



INDEPENDENT CONSUMER AND COMPETITION COMMISSION

*Review into
Water and Sewerage
Pricing arrangement*

Issues Paper

25 March 2009

FOREWORD

The Independent Consumer and Competition Commission (“the Commission”) is a statutory body established under the provisions of the *Independent Consumer and Competition Commission Act 2002* (“the **ICCC Act**”). The Commission is vested with responsibilities under the ICCC Act to promote fair trading, regulate prices of certain goods and services, protect consumers’ interest and undertake other related responsibilities. Under the *Prices Regulation Act Chapter 320* (“**PRA**”), the Commission amongst others is responsible for the regulation of prices for the water and sewerage services.

The Commission has three Commissioners:

- **Thomas Abe**, Commissioner & CEO
- **David Dawson**, Associate Commissioner (Non-Resident)
- **Associate Professor Billy Manoka**, Associate Commissioner (Resident)

In 2004, the Commission undertook its first full scale review into the price setting arrangement of the two water companies in PNG; Eda Ranu and PNG Waterboard, to determine whether there was a need to continue to regulate prices of water and sewerage services, and if so, the appropriate form of regulation to apply for these services.

At the completion of the review in November 2004, the Commission released its Final Report and a five year price path commencing 1st January 2005 applied to water and sewerage services provided by Eda Ranu and Waterboard. These price directions have been used to set annual tariff for the water companies over the 5 year regulatory period ending 31st of December 2009. Unlike the Waterboard price path which remains unchanged, the Commission in 2007 and at the request of the Minister for Finance & Treasury undertook a specific review of Eda Ranu’s capital expenditure. Based on the findings of this review, Eda Ranu’s price path was amended for the remainder of the regulatory period; 2007 - 2009.

Under the provisions of Section 25A(6) of the PRA, and in view of the current regulatory period drawing to an end, the Commission has decided to undertake this comprehensive Review to determine whether the current price determinations and regulatory arrangements applying to water and sewerage services is to continue and if so, set appropriate price directions to apply for the next regulatory period commencing 1 January 2010.

In order for the Commission to reset the new regulatory arrangement for the Eda Ranu and Waterboard, the Commission must meet certain deadlines in terms of its preparation and release of the Issues Paper, Draft and Final Reports including making available copies of the Reports at those stages of the Review for public and industry consultation. Hence, the timetable for the current Review is as follows:

Event	Date
Release of Issues Paper	March 25, 2009
Close of submissions to the Issues Paper	April 27, 2009
Release of Draft Report & Draft Order	May 27, 2009
Close of submissions to the Draft Report & Draft Order	June 26, 2009
Release of Final Report & Final Order	July 29, 2009

The process of the Review undertaken by the Commission is transparent and designed to facilitate wider public consultation and involvement in this Review. To this end, the Commission is seeking to provide every opportunity for the general public to be informed of all aspects of the Review and encourages the general public, stakeholders and the water entities to participate throughout the Review process.

This Issues Paper is intended to provide a brief overview of the issues that will be considered as part of the public Review process. Hence, the Commission invites submissions and comments on all aspects of the Review process. The Commission, upon considering comments and submissions from the Issues Paper would release a Draft Report outlining its Draft Determination, and the corresponding Draft Order under the PRA. There will be opportunity for further submissions from the general public on the Draft Determination and the Draft Order, and these shall be considered in detail by the Commission prior to the Commission making its Final Determination and Final Order.

Those intending to make submissions should be aware that the Commission publishes all submissions made to its inquiries, unless there is a specific claim for information to be treated as confidential and the Commission agrees with the claim. Submissions are published at the Commission's website and are available for public viewing.

Submissions to this Issues Paper should be received by the Commission no later than 27th April 2009 and be directed to the Commission at the addresses below:

Mr. Thomas Abe
Commissioner & CEO
Independent Consumer and Competition Commission
1st Floor, Garden City, Angau Drive, Boroko
P O Box 6394
BOROKO, 111
National Capital District

For further information about making a submission or to obtain a copy of the Issues Paper, please contact Mr. Fego Ota Kiniafa, Acting Executive Manager for the Prices, Regulatory Affairs and Special Projects Division on telephone 325 2144 or by fax on 325 3980 and/or on email: fota@iccc.gov.pg. Copies of the Issues Paper can also be downloaded from the ICCC Website on www.iccc.gov.pg.

