GRV).
- Non-residential wastewater charges:
  - Country fixed and usage charges are the same as metropolitan charges.

Metropolitan Drainage – Water Corporation Customers

Method

- The metropolitan drainage accounts determine the cost of service to be recovered from customers.

Tariffs

- Metropolitan customers pay for drainage on the basis of GRV:
  - 0.501 cents per dollar of GRV for residential customers;
  - 0.603 cents per dollar of GRV for non-residential customer; and
  - a minimum of $63.10 for all customers.
- Note that this is the first time the Authority has been asked to consider drainage tariffs.

Country Drainage

Method

- The country drainage accounts determine the cost of service.

[31] Note that non-regulated revenue is also taken into account in determining the revenue requirement from country residential wastewater customers.

Tariffs

- Country customers are not charged for drainage services. The cost is met entirely by a CSO.

3.1.3 Comparison with Other Jurisdictions

Compared to the regulatory approaches applied in other Australian jurisdictions and to other utilities in Western Australia, there are a number of differences in the way that tariffs are calculated for the three water utilities.

First, the Authority provides recommendations to the Government as opposed to actually determining tariffs. This differs from the role of equivalent agencies in other jurisdictions which actually regulate water and wastewater tariffs such as IPART in New South Wales, the ESC in Victoria, and the ICRC in the Australian Capital Territory. While the Government has so far accepted most of the Authority's recommendations, it has the ability to set aside the Authority's recommendations if it so chooses.

Second, the Authority updates its advice to the State Government annually based on actual capital expenditure in the preceding year and forecasts of capital and operating expenditure for the coming ten years. An implication of this approach is that customers bear all the risk associated with incorrect forecasts of demand as the Authority effectively runs an 'unders-overs' account whereby any incorrect forecasts of demand, and subsequently revenues, are accounted for in the following years. This approach differs from that adopted in other jurisdictions where tariffs are calculated for a designated 'regulatory period', typically three to five years. Tariffs are locked-in (to be adjusted for inflation on an annual basis). This approach is often referred to as 'incentive regulation' as it provides an incentive for the regulated business to try and out-perform the forecasts. The incentive is created as the regulated business is able to keep any savings below the forecast level of costs. Such an incentive based approach may be particularly effective where the regulated business is a private sector business.

Third, there is no detailed investigation of capital expenditure by an independent regulator. Under a standard approach, the periodic reviews undertaken by the regulator examine the actual capital costs incurred over the preceding period and allow only those that are considered prudent and efficient to be included in the regulated asset base (upon which a return is subsequently calculated). Under the current approach, no oversight of incurred costs is undertaken before these costs are included in the asset base as part of the annual price adjustment process. Similarly, no detailed oversight of forecast capital expenditure occurs as part of the annual price adjustment. However, with respect to the Corporation, while the Authority does not undertake an audit of costs, all expenditure is subject to sign-off by the Government's Cabinet Expenditure Review Committee.

3.2 Scope for Efficiency Gains

This section discusses two components of the revenue requirement: operating expenditure and capital expenditure.

3.2.1 Operating Expenditure

Operating costs cover all expenditure related to the overall operation of the business and include water and wastewater treatment plant operation (power, chemicals, labour,

materials), plant and equipment, administration, salaries, contracted services and overheads.

For the purposes of this inquiry, the Authority will invite the water utilities to indicate their operating cost targets. The Authority will review these forecasts to determine:

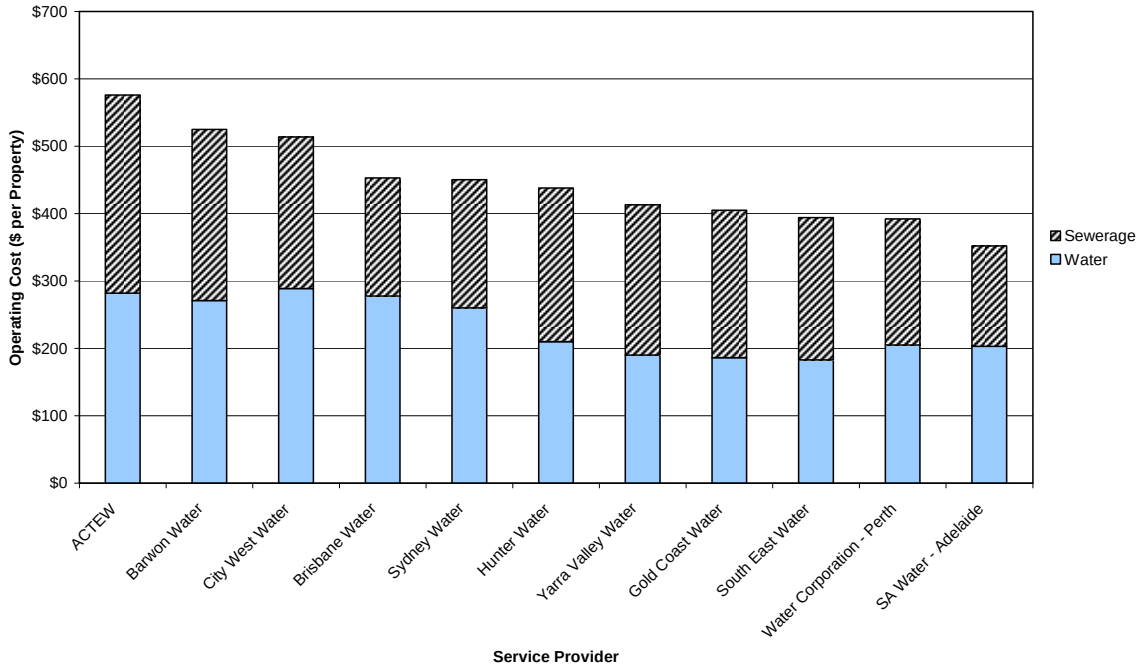
- whether the forecasts represent reasonable projections of costs that would be incurred by a prudent and efficient service provider in undertaking the activities to which the cost forecasts relate;
- whether any assumptions made by the water utilities as to efficiency gains that may be made over the period are appropriate; and
- whether the cost forecasts of the water businesses should be adjusted to incorporate any efficiency gains over and above those already contemplated.

In assessing forecasts of operating expenditure for each of the water utilities, the Authority will engage a consultant to review the processes that drive operating expenditure and make comparisons with similar businesses throughout Australia and internationally. In undertaking this analysis, the Authority recognises that the use of benchmarking is problematic: the number of suitable comparator businesses in Australia is small, and difficulties arise in determining whether differences in operating cost performance between businesses are due to different efficiencies, or could be explained by other factors (e.g., geography, demography, hydrology, climate, technology, social factors).