.....
THOMAS ABE
Commissioner

25 March 2009

CONTENTS

FOREWORD	2
1. INTRODUCTION	6
1.1. BACKGROUND	6
1.2. LEGAL REQUIREMENTS	6
1.3. FORMAT OF THE REVIEW PROCESS	7
2. THE STRUCTURE OF THE WATER MARKET	8
2.1. EDA RANU'S OPERATING ENVIRONMENT	8
2.2. WATERBOARD'S OPERATING ENVIRONMENT	8
2.3. OTHER OPERATING ENVIRONMENTS	8
2.4. CONSIDERATION OF COMPETITION ISSUES AND RATIONALE FOR REGULATION	8
2.4.1. ENTRY OF NEW PLAYERS IN THE MARKET	9
2.4.2. DEGREE OF COUNTERVAILING POWER	9
2.4.3. AVAILABILITY OF BOTTLED WATER AND OTHER MEANS OF WATER SUPPLY	10
3. LENGTH OF THE REGULATORY PERIOD	11
3.1. COMMISSION'S PREVIOUS DECISION	11
3.2. COMMISSION'S DECISIONS FOR OTHER REGULATED ENTITIES	11
3.3. DECISIONS IN OTHER JURISDICTIONS	11
3.4. PRELIMINARY VIEW ON LENGTH OF REGULATORY PERIOD	12
3.5. COST PASS THROUGH ARRANGEMENTS	13
4. LEGISLATIVE CONTEXT OF REGULATION	14
4.1. CURRENT LEGISLATIVE CONTEXT OF REGULATION	14
4.2. PROPOSED AMENDMENTS TO REGULATORY ARRANGEMENTS	14
5. FORM OF ECONOMIC REGULATION	16
5.1. CURRENT FORM OF REGULATION	16
5.2. PROPOSED FORM OF REGULATION	16
5.2.1. TOTAL REVENUE CAP	17
5.2.2. AVERAGE REVENUE CAP	17
5.2.3. PRICE CAP (MAXIMUM AVERAGE PRICE CAP)	18
5.3. PRELIMINARY VIEW ON THE PROPOSED FORM OF REGULATION	19
6. BUILDING BLOCK APPROACH	20
6.1. RETURN ON CAPITAL	21
6.1.1. REGULATED ASSET BASE	21
6.1.2. ROLL-FORWARD OF RAB	24
6.1.3. OVERVIEW OF WACC CALCULATION	25
6.2. RETURN OF CAPITAL	30
6.3. OPERATING AND MAINTENANCE EXPENDITURE	30
6.4. CAPITAL EXPENDITURE	31
6.5. SERVICE STANDARDS	32

<u>7.</u>	<u>PRICING ISSUES</u>	<u>34</u>
7.1.	PRICING STRUCTURE	34
7.1.1.	WATERBOARD'S PRICING STRUCTURE	34
7.1.2.	EDA RANU'S PRICING ARRANGEMENT	35
7.2.	LIFE LINE TARIFF	36
7.3.	ILLEGAL CONNECTIONS	37
7.4.	LEAKAGES	38
<u>8.</u>	<u>RELATED ISSUES</u>	<u>39</u>
8.1.	SOCIAL	39
8.2.	ECONOMIC	40
8.3.	ENVIRONMENTAL	40
<u>9.</u>	<u>APPENDIX</u>	<u>41</u>
	APPENDIX 1: SECTION 21(2A) OF THE PRICES REGULATION ACT CHAPTER 320 (AMENDED)	41
	APPENDIX 2: DATA TEMPLATES FOR EDA RANU AND WATERBOARD SUBMISSIONS	42

1. INTRODUCTION

The current regulation of water and sewerage services in PNG has been set in November 2004 and will continue to apply until 31st December 2009. This Review is conducted under Section 25A(6) of the PRA to determine whether the continuation of price regulation in its current form is necessary or otherwise from 1st January 2010.