The Authority notes that operating costs per property for the three water utilities are low compared to other utilities.

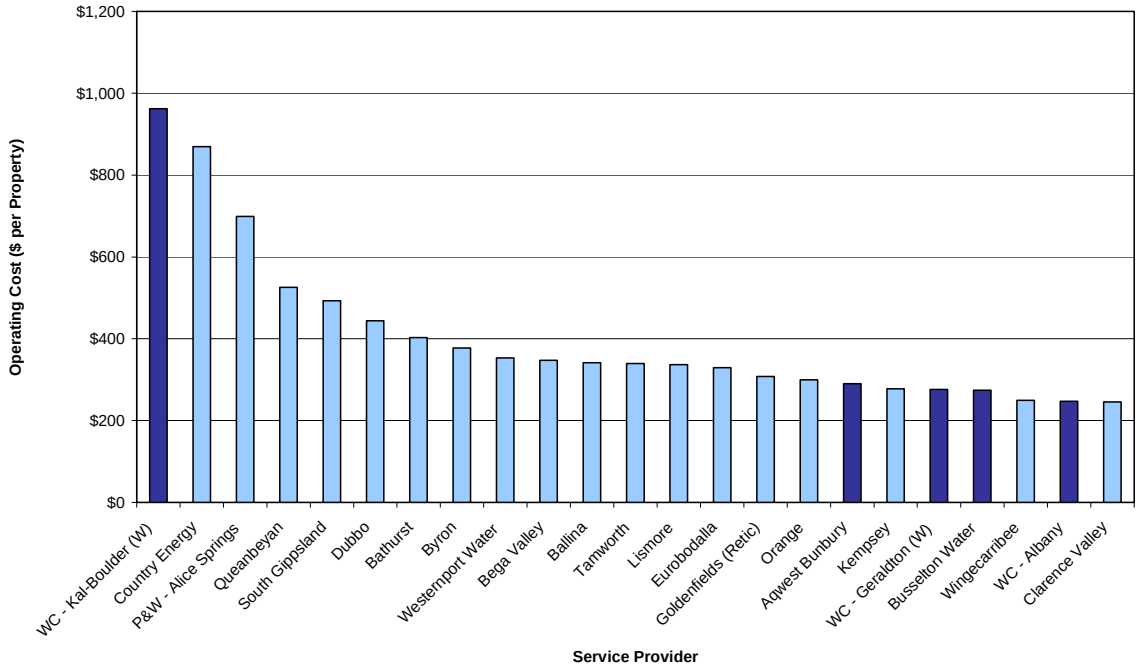
Figure 3.1 shows that Water Corporation's Perth operations have a total operating cost per property that is lower than the costs of the other large water utilities except for SA Water. Figure 3.2 shows that AQWEST and Busselton Water have total operating costs per property that are in the bottom third when compared to water utilities of a similar size.

Figure 3.1 Operating Costs for Water and Sewerage Services ($ per Property) in 2006-07 – Service Providers with 100,000 Customers or More



Source: Water Services Association of Australia Ltd, National Water Commission and NWI Parties (2008), National Performance Report 2006-2007: Urban Water Utilities.

Figure 3.2 Operating Costs for Water and Sewerage Services ($ per Property) in 2006-07 – Service Providers with 10,000 to 20,000 Customers



Source: Water Services Association of Australia Ltd, National Water Commission and NWI Parties (2008), National Performance Report 2006-2007: Urban Water Utilities.

The methodological issues for this inquiry include:

- The appropriateness of applying the Office of Water Services UK (**OfWAT**) and IPART methods that distinguish between efficiency gains possible for the comparatively less-well performing businesses by adopting existing best practice technologies and practices ('catch-up' efficiency gains), and efficiency gains made possible by improvements in technology and business practice emerging during the future regulatory period ('continuing' efficiency gains).
- Whether the development of incentives should incorporate both 'carrot' and 'stick' incentives. Under such an approach, part of the assumed efficiency gains is reflected in forecasts of operating costs and prices (resulting in lower prices and benefits to service customers), and the benefits of the remainder of the efficiency gains can be captured by the business as additional profit.
- Whether to apply the efficiency target to a base measure of operating expenditure, which excludes variations in operating expenditure due to improvements in service levels, or to the total level of operating expenditure (for the Corporation, the Authority has previously applied an efficiency target to base operating expenditure.)

Issues

- Should efficiency targets distinguish between 'catch-up' efficiency gains and 'continuing' efficiency gains?
- Should the development of incentives incorporate both carrot and stick incentives?
- Should efficiency targets apply to total operating expenditure or to a measure that excludes changes in operating expenditure due to improvements in service levels?

3.2.2 Capital Expenditure

The Authority intends to focus on whether there is scope for the water utilities to improve the cost-effectiveness of project delivery.

Capital costs are the costs of purchasing and constructing new physical assets used to provide services. For the purposes of this inquiry, all three of the water businesses will be required to submit forecasts of costs to the Authority and the processes they use to achieve cost-effectiveness.

In assessing the processes for project delivery for each of the water businesses, the Authority will engage a consultant to make comparisons with similar businesses throughout Australia and elsewhere.

Issues

- In reviewing each water utility's processes for undertaking capital expenditure, are there any particular matters the Authority should consider?

3.3 Rate of Return

Investors have a right to expect a return on the value of their assets equal to the cost of capital associated with the regulated activities. Assets are often financed by a combination of debt and equity. Thus, the returns from an asset must compensate both the providers of debt and the equity holders. For this reason, the term "Weighted Average Cost of Capital" (**WACC**) is often used to refer to the average cost of debt and equity capital, weighted by a proportion of debt and equity to reflect the financing arrangements for the assets.

In setting a rate of return, the objective is to ensure that investment funds continue to flow to the regulated industry, while at the same time ensuring that customers pay no more than is necessary to provide the service efficiently.

The rate of return determined by the Authority is used as an input for setting allowable revenues for the water utilities. The Authority calculates the WACC for the Water Corporation, AQWEST and Busselton Water by:

- using the Capital Asset Pricing Model (**CAPM**) to estimate the return on equity; and
- calculating a pre-tax real WACC.

For further details on how the Authority calculates the rate of return, see Appendix 4.

In previous advice, the Authority adopted the same WACC assumptions for all three utilities with the exception of the assumption as to the level of financial gearing of the business and the associated equity beta value (which captures the exposure of the business to risks that cannot be eliminated by investors through portfolio diversification).

- Based on empirical evidence from the cost structures of other utilities, a standard gearing assumption for large utility businesses – of similar size to the Water Corporation – is 60 per cent. However, for AQWEST and Busselton Water such a level of gearing may not be achievable given the relatively small sizes of the businesses and the exposure of the businesses to cost variations. For this reason, the Authority's previous advice assumed a lower level of gearing of 40 per cent for the water boards (and a lower associated equity beta value).[32]

[32] The assumed level of financial gearing of the businesses affects the appropriate assumption as to the equity beta. For a given asset beta (i.e. the level of exposure of the entire business to systematic risk, rather than just the returns to equity), the equity beta will vary in proportion to the level of financial gearing. That is, a lower level of financial gearing will correspond to a lower equity beta. For AQWEST and Busselton Water, an equity beta value of 0.60 at 40 per cent gearing is equivalent to an equity beta of 0.80 for the Water Corporation at 60 per cent gearing.

In the 2005 Inquiry, the Authority calculated a real pre-tax WACC of 5.63 per cent for the Water Corporation and 5.87 per cent for AQWEST and Busselton Water. Increases in the real risk free rates and debt premia since the 2005 inquiry are likely to have led to an increase in the rate of return.

Issues

- The Authority invites the water utilities and others to consider appropriate parameters for determining the rates of return.

3.4 Cost Allocation

A particular area of focus for this inquiry is whether the allocation of costs between commercial and residential customers is accurate. For the Corporation, the Authority has previously assumed, in the absence of better information:

- The sharing of costs between commercial and residential metropolitan water customers is maintained at its 2004/05 level.
- The sharing of costs between commercial and residential metropolitan wastewater customers is maintained at its 2004/05 level.
- Country residential wastewater customers pay, if they are not on the cap, the amount required to cover costs in each country scheme after revenue from commercial wastewater customers is taken into account. This situation arises because country commercial wastewater customers pay the same tariffs as metropolitan commercial customers.

During this inquiry, the Authority will be investigating whether a better method of allocating costs between commercial and residential customers can be achieved. For example, in relation to allocating the costs of water service provision between commercial and residential customers, one approach that will be considered is to:

- align the 20mm meter charges for residential and commercial customers (currently residential customers pay $162.60 per year and commercial customers pay $544.50 per year); and
- set charges for commercial customers with larger diameter meters on the basis that the cost increases with the square of the diameter of the meter (which is actually the same principle as currently applies).

However, relative to the current approach, this approach would have the result of shifting costs from commercial to residential customers (because the residential fixed charge is currently significantly lower than the commercial 20mm meter charge).

In relation to the costs of wastewater service provision, costs between commercial and residential customers could be allocated on the basis of the relative levels of discharge into the sewers, which is information that is understood to be available.

Another issue that impacts on cost allocation between commercial and residential customers in the country is the current policy of charging commercial wastewater customers in the country the same tariffs as apply to commercial wastewater customers in

the metropolitan area. As indicated above, this policy could result in residential customers paying either too much or too little for their wastewater service in comparison to the actual costs of providing the service. One approach that the Authority is intending to consider is to discontinue the uniform charging approach and allocate costs on a scheme by scheme basis between residential and commercial customers on the basis of their relative discharge into the sewer.

Issues

- Should the current method for allocating costs of water service provision in the metropolitan area between residential and non-residential customers, which is based on maintaining existing relativities, be modified in some way to achieve a more cost reflective allocation of costs?
- Should the current method for allocating costs of wastewater service provision in the metropolitan area between residential and non-residential customers, which is based on maintaining existing relativities, be modified in some way to achieve a more cost reflective allocation of costs?
- Should country non-residential wastewater charges be set equal to metropolitan non-residential wastewater charges?

3.5 Treatment of Inflation

The Corporation and Water Boards have historically sought an across-the-board increase in tariffs based on the inflation rate that has been provided by the Department of Treasury and Finance for the purpose of increasing the price of government services in the budget. The inflation rate is the average annual four quarter increase in the Perth Consumer Price Index (**CPI**) (for the four quarters to September).

More generally, the approach to annual tariff escalation is to use the most recent annual increase in the eight city average CPI.[33] The main reason for using an Australia-wide index is that Australia-wide inflationary expectations are built into domestic capital markets and therefore into the rate of return that is applied to determine an appropriate revenue requirement. It would be inconsistent to set the revenue requirement for a utility on the basis of one inflation measure but allow the utility to escalate its tariffs on the basis of a different inflation measure. Further, such an approach could result in a utility earning revenue that exceeds its costs for a period of time (although it would be expected that over time the two inflation measures would converge).

Applying the standard regulatory approach to tariff escalation to the water utilities could place the water utilities under greater pressure to make productivity gains during times when the eight city average CPI is increasing at a lesser rate than the Perth CPI, which is the situation at present. However, the Perth CPI has been significantly impacted by increases in housing costs, which may be unrelated to the water utilities' cost drivers.

[33] The use of the eight city average is consistent with approaches adopted by regulators in other jurisdictions such as the Independent Pricing and Regulatory Tribunal in New South Wales, the Independent Competition and Regulatory Commission in the Australian Capital Territory and the Essential Services Commission in Victoria.

A further reason why it may not be appropriate to base the cost escalation increase on local factors is that two thirds of a water utility's costs typically relate to:

- a return on assets, which is a cost influenced by financial markets; and
- depreciation, which is the recovery of capital expenditure sourced more broadly than from the local market.

Issues

- What is the appropriate inflation measure to apply to the escalation of tariffs on an annual basis?

3.6 Treatment of Underground Network Assets

As part of the Inquiry on Urban Water and Wastewater Pricing in 2005, the Corporation indicated that it may consider infrastructure renewals accounting in the future. OfWAT has applied this approach to the England and Wales water industry since 1989. OfWAT defines infrastructure assets, in broad terms, as underground assets, such as pipes. Non-infrastructure assets are above ground assets such as treatment works.

Under renewals accounting, infrastructure assets are not depreciated. Instead, the network is treated as a single asset system to be maintained in perpetuity, and an annual charge is made against profits for the costs of maintaining and replacing the network infrastructure at its current level of operations. OfWAT calculates the infrastructure renewals charge on the average forecast level of expenditure over a 15-year period.

From the point of view of recovering costs in the future, the difference between the OfWAT approach and the Authority's current approach may not be substantive. Under the current approach, all efficient capital expenditure, which includes capital expenditure to replace the network infrastructure, is recovered from customers (note that the capital expenditure for distribution assets is not recovered from customers as it is paid for by developers). In comparison, under the OfWAT approach, the amount that is recovered from customers is an average of the last 15 years, which for a long lived network would be expected to provide a reasonable estimate of costs for the next 15 years.