In this Review, the Commission will decide whether to continue, amend or terminate the current regulatory arrangements for water and sewerage services in PNG. The Commission intends to undertake this Review and make appropriate determinations which are beneficial to both consumers and the participants in the water and sewerage Industry, being guided by the provisions of the PRA, and in particular Section 21 (2A). This Review process will be undertaken in a transparent and accountable manner.

1.1. Background

As part of the initial review in 2004, the Commission considered issues relating to the operating environment of the service providers, form of and need for regulation, length of regulatory period, type of services to be regulated, appropriate approach to setting price paths and other related issues.

Having considered these issues and others raised during the review process, the Commission established that there was limited competition in this industry. Each business had some degree of monopoly status in their respective business operating environment. For this reason, the Commission made the determination that water and sewerage services should continue to be regulated under Sections 10 and 21 of the PRA.

Based on this decision, a five year regulatory price path was set for Eda Ranu and Waterboard which commenced on the 1st of January 2005. Under these price directions, the Commission has applied a revenue cap form of regulation whereby the maximum average revenue ("MAR") that Eda Ranu and Waterboard are allowed to earn annually over the duration of the regulatory price path should be within the MAR which is calculated using a CPI + X formula. Waterboard was allowed to adjust its MAR annually by CPI + 7.8% for the five years and Eda Ranu to adjust its MAR by CPI + 11% and +10% respectively in the first two years, and subsequent adjustments by CPI + 5% per annum over the next three years.

The Minister for Treasury directed the Commission pursuant to section 25A(2) of the PRA to review Eda Ranu's price path for the period from 2007 noting that Eda Ranu did not incur the large proportion of the capital expenditure earmarked for the Port Moresby Sewerage System Upgrade Project which was factored into the initial price path. An amendment was made to Eda Ranu's price path for the remainder of the current regulatory period which resulted in an annual adjustment of CPI-2.5%. It took effect on 1st January 2008 and will end on 31st December 2009.

These price paths are designed to provide some level of incentives to encourage the water businesses to drive cost efficiencies in their running of the water and sewerage networks in PNG. The Commission expects that these efficiencies can eventually be reflected in one or a combination of improved quality of service and more affordable prices for consumers of water and sewerage services in PNG.

1.2. Legal Requirements

The current regulatory arrangement which applies to water and sewerage services are governed under Sections 10 and 21 of the PRA. The Government through the Minister for Treasury has declared the prices for water and sewerage services under Section 10 of the PRA for price control purposes while the Commission, under Section 21 of the PR Act, sets the maximum prices for the various categories of water and services provided by Eda Ranu and Waterboard.

The provisions of Section 25A (6) allows the Commission of its own accord to initiate a Review and Section 25B outlines the processes by which a review of a Price Order can be undertaken including the deadline, the requirement for the Commission to publish details of its decisions, and the form of a decision that can be undertaken as a consequence of the Review. Section 25C (3) specifies that in response to a Review, the Commission may determine to:

- Continue to operate the existing price control arrangements in their present form,
- Vary the existing price control arrangements, or
- Terminate the present price control arrangements.

The amended provisions of the PRA allow the Commission with some degree of flexibility to undertake this Review.

In undertaking this Review, the Commission, will have regard to the confidentiality and public disclosure provisions of the Act on information received from submissions and the current and prospective outlook for the water and sewerage industry in PNG.

1.3. Format of the Review process

The Review process will include the following broad stages;

- Public announcement of the inquiry and invitation for written submissions;
- Release of an Issues Paper discussing aspects of the inquiry and the major issues to be considered in the Review;
- Release of a Draft Report containing Draft Determinations and a Draft Order, and invitation for written submissions on these;
- Possible holding of a Public Hearing on the Draft Report and Draft Order; and
- Release of Final Report containing Final Determinations and a Final Order.