Issue

- What is the appropriate treatment of infrastructure network assets for the purpose of determining the revenue requirement for a water utility?

3.7 Treatment of Developer Contributions

There are alternative methods for treating developer contributions so that customers making the contributions do not pay twice for the development-related assets that they fund. Each method results in the same revenue requirement from customers.

Note that developer contributions are in two forms: either in cash or in the form of gifted assets.

The current approach applied by the Authority is to:

- treat gifted assets as capital expenditure (which means it gets added to the asset base, and costs are calculated for a return on those assets as well as depreciation); and
- treat gifted assets as revenue in the year the gifted assets were received (which exactly matches the additional costs that are created from treating gifted assets as capital expenditure); and
- treat cash contributions as revenue; and
- calculate tariffs at the level required to balance costs and revenue, which means that any revenue acquired from developers reduces the tariff revenue required to be raised from customers.

An alternative approach applied by regulators such as IPART and the ESC is to:

- not treat gifted assets as capital expenditure (which means they do not get added to the asset base); and
- treat cash contributions as revenue; and
- calculate tariffs at the level required to balance costs and revenue, which means that any (cash) revenue acquired from developers reduces the tariff revenue required to be raised from customers.

There are pros and cons of each approach. Under the Authority's approach the regulatory asset value is a measure of the actual value of the business in its entirety, which is not the case with the alternative approach. The Authority's approach is also consistent with existing taxation standards, which is useful because the Authority also models the water utilities' statutory accounts for the purpose of advising the Government on the financial implications to the State as a result of varying tariffs.

An issue with the Authority's current approach is that developer contributions can be lumpy, which can result in tariffs being more variable under the Authority's approach than under the alternative. However, the extent of this variation is moderated by the Authority's approach to modelling the financial flows over a period of 10 years. The lumpiness of developer contributions is smoothed as a result of this approach.

Issues

- How should the Authority treat developer contributions in its financial modelling of water utilities?

PART THREE: ISSUES SPECIFIC TO EACH UTILITY

4 Issues Specific To Each Utility

In addition to the issues raised in the preceding chapters, there are likely to be a wide range of issues specific to each utility that will need to be considered as part of this inquiry. Interested parties are invited to identify any issues that they are particularly concerned about.

For the Corporation, a particular set of issues that the Authority is intending to investigate includes:

- The reasons for the Corporation having the highest residential wastewater charges in the country (see Figure 1.1). The recent National Performance Report 2006-07 for urban water utilities showed that, of the eleven largest urban water and wastewater service provides (with 100,000 customers or more), the Corporation had the highest wastewater bills for a typical residential household, despite having one of the lowest operating costs for wastewater services in that category.[34]
- The billing frequency for water services. The Corporation bills its customers twice a year for their water consumption and annually for the annual service charge. A higher frequency of billing for water usage could improve the price signalling to customers. However, these benefits would need to be weighed against the additional administrative costs of more frequent billing.

A further matter identified by the Authority relates to the numerous different tariffs offered (and in many cases required by the Government to be offered) by the Corporation. These tariffs are outlined in Appendix 3. This inquiry provides a good opportunity to assess each of these tariffs to ensure they are appropriate and meeting their objectives.

A matter that was highlighted as part of the Authority's previous analysis of the Water Board's tariffs was the level of developer revenue that they each were receiving. In addition, the Authority's analysis as part of the Inquiry into Developer Contributions to the Corporation identified a set of principles for setting developer charges. The Authority will investigate, as part of this inquiry, the implications of applying those principles to the Water Boards.

Issues

- Are there any issues specific to each utility that warrant particular attention?

[34] Water Services Association of Australia (2008), *National Performance Report 2006-07: Urban Water Utilities*

APPENDICES

Appendix 1: Terms of Reference

INQUIRY INTO TARIFFS OF THE WATER CORPORATION, AQWEST AND BUSSELTON WATER

I, ERIC RIPPER, Treasurer and pursuant to section 32(1) of the *Economic Regulation Authority Act 2003* request that the Economic Regulation Authority (the Authority) undertake an Inquiry into the tariffs of the Water Corporation (as established by the *Water Corporation Act 1995*) the Bunbury Water Board (Aqwest) and the Busselton Water Board (as established by the *Water Boards Act 1904*).

In doing so, the Authority is to investigate and report on the following matters:

- the appropriate charging structures and recommended tariff levels for the Water Corporation, Aqwest and the Busselton Water Boards' water supply services;
- the appropriate charging structures and recommended tariff levels for the Water Corporation's wastewater services;
- the appropriate charging structures and recommended tariff levels for the Water Corporation's drainage services;
- the appropriate charging structures and recommended tariff levels for the Water Corporation's other regulated services.

The Authority must give consideration to, but will not be limited to, the following:

- the method used to determine the revenue requirements of each service provider;
- the operating and capital costs of providing services, with a focus on:
  - cost effectiveness in the supply of services; and
  - resources necessary to meet the required service standards.
- the appropriate rate of return on each service provider's assets;
- the efficiency of demand management activities;
- the impact of the recommendations on each service provider's net financial position;
- the impact of the recommendations on the Government's net financial position, in particular, net debt, dividends, tax equivalent payments and the level of Government funding (through Community Service Obligation Payments); and
- the environmental and social impact of the recommendations.

In developing its recommendations, the Authority is to have regard to the following policies:

- the pricing principles of the 1994 Council of Australian Governments water reform agreement and the National Water Initiative;
- the Western Australian State Government's Uniform Pricing Policy;
- the Western Australian State Government's Sustainability Policy;

- the Western Australian State Government's Community Service Obligations Policy; and
- the pricing mechanisms available to the utility service providers through the *Water Agencies (Powers) Act 1984* and the *Water Boards Act 1904*.

The Authority will release an issues paper as soon as possible after receiving the terms of reference. The paper is to facilitate public consultation on the basis of an invitation for written submissions from industry, government and all other stakeholders groups, including the general community.

A draft report is to be made available for further public consultation on the basis of an invitation for written submissions. A final report is to be completed by close of business, no later than 15 June 2009.

Appendix 2: Description of the Water Corporation, AQWEST and Busselton Water

The Water Corporation

The Corporation is a statutory corporation operating under the *Water Corporation Act 1995*. The Corporation was established as a commercially focused utility on 1 January 1996 following a restructuring of the water industry that also saw the roles of water resource manager (now the Department of Environment) and regulator (now the Authority) separated from the functions of the utility. The Corporation is governed by a Board of Directors acting in accordance with Corporations Law, and the Board is accountable to the Minister responsible for the *Water Corporation Act 1995*.

The Corporation is a vertically integrated water and wastewater business. It was established in 1995 and given the task of providing "sustainable water services to make Western Australia a great place to live and invest".[35] Prior to the creation of the Corporation, water and wastewater services were provided directly by the Western Australian Government. In undertaking the tasks associated with water and wastewater services, the Corporation must comply with the relevant health and environmental regulations.

The prices the Corporation charges for its services are determined by the Western Australian Government. In making its final determination of prices, the Government takes into account advice that is provided to Government through public processes by the Authority.

During the 2006-07 financial year, the Corporation had revenues of approximately $1.6 billion (including $360 million from the Western Australian Government for the provision of community service obligations) and an after-tax profit of $513 million. A dividend of $356 million was paid to the Western Australian Government, the Corporation's owner.[36]

AQWEST

Bunbury Water Board, trading as AQWEST is a statutory authority established under the *Water Boards Act 1904*. The Bunbury Water Board was established in 1905 and was operated in association with the Bunbury local government authority until 1997 when it was re-formed as a separate entity.

AQWEST provides potable water services to the Bunbury-Wellington region, including water sourcing, treatment, distribution and retailing operations. Water is sourced from the Yarragadee aquifer through 13 production bores and supplied to about 14,000 connections through 332 kilometres of water mains. About 72 per cent of water produced is supplied to residential customers and the remaining 28 per cent is supplied to non-residential customers. AQWEST does not provide wastewater services, which in AQWEST's region of operation are provided by the Corporation.[37]

[35] http://www.watercorporation.com.au/C/company_index.cfm?uid=6135-9990-9046-5900

[36] Water Corporation Annual Report 2007, pp 68 - 73.

[37] ERA, *Final Report on the Inquiry on Urban Water and Wastewater Pricing,* November 2005, pg 117.

During 2006-07, AQWEST had total income of approximately $9 million and an after-tax profit of approximately $1 million.[38]

Busselton Water

The Busselton Water Board, trading as Busselton Water, is a statutory authority established under the *Water Boards Act 1904*. The Busselton Water Board was established in 1906. Busselton Water is governed by a Board of Directors appointed by the Minister for the Environment and acting under powers created by the *Water Boards Act 1904*.

Busselton Water provides a potable water service to the town of Busselton and to surrounding areas, including water sourcing, treatment, distribution and retailing operations. Water is sourced from the Yarragadee aquifer through 8 production bores and supplied to about 8,700 connections through 232 kilometres of water mains. About 82 per cent of water produced is supplied to residential customers and the remaining 18 per cent supplied to non-residential customers. The business has an employee workforce of around 23 full-time-equivalent staff. Busselton Water does not provide wastewater services, which in Busselton Water's region of operation are provided by the Corporation.[39]

During 2006-07, Busselton Water had total income of approximately $7 million and an after-tax profit of approximately $2.5 million.[40]

[38] AQWEST Annual Report 2007 pg 22.

[39] ERA, *Final Report on the Inquiry on Urban Water and Wastewater Pricing,* November 2005, pg 151.

[40] Busselton Water Annual Report 2007, Financial Statements pg 2.

Appendix 3: Tariff Structure – Other Regulated Tariffs of the Water Corporation

Water Tariffs

- A wide range of variations to the standard residential by-law fixed charges apply (compared to the standard residential fixed charge of $180.50):
  - Land provided in one pilot metro suburb solely for garden purposes is charged an additional fixed charge (either $65.15 or $130.30 depending on the size of the land) for non-potable supplies;
  - Various customers in the metro area provided with exemptions to the fixed charge (e.g. land belonging to a religious body, land used as a public hospital, public school, public library, public museum, public art gallery, land used for charitable purposes, not for profit entities such as sporting clubs, societies and associations, land used for horse racing, greyhound racing and trotting, cemeteries);
  - Strata-titled or long term residential caravan bays ($126.80);
  - Community residential, which is land occupied as a communal property on which several family units dwell at the same time and is managed by the persons dwelling on the land or a committee of them ($90.25 for each notional residential unit). The community residential charges is based on the residential charge, with a built in 50 per cent concession, recognising that most residents are welfare recipients (pensioners).
- A range of variations to the standard residential usage charges apply (compared to the standard metro residential usage charges of $0.643, $0.828, $0.997, $1.423, $1.714):
  - Community residential ($0.321, $0.828 then the same, for metro community residential). As with the service charge, the community usage charge is based on the standard charge with a 50 per cent discount built in which recognises that most residents are welfare recipients;
  - For strata titled caravan parks in the metro area, each bay pays $0.643 for first 150kL then a rate linked to the highest non-residential metro usage charge ($1.043);
  - For strata titled caravan parks in the non-metro area, each bay pays $0.643 for first 150 kL then the highest non-residential usage charge for the town class.
- A range of variations to the standard metro non-residential usage charges (compared to metro prices of $0.983, $1.043, $1.028):
  - Commercial residential charges for dual use residential and non-residential properties. The first 150kL is charged at residential prices, recognising the residential component of water use;
  - Metro farmland ($108.3).
- Non-residential non-metropolitan:
  - Mining customers ($1.889);

  - Farmland ($1.083);
  - Institutional public, charitable ($1.042, $1.697);
- Coral Bay non-residential desalinated ($5.61);
- Local government standpipes ($1.083);
- Stock watering ($1.083);
- Metro hydrant standpipes ($1.043);
- Denham desalinated water. Charge of $0.51.7 / kL up to a quota with an $11.824 / kL thereafter.

Wastewater tariffs

- A range of variations to the variable metropolitan by-law charges apply:
  - Various customers in the metro area are provided with exemptions to the fixed charge (e.g. land belonging to a religious body, land used as a public hospital, public school, public library, public museum, public art gallery, land used for charitable purposes, not for profit entities such as sporting clubs, societies and associations, land used for horse racing, greyhound racing and trotting, cemeteries). Exemptions apply to all classifications (residential, commercial and vacant land). The exemption is from availability based charges with these customers paying a fixed charge for each fixture connected to sewer;
  - In all other cases, a charge equal to the number of fixtures multiplied by $163.30.
- Country exempt:
  - Institutional public ($163.30 for the first major fixture and $71.80 for each additional fixture thereafter);
  - Charitable purposes ($163.30 for the first major fixture and $71.80 for each additional fixture thereafter);
  - Community residential ($71.80);
  - General exempt - as with institutional public.
- Caravan bay ($200.70);
- Strata-titled storage unit and strata-titled parking bay ($60.15);
- Non-residential strata-titled unit pay either commercial charges (based on major fixtures) or the shared fixture charge (the charge for four or more fixtures);
- Land from which industrial waste is discharged into a sewer of the Corporation ($187.70);
- Variable charges for residential properties are determined using an amount for each dollar of the Gross Rental Value of the property:
  - Up to $9,300 (4.75 cents/$ of GRV);
  - Over $9,300 (1.62 cents/$ of GRV);
  - Subject to a minimum ($275.90).