2. THE STRUCTURE OF THE WATER MARKET

The water market in PNG can be split into two segments: water (potable water) and wastewater (sewerage). These two segments of the market can be discussed in two different geographical markets as there are two declared water entities that provide water and sewerage services in PNG. The two declared water entities which provide water and sewerage services to the urban and semi-urban centres of PNG are PNG Waterboard (“Waterboard”) and Eda Ranu.

2.1. Eda Ranu’s operating environment

Eda Ranu provides water and sewerage services to residents in the capital city of PNG, Port Moresby and the nearby rural villages in the Central Province. It obtains its water supply from Sirinumu dam which is owned by PNG Power and pipes the bulk water to its water treatment plant at Mt. Eriama. The treatment of water at Mt. Eriama is done under a Concessionaire Arrangement through a build operate transfer (“BOT”) scheme with a Malaysian based company trading in PNG as PNG Water Limited. The treated potable water is then piped to residential homes and businesses for consumption. Waste is then returned to a treatment system through the drains of the sewer system.

2.2. Waterboard’s operating environment

Unlike Eda Ranu, Waterboard operates in each of the provincial towns of all other provinces including the semi-urban towns except in Goroka, Vanimo, Kerema, Mendi and Kieta and has a number of water networks which have varying concentrations of consumers. However, the nature of activities undertaken in each of the provinces is identical.

Waterboard obtains its water supply from rivers and waterbores and feeds its dams which are then treated at their treatment plants and piped to residential homes and businesses for consumption. Waste is then returned to a treatment system through the drains of the sewer system.

2.3. Other operating environments

In centres like Goroka, Mendi, Kerema and Kieta where Waterboard does not have a presence, the provincial government under the Department of Works or the Town Authority in each province provides the services to the residents at minimal charge. The Commission understands that under this arrangement, the water supply is piped from a dam to a main reservoir for treatment and is then piped to residential homes and businesses for consumption. Waste is then returned to a treatment system for disposal. Efficient and reliable services maybe lacking in these towns given the aging nature of the infrastructures and the inability of the provincial governments or the town authorities to refurbish the water and sewerage facilities to meet growing demands. The charge for consumption of water and waste water might be minimal which may not be reflective of the costs of providing the service and this has resulted in a deteriorating state of the network and inefficient services rendered by the provincial government.

The Commission is of the view that opportunity exists for Waterboard or any interested water business to operate in these centres and where necessary take over the assets from provincial government in these centres and improve the services.

2.4. Consideration of competition issues and rationale for regulation

In arriving at the 2004 Final Determination, the Commission decided that water and sewerage services should continue to be regulated under the PRA due to their natural monopoly status in

each of this particular business operating environment. Relevant issues relating to whether competition has occurred in the industry or not, and whether these businesses continue to operate on a monopoly basis, is discussed below under the following three heading:

- Entry of new players into the market; and
- Degree of countervailing power;
- Availability of bottled water and other substitutes.

2.4.1. Entry of new players in the market

Competition in the water and sewerage market is unlikely to occur under the current operating circumstance of the businesses which is vertically intergrated and highly capital-intensive and the fact that the perculiar business operating environment of the country including demand sufficient enough to sustain competing operators in one location presents a challenge for any new entry to the market. In addition, the majority of the population of PNG lives in the rural areas and are depend entirely on natural sources (rivers, creeks, rain) to obtain their water supplies and the demand for treated water supply in urban and semi-urban towns in the rural areas is considered insufficient to attract any new entrants to the market. This low demand coupled with high investment and sunk cost characteristics of this industry act as barrier to entry but there is potential for entry in certain locations in PNG where Eda Ranu and Waterboard do not have current presence. However, competition may occur in the long-run as the industry over time becomes more disaggregated and living standards improve. This possibility must be balanced with economies of scale in network management. The potential for competition to be realised in the water and sewerage network is quite limited and may only be possible if the network can be structured in such a manner that allows for instance competing bulk water supply and retailing operations seeking access to a particular water treatment facility or pipe transmission system. Although this is possible, the reality under the current circumstance is different and expansion of supply may take a while to happen in PNG. Therefore, the possibility of new player entering the existing markets in the short-run (i.e. next five years at least) is highly unlikely to occur in this industry.