- Vacant metropolitan non-residential not being land comprised in a residential property, a nursing park home, a caravan park , a connected metropolitan except or a strata-titled caravan bay:
  - An amount of 1.530 cents/$ of GRV;
  - Subject to a minimum in respect of any vacant land the subject of a separate assessment ($207.50).
- A range of variations apply in respect to wastewater charges for country areas. The rates are determined using a table in the *Water Agencies (Charges) By-laws 1987* using an amount for each dollar of the GRV of the property. The rates are subject to a minimum:
  - in the case of land classified as residential ($275.90);
  - in the case of land classified as vacant land ($181.60);
  - in the case of land not classified as residential or vacant land ($607.90);
  - subject to a maximum in respect of any land classified as residential or classified as vacant land and held for residential purposes ($687.50).
- Industrial waste discharged into the sewer of the Corporation pursuant to a major permit is uniform state-wide, charged based on the volume of discharge together with composition of the discharge and the quantity of contaminants in the discharge:
  - For volume (111.0 c/kl);
  - A range of charges from no charge for sulphate discharge with a concentration of up to 0.05 kg per kL or dissolved salts discharge with a concentration up to 1 kg per kL up to a charge of 342,465 c/kg for mercury discharge with a concentration of over 0.001 kg per day.
- A range of service charges exist for industrial waste:
  - Permit fee ($187.70);
  - Meter reading ($21.20);
  - Establishment fee – routine program or unscheduled visit ($105.50/hour);
  - Inspection fee – routine program or unscheduled ($116.05/hour);
  - Production evaluation – routine program – N/A;
  - Production evaluation – unscheduled visit ($132.40/hour);
  - Grab samples – routine program ($246.95);
  - Grab samples – unscheduled visit (at cost);
  - Composite samples – routine program ($579.70);
  - Composite samples – unscheduled visit (at cost);
  - Non-permit holders discharging industrial waste ($105.50/hour);
  - Discharging industrial waste from an open area ($1.25/square metre);
  - Fats, oils and grease management charge ($87.50), introduced in 2008/09.

Drainage

- Drainage charges are calculated based on either fixed charges or variable charges.
- Fixed charges apply for a strata-titled caravan bay ($18.95) or strata-titled storage unit and strata-titled parking bay ($7.80).
- Variable charges apply in all other circumstances and is calculated using an amount for each dollar of the gross rental value of the property:
  - Land in a drainage area within the meaning of the *Metropolitan Water Authority Act 1982* classified as residential or semi-rural residential (0.501 cents/$ of GRV subject to a minimum of $63.10);
  - Land in a drainage area classified as vacant land (0.400 cents/$ of GRV subject to a minimum of $63.10);
  - Land in a drainage area within the meaning of the *Metropolitan Water Authority Act 1982* other than those mentioned above (0.603 cents/$ of GRV subject to a minimum of $63.10).

Discounts and Additional Charges

- Discount if an account is paid on or before 31 July in the year the charge was incurred ($1.50);
- Additional charges ranging from $1.50 to $3.00 if instalment payment arrangements are made with the Corporation (does not apply to pensioners or seniors);
- Two different rates of interest are applicable to outstanding amounts as a result of special payment arrangements made with the Corporation (5.36 per cent per annum and 6.36 per cent per annum);
- Concession charges apply for retirement village residents who were liable for a charge prior to 1 July 2005 and that person is also liable to pay a charge after 1 July 2005. The concession to be allowed is 25 per cent of the charge, or the amounts set out below, whichever is the lesser amount:
  - Charge for water supply ($78.95);
  - Charge for sewerage ($156.00);
  - Charge for drainage ($16.50).
- Interest on overdue amounts (13.99% per annum).

Water Supply Charges for Government Trading Organisations and Non-commercial Government Property

- Government trading organisations and non-commercial Government property are subject to an annual fixed charge based on the meter size and subject to a minimum charge where the meter is not served by the Corporation. Charges are based on service connection (as with exempt properties generally) rather than service availability;
  - Meter size of 20mm or less ($500.30);
  - Meter size of 350mm ($145,216);

  - Minimum charge ($500.30).
- A volumetric charge for metropolitan users for:
  - The first 600 kL (98.3 cents);
  - 601 kL to 1,100,00 kL (104.3 cents);
  - Over 1,100,000 kL (102.8 cents).
- A volumetric charge for country users according to the town/area in which the property is situated:
  - Up to 300 kL (104.2 cents kL to 375.7 cents kL;
  - Over 300 kL (169.7 cents kL to 559.1 cents kL).

Appendix 4: Rate of Return

Estimating the Rate of Return

Assets are often financed by a combination of debt and equity. Thus, the returns from an asset must compensate both the providers of debt and the equity holders. For this reason, the term "Weighted Average Cost of Capital" (**WACC**) is often used to refer to the average cost of debt and equity capital, weighted by a proportion of debt and equity to reflect the financing arrangements for the assets, i.e.,

$$WACC = R_e \frac{E}{V} + R_d \frac{D}{V};$$

where R_e is the return on equity, R_d is the cost of debt, E/V is the share of equity and D/V is the share of debt such that $V = E + D$.

The WACC is an estimate of the post-tax (cash) return on assets. Calculating the WACC consists of:

- determining the (post tax) Rate of Return on equity R_e
- determining the Cost of Debt R_d
- setting the benchmark financing structure (D/V and E/V).

Determining the Rate of Return on Equity (R_e)

There are several approaches to estimating the expected rate of return on equity, of which the Capital Asset Pricing Model (**CAPM**) is the most widely used by the finance community, regulated businesses and by regulators of utility industries in Australia.[41]

Under the CAPM model, the total risk of an asset can be divided into systematic and non-systematic risk. Systematic risk is a function of broad macroeconomic factors (such as interest rates) that affect all assets and cannot be eliminated by diversification of the businesses asset portfolio. In contrast, non-systematic risk relates to the attributes of a particular asset, with this risk managed by portfolio diversification.