2.4.2. Degree of countervailing power

Countervailing power exists where a water provider faces a consumer with market power or access to a credible threat of bypass. Water is a precious commodity and a necessity for sustaining life and health, and given that Eda Ranu and Waterboard have a monopoly over their businesses in each of their different operating environment, the Commission believes that there is no countervailing power held by consumers. To this end, Eda Ranu and Waterboard are the dual suppliers of water and sewerage services in their separate operating areas, and therefore consumers do not have much countervailing powers over both water entities. The water entities however can determine or exercise some form of market power over their customers.

Although the consumers have limited countervailing power, there are customers who struggle to receive better water services such as high water pressure and may resort to buying tanks and collecting rain water for their own consumption and thus bypassing the water companies and exercising some form of countervailing power. However, in centres like Port Moresby where there is infrequent rain and an irregular rainy season, it is impossible to bypass the water companies. In addition, there do not appear to be significant numbers of trucked potable water suppliers within the monopoly supply areas or a significant number of consumers involved in tank storage by-pass activity which might otherwise encourage the water companies to better adhere to their customers needs.

2.4.3. Availability of Bottled water and other means of water supply

The availability of bottled water in recent times has placed some form of competition in the niche markets especially in hotels, offices, conferences and meeting venues for direct consumption. However, for use of water for other purposes there is no competition provided to Eda Ranu and Waterboard. While in other centres that experience continuous rain, consumers may potentially resort to use of water tanks in an attempt to avoid the cost for using water supplied by Waterboard. The impact of this scenario could be seen as marginal but the total volume of water consumed over the period could impact the overall revenue of the current monopolies, limiting their opportunity to invest in extension and further connections to their networks.

Nonetheless, having considered the above issues, the Commission's preliminary view is that arrangement in sourcing, treating and distributing water supplies by Eda Ranu and Waterboard including the arrangement of disposal of sewerage have not changed since the 2004 Review and Eda Ranu and Waterboard still have the monopoly status in their operating environments. Therefore, the Commission considers that it is appropriate to continue price regulation of water and sewerage services.

The Commission is seeking comments or submissions from Eda Ranu, Waterboard and interested stakeholders on the current level of competition in the water and sewerage industry in PNG and the potential for new entry if any.

The Commission is seeking comments and submissions from the water businesses and any interested stakeholders on the existence if any on the form and shape of countervailing powers by consumers of water and sewerage services in PNG.

The Commission is seeking comments or submissions from the water businesses and any interested stakeholders on its preliminary view that continued regulation of water and sewerage services in PNG is appropriate.

3. LENGTH OF THE REGULATORY PERIOD

The current length of regulatory period was decided in the 2004 Final Determination to be a period of 5 years. This will expire on the 31st December 2009. The Commission envisages resetting the subsequent regulatory period through this Review process, and prior to the expiry of the current regulatory period. The following paragraphs discuss the regulatory periods seen in other industries and jurisdictions under the following three headings:

- Commission's previous decision;
- Commission's decisions for other regulated entities; and
- Decisions in other jurisdictions.

3.1. Commission's previous decision

The adoption of a five (5) year regulatory price path was designed to provide a degree of certainty in terms of their regulated revenues to enable Eda Ranu and Waterboard to undertake forward planning on their businesses. The Commission recognises that continued planning and investment in the business is required to improve reliability and quality of service. Also that this requires, among other things, regulatory certainty and a five year price path is considered sufficient under the PNG circumstances to provide that. The Commission further considers that the five year price path is sufficient enough to provide comfort to equity holders and external financiers and business partners of water and sewerage companies of the annual price adjustment mechanisms and regulated revenues required to meet their equity and debt obligations. The regulatory price path timeframe is also considered appropriate to allow for more accurate projection of volume growth and costs.

In determining the current Price Order the Commission sought to ensure that potential problems associated with an unavoidable departure from the price path was minimised and set out a cost pass-through mechanism for changes in corporate taxes, exchange rate, capital expenditure program and the dividend policy of the regulated businesses.