The most common formulation of the CAPM estimates directly the required return on the equity share of an asset as a linear function of the risk free rate plus a component to reflect the risk premium that investors would require over the risk free rate:

$$R_e = R_f + \beta_e \left(R_m - R_f\right)$$

where R_e is the required rate of return on equity, R_f is the risk-free rate, β_e is the equity beta and (R_m-R_f) is the market risk premium.

The key parameters that the Authority has to assess for the CAPM model are the risk free rate R_f, the market risk premium (R_m-R_f) and the equity beta β_e.

[41] Other models include Arbitrage Pricing Theory, the Fama-French Model and the Dividend Growth Model.

Risk Free Rate

The Authority prefers to use a 20-day moving average of observed rates of return on 10-year Commonwealth government bonds as an estimate of the risk free rate. Variations in this approach (with different averaging periods and different terms to maturity) normally would not have a material effect on the proxy risk free rate.

The risk free rate is calculated using the market data prevailing at the time that the Authority provides its final advice.

In the 2005 Urban Water report, the Authority used a nominal risk free rate of 5.23 per cent and a real risk free rate of 2.42 per cent, based on financial information available on 30 September 2005.

In a recent rail determination, the Authority estimated the nominal risk free rate from implied yields on nominal government bonds over the 20 trading days to 30 May 2008, which indicated a nominal risk free rate of 6.37 per cent. Together with the assumed inflation rate of 2.75 per cent, this nominal risk free rate implies a real risk free rate of 3.52 per cent.

The inflation assumption made by the Authority for the recent rail determination was based in part on statements by the Reserve Bank of Australia and forecasts by the Western Australian Treasury.

Market Risk Premium

The market risk premium (**MRP**) is the average return of the market above the risk free rate. One approach for estimating the MRP is to use historical data on equity premiums. Historically, equity premiums in Australia have been around 6 to 7 per cent, although recent evidence suggests that Australian MRPs have been declining over the past fifty years.[42]

Regulated businesses have previously taken the view that the MRP should be determined solely on the basis of observed historical equity premia, which typically indicate values of between 5 and 8 per cent (and favoring values greater than 6 per cent).

In regulatory decisions, the Authority and other regulators around Australia have consistently used an estimate of around 6 per cent for the MRP.[43,44]

Equity Beta

The systematic risk (beta) of a firm is the measure of how the changes in the returns to the firm's stock are related to the changes in returns to the market as a whole. Systematic risks are those risks that cannot be costlessly eliminated through portfolio diversification, such as unexpected changes in real aggregate income, inflation and long-term real interest rates.

[42] The Allen Consulting Group (2005), *Electricity Networks Access Code 2004: Advance Determination of a WACC Methodology*, Report to the Economic Regulation Authority.

[43] IPART (2008), *Review of Prices for Sydney Water Corporation's Water, Sewerage, Stormwater and Other Services, From 1 July 2008, Water — Draft Determination and Draft Report March 2008*.

[44] ICRC (December 2007), *Water and Wastewater Price Review, Draft Report and Price Determination*, Report 11 of 2007.

The equity beta (β_e) for an entity is a measure of the degree to which the returns to equity for that entity vary with the returns to the stock market in general. It reflects the exposure of the business to non-diversifiable risk (i.e. risk which cannot be avoided by holding the asset as part of a diversified portfolio of assets).

Since most regulated industries are not listed on the stock exchange, regulators commonly use proxy equity betas, based on beta values for other listed entities that have similar assets and face similar systematic risks. The most relevant comparators for deriving a proxy equity beta value for the Water Corporation are:

- other regulated water and sewerage service providers in Australia; and
- other regulated utilities in Australia (such as gas and electricity distribution).

The approach adopted to tariff calculation also affects the equity beta. As discussed in Section 3, the approach adopted by the Authority insulates the water businesses from any demand side risk. Therefore, the systemic risk of the business is reduced which in turn reduces the equity beta.

In the 2005 Urban Water Inquiry, the Authority assumed an equity beta of 0.8 for the Water Corporation and 0.6 for the water boards. Recent decisions by regulators of water utilities incorporated equity beta assumptions of 0.8-1.0 (IPART for Sydney Water), 0.65 (ESC for regional and rural water service providers), and 0.9 (ICRC for ACTEW).

Determining the Cost of Debt (R_d)

The cost of debt is commonly presented as a margin over the risk free rate. The calculation of a debt premium from observed yields requires characterisation of the regulated business' credit rating, and then selection of observations on yields for corporate entities that are comparable in terms of activities and credit rating. Generally, regulators have estimated a benchmark margin on the basis of the weighted average cost of debt for a typical debt portfolio rather than a regulated utility's actual cost of debt, so as to provide an incentive to minimise inefficient debt financing.

The debt margin can be seen to comprise two components:

- an interest rate premium over the risk free rate; and
- an allowance for transaction costs incurred in arranging the debt facilities, including gross underwriting and credit rating fees.

In the 2005 Urban Water Inquiry, the Authority assumed a total debt margin of 112.5 basis points. Given the current state of global credit markets and potential effects on the cost of corporate debt, debt margins are significantly greater than in 2005.

For example, in a recent rail determination, which was based on recent capital-market evidence on debt margins, the Authority applied debt margins of 302 basis points for the (assumed BBB+ rated) freight network and 251 basis points for the (assumed A rated) urban network. In addition, the Authority provided for debt raising costs of 12.5 basis points.

Setting the Benchmark Financing Structure (D/V and E/V)

Australian utility regulators have conventionally assumed a benchmark debt-to-asset (*D/V*) or gearing ratio of 60 per cent, with an equity-to-asset (*E/V*) ratio of 40 per cent. In the

2005 Inquiry, the Authority used a benchmark gearing ratio of 60 per cent for the Corporation. This is the same ratio applied by the Authority in assessing rates of return for gas pipelines, electricity networks and rail and is in line with current regulatory practice in Australia.

For the water boards, the Authority assumed a gearing ratio of 40 per cent, given the relatively small sizes of the businesses and the exposure of the businesses to cost variations.

Choice of WACC – Pre-tax Real or Other?

The CAPM and WACC models provide estimates of post-tax returns to investors. However, the revenue benchmarks used to determine regulatory price controls are based on pre-tax revenue streams. This means that regulators need to make assumptions about regulated companies' tax liabilities and adjust either the WACC or the pre-tax cash flow streams. "Pre-tax" approaches transform the post-tax WACC into a pre-tax WACC by making an assumption about the effective tax rate for the regulated entity. "Post-tax" approaches involve modelling the taxation liabilities and calculating a tax allowance to be added to the cash flows of the regulated entities. For each approach, there is a corresponding cash flow definition.