Furthermore, the Commission sought to reduce any unreasonable regulatory burden on the water and sewerage businesses and provide a simple mechanism for adjusting prices in order to ensure that regulated revenue was sufficient to recover efficient operating costs, undertake much needed capital investment and allow the water businesses to meet their debt and equity obligations in each year of the regulatory period.

3.2. Commission's decisions for other regulated entities

Apart from regulating prices for water and sewerage services, the Commission also currently regulates other state owned businesses such as PNG Power, PNG Ports Corporation, Post PNG and Telikom PNG. The Commission regulates these SOE businesses under a regulatory contract arrangement as provided under the ICC Act. Except Post PNG, the Commission, through the regulatory contracts, has determined a price path of ten years for each of the entities with review provisions to account for unforeseen circumstances that significantly impact on the operations of the businesses.

These regulatory arrangements were put in place by the Government after a major review into all the State Owned Entities in 2000 and 2001 as part of its broader policy on corporatisation and the potential privatisation of State owned businesses. It was noted during this review that service delivery of these businesses was found to be substantially substandard and a lot of work including statutory, regulatory and operational reforms were needed to improve these businesses. Part of that reform established the 10 year regulatory price path for these businesses to provide regulatory certainty for them to plan and conduct their affairs going forward.

3.3. Decisions in other jurisdictions

The Economic Regulation Authority (“**ERA**”) which is responsible for water regulation in Western Australia has set a ten-year price path for urban water and sewerage. The longer regulatory period adopted by ERA was to balance water consumption due to changing climate conditions and water supply constraints.¹ The ERA further argued that the longer regulatory period would allow sufficient flexibility to address under-recovery or over-recovery of revenue to the extent that this ensues from differences between actual demand and forecast demand.² The ERA’s decision on the ten-year price direction also includes periodical review of prices should the differences between actual and forecast demand be greater than the expected outcome.³

The Independent Competition and Regulatory Commission (“**ICRC**”) in the Australian Capital Territory released a price determination in April 2008 on water and sewerage pricing. The determination will apply for a period of five years.⁴ One of the reasons why ICRC adopted a five year price path was to discontinue annual reforecast of volumes and establish a mechanism whereby the water supplier will refund its customers in the next regulatory period if the actual revenue is greater than the forecast revenue by more than 3% across the first 4 years of the regulatory period. This approach is aimed at reducing the impact of uncertainty of water usage in the next regulatory period given the uncertainty on the restriction of water supply.⁵

3.4. Preliminary View on length of regulatory period

The Commission notes that different jurisdictions have varying lengths of regulatory period given their different operating environments for their water businesses. It is important to note that the technology in sourcing, treating and supplying water and returning wastes into the sewer system are more advanced in Australia than in PNG, hence the reasons for having the length of the regulatory period vary accordingly. However, the underlying factor to consider when setting the length of the regulatory period is to ensure that there is incentive for the regulated businesses to realise cost efficiency gains and that there should be minimal variance between the actual and forecast costs.

For purposes of this current inquiry, the Commission needs to consider whether the current regulatory period should be extended beyond five years or reduce from five years. The Commission’s preliminary view is that;

- a regulatory period which is longer than five years would increase the risk of significant variance between the actual and forecast costs;
- less than five year may not be appropriate for investment planning and efficiency reforms as the water and sewerage industry is capital intensive; and
- therefore would seek to have a regulatory period which minimises these risks whilst ensuring the regulated businesses are provided the opportunity to realise their efficiency gains and invest in their businesses.

On this basis, the Commission’s preliminary view is to maintain a five-year regulatory period for both Eda Ranu and Waterboard for the subsequent price direction.

¹ Economic Regulation Authority (“**ERA**”), *Final Report: Inquiry on Urban Water and Sewerage Pricing*, November 4, 2005, p.12, (www.era.wa.gov.au).

² ERA, November 4, 2005, p.13.

³ ERA, November 4, 2005, p.14

⁴ Independent Competition & Regulatory Commission (“**ICRC**”), *Final Report and Price Determination: Water and Sewerage Price Review*, April 2008, p.17, (www.icrc.act.gov.au/waterandsewerage).

⁵ ICRC, April 2008, p.16

The Commission is keen to consider views and comments either in support of this preliminary view or otherwise from Eda Ranu, Waterboard and the interested stakeholders on the appropriate length of the forthcoming regulatory period.

3.5. Cost pass through arrangements

Cost pass through events and processes are sometimes included in price control arrangements to allow the regulator to factor in the effects of unanticipated events which either raise or lower costs for the regulated business in a substantial manner.

In its 2004 Final Determination, the Commission allowed both PNG Waterboard and Eda Ranu in making their annual tariff submissions to request tariff adjustments to incorporate effects of a pass-through event seen during the regulatory period. Pass through events allowed for consideration by the Commission were;

- a change in taxes;
- an act of terrorism;
- major natural disaster; or
- an augmentation event requiring capital expenditure which was not forecast during the regulatory reset.

The Commission believes these pass through events are still relevant and proposes that these be included for the regulatory period commencing 1st January 2010.

The Commission welcomes views and comments from interested stakeholders on the appropriateness of the current cost pass through provisions, whether these should be included in the regulatory period commencing 1st January 2010, and whether or not any improvements to what currently exists is necessary.

4. LEGISLATIVE CONTEXT OF REGULATION

4.1. Current legislative context of regulation

Water and sewerage services are currently regulated under Sections 10 and 21 of the PRA. In accordance with these provisions, the Commission is mandated to set the maximum average prices for water and sewerage services provided by Eda Ranu and Waterboard based on the current five-year Price Order.

The provisions of the PRA also allows for a review of the Commission's decisions relating to water and sewerage services and more specifically, Section 25A of the PRA allows for such reviews to be undertaken either through a formal request by the Minister responsible for Treasury matters, the supplier of services, or at the Commission's own volition.

The amended legislative provisions, of the PRA also allows either party, the Minister or the regulator to intervene in the regulatory process as and when necessary, with or without the consent of the service providers to conduct a review of the Price Orders set by the Commission. To the extent that if such a situation were to occur, this could be viewed as disruptive and detrimental to the progress of established pricing arrangements as well as potentially causing some degree of uncertainty and consequential implications to the overall operations of the service providers, as a going concern. In the normal course of events, the Commission would only seek to review a Price Order towards the end of each regulatory period, so that new arrangements can be determined before the expiry of the Price Order, to provide certainty to the regulated businesses.

4.2. Proposed amendments to regulatory arrangements

The Commission has proposed to Eda Ranu and Waterboard to enter into a Regulatory Contract with the Commission. The regulatory contract ("the **Contract**") arrangement falls under Part III of the ICCA Act whereby the Minister declares state owned entities supplying goods and services to be a "Regulated Entity". The Commission currently has a regulatory contract with each of these regulated entities like Telikom PNG, PNG Power and Post PNG.

Generally, a regulatory contract provides a form of agreement and commitment between the regulated entity and the Commission. In essence, it provides the rules and parameters within which the regulator and the regulated entity can act in the future, and in doing so provide a degree of protection and independence between the regulator and/or the regulated entity. It also provides the basis upon which consumers can have a degree of confidence that the regulated business will endeavour to meet its obligations by adhering to set minimum service standards requirements. A Regulatory Contract among others specifies the following;

- Service standard requirements;
- Price or revenue path that will apply to the regulated entity over an agreed period;
- Pricing principles that are to be applied in reviewing the price or revenue path at some future dates;
- The process for translating the price or revenue path into tariffs for different consumer segments;
- Regulated pass through to account for unforeseen adverse effects on the business which change the costs from those envisioned in the price or revenue path;
- Capital expenditure requirements; and
- Penalties that will apply if the regulated entity fails to meet its obligations or the requirements which are built into the price path that form the basis of the Contract.

The benefit of having a Regulatory Contract is that any decision to review or amend the price or revenue path during the regulatory period will be based on a mutual agreement between the regulator and the regulated entity. The regulator cannot act on its own outside the rules specified

in the Contract and neither will the regulated entity. Decisions by the regulator relating to the implementation of the regulatory are also appealable to an independent Appeals Panel, prior to resorting to administrative review before the Courts of PNG. This tends to be a faster and less costly appeals process without limiting the ultimate recourse to the Courts. The contract would also allow for a mid-term capital expenditure review, to take into account unexpected changes to the investment expenditures of the regulated business.