The Authority has a preference for a pre-tax real WACC approach, using a forward transformation approach to convert the post-tax (Officer) WACC formulation to a pre-tax formulation.

With this method:

- the nominal post-tax (Officer) WACC is grossed up by $(1-T_c)$ to obtain the pre-tax nominal WACC;[45] and
- the pre-tax nominal WACC is then adjusted for inflation to obtain the pre-tax real WACC.

The Authority's preference for a pre-tax real WACC approach reflects that this method:

- simplifies financial modelling;
- is consistent with the regulatory practice adopted by Australian water regulators[46] that quarantines regulated businesses from inflation risk in regulated prices;
- is consistent with the preferences of major utilities in Western Australia (e.g. Water Corporation and Western Power); and
- allows consistency across regulated utilities in Western Australia.

A pre-tax WACC may be expressed in real terms (indexed for inflation) or nominal terms (no indexation for inflation). The choice to use a real or nominal WACC depends upon the choice of whether to model costs and returns in real or nominal terms.

While all regulators of utility industries in Australia use the CAPM to estimate the cost of capital, there is no clear precedent on the form of the WACC to be used (i.e. pre-tax or post-tax, real or nominal).

[45] T_c refers to the company tax rate.

[46] For example, both IPART and ICRC use a real pre-tax WACC.

- A pre-tax real WACC has been generally preferred by IPART and the ICRC.
- The ACCC and AER have used a post-tax nominal form of WACC in recent decisions.
- The ESC has used a post-tax real form of WACC in recent decisions.

Corporate Tax Rate

There has been some debate amongst regulators as to whether WACC determinations should use the statutory corporate tax rate (30 per cent), or effective tax rates.[47] Many companies have effective tax rates that are well below the statutory rate and there is a risk that using the statutory tax rate will overestimate the returns required by companies to meet tax obligations. However, verifying an individual company's effective tax rate would require modelling of taxation cash flows, which would be highly complex with substantial information requirements. The benefit of using the statutory rate as a benchmark assumption is that it is simple to apply.

The Authority has in previous WACC determinations assumed the effective taxation rate of the utility businesses to be equal to the statutory rate of corporate income tax.

Value of Taxation Credits

A franking credit is received by Australian resident shareholders for corporate taxation paid at the company level when determining their personal income taxation liabilities under the system of dividend imputation.

The actual value of franking credits, represented in the WACC by the parameter 'gamma', depends on the proportion of the franking credits that are created by the firm and that are distributed, and the value that the investor attaches to the credit, which depends on the investor's tax circumstances (that is, their marginal tax rate). As these will differ across investors, the value of franking credits may be between nil and full value (i.e. a gamma value between zero and one). A low value of gamma implies that shareholders do not obtain much relief from corporate taxation through imputation and therefore require a higher pre-tax income in order to justify investment.

Australian regulators are faced with varying and conflicting theory and evidence on the value of franking credits. The Authority is left with a need to make a determination on the value of gamma to be applied in the WACC determination with the major conceptual issues unresolved.

The Authority has previously assumed a value for gamma of 0.5 for water pricing purposes. This is consistent with recent decisions by the Authority and its predecessor agencies, and consistent with the Authority's recent determinations on a WACC methodology for the electricity and rail networks. It is also within the range used by other regulators.[48]

[47] See IPART (2002), *Weighted Average Cost of Capital: Discussion Paper*.

[48] Recent regulatory decisions have employed a gamma value of 0.5, except for IPART, which continues to use a range between 0.3 and 0.5.

Appendix 5: Summary of Issues

This appendix contains a summary of the issues raised throughout the paper.

- Are the current levels of service appropriate?
- What pricing principles should guide the setting of water usage charges?
- Should country water usage charges be set in relation to marginal cost?
- Should residential wastewater charges be decoupled from property values?
- Do interested parties have any concerns with the current approach to charging non-residential customers for wastewater services?
- What is the most appropriate charging basis for metropolitan customers for drainage services?
- Should customers in country towns pay for drainage services provided by the Water Corporation?
- Are current CSOs consistent with the objectives sought by government?
- Are current CSOs value for money or should they be modified in some way?
- Should the uniform tariff threshold be changed?
- Should discounts be provided for non-discretionary water usage, such as the first 150 kL of annual water usage?
- Should very high volume water users pay a penalty rate?
- Should demand restrictions and other demand management measures continue in the metropolitan area given the construction of the second desalination plant?
- Should demand restrictions be determined on a scheme-by-scheme basis as opposed to North and South of the State?
- Should tariffs be adjusted to take into account any environmental externalities, and if so, how?
- Should efficiency targets distinguish between ‘catch-up’ efficiency gains and ‘continuing’ efficiency gains?
- Should the development of incentives incorporate both carrot and stick incentives?
- Should efficiency targets apply to total operating expenditure or to a measure that excludes changes in operating expenditure due to improvements in service levels?
- In reviewing each water utility’s processes for undertaking capital expenditure, are there any particular matters the Authority should consider?
- The Authority invites the water utilities and others to consider appropriate parameters for determining the rates of return.
- Should the current method for allocating costs of water service provision in the metropolitan area between residential and non-residential customers, which is based on maintaining existing relativities, be modified in some way to achieve a more cost reflective allocation of costs?
- Should the current method for allocating costs of wastewater service provision in the metropolitan area between residential and non-residential customers, which is based

on maintaining existing relativities, be modified in some way to achieve a more cost reflective allocation of costs?

- Should country non-residential wastewater charges be set equal to metropolitan non-residential wastewater charges?
- What is the appropriate inflation measure to apply to the escalation of tariffs on an annual basis?
- What is the appropriate treatment of infrastructure network assets for the purpose of determining the revenue requirement for a water utility?
- How should the Authority treat developer contributions in its financial modelling of water utilities?
- Are there any issues specific to each utility that warrant particular attention?

Appendix 6: Glossary

Term	Definition
ACTEW	The water and wastewater service provider in the ACT
CAPM	Capital Asset Pricing Model
COAG	Council of Australian Governments
CPI	Consumer Price Index
CSO	Community Service Obligation
ESC	Essential Services Commission (Victoria)
ESCOSA	Essential Services Commission of South Australia
GRV	Gross Rental Value
ICRC	Independent Competition and Regulatory Commission (ACT)
IPART	Independent Pricing and Review Tribunal
LRMC	Long Run Marginal Cost
MRP	Market Risk Premium
OfWAT	Office of Water (England)
UTP	Uniform Tariff Policy
WACC	Weighted Average Cost of Capital