Having stated the above, the Commission considers that water and sewerage service providers would benefit from the proposed regulatory arrangement and so would their customers, and it is the Commission's preliminary view that Eda Ranu and Waterboard to be regulated under Part III of the ICCA Act, rather than as declared businesses under the PRA.

The Commission is inviting comments, views and submissions from Eda Ranu, Waterboard and any interested parties on the proposed shift to regulate Eda Ranu and Waterboard under Part III of the ICCA Act, compared to the current regulatory arrangements and legislative provisions under the Prices Regulations Act .

5. FORM OF ECONOMIC REGULATION

5.1. Current form of regulation

The Commission has adopted a forecast cost-of-service approach to establishing both Eda Ranu's and Waterboard's efficient costs of operating their businesses and setting a revenue path according to a CPI+X formula. In deciding on this approach, the Commission was required to have regard to the following regulatory principles under Section 21(2A) of the PRA.

- a) the need to protect consumers and users of the declared goods or services from misuse of market power in terms of prices, pricing policies (including policies relating to the level or structure of prices) and the standard of the declared goods or services;
- b) the cost of making, producing or supplying the declared goods or services;
- c) the desirability of encouraging greater efficiency in relation to making, producing or supplying the declared goods or services;
- d) the need to ensure an appropriate rate of return on any investment in relation to the declared goods or services;
- e) the borrowing, capital and cash flow requirements of persons making, producing or supplying the declared goods or services;
- f) considerations of demand management and least-cost planning;
- g) existing standards of quality, reliability and safety of the declared goods or services, and the desirability of encouraging improvements in those standards;
- h) the effect any proposed order on general price inflation over the medium term; and
- i) the economic and social impact of any proposed order; and
- j) any other matters the Commission considers relevant.

To meet the requirements of the above principles, the Commission has explored amongst others the following three alternative forms of price control methods;

- a. Total revenue cap;
- b. Average revenue cap; and
- c. Price cap.

In deciding on the appropriate form of regulation, the Commission took into consideration the need to provide incentives to the regulated businesses meet the objectives of Section 21(2A), including such that they are able to retain some of the benefits of cost and operational efficiencies and eventually pass these savings on to end users through one or a combination of improved service quality, improved reliability and lower prices.

On the bases of these considerations and consistent with the above regulatory principles, the Commission decided in its 2004 Final Determination that the Maximum Average Revenue Cap form of regulation for both Eda Ranu and Waterboard was the most appropriate for their water and sewerage services.

Under this arrangement, Eda Ranu and Waterboard are required to set prices for water and sewerage services for each regulatory year such that their Maximum Average Revenue per kilolitre for water and wastewater should increase by no more than the Consumer Price Index (CPI) plus/minus an X-factor (hence a CPI + X formula).

5.2. Proposed form of regulation

As indicated in section 4.2 of this Paper, the Commission has proposed to have water and sewerage services regulated under Part III of the ICC Act. Most of the principles the Commission will be considering under a regulatory contract are similar to those stated in section 5.1 of this Paper. Therefore, regardless of whether water and sewerage services are regulated under the PRA or the ICC Act, the form of regulation the Commission will consider for these

services will not likely be different to the current form of regulation which is the cost-based form of regulation.

For purposes of this Review, the Commission needs to consider whether it continues to maintain the current form of incentive regulation or should it adopt another form of regulation for the next regulatory period. Within the concept of incentive regulation involving price or revenue paths extending for several years there are different forms of price control that can be used which are discussed below.

5.2.1. Total revenue cap

Under a total revenue cap form of regulation, a direct limit is placed upon the total revenue that the regulated entity can earn in a regulatory year for the provision of its regulated service. An additional adjustment mechanism provides for any over or under recoveries of revenues in a regulatory year by allowing consumers to receive lower tariffs in the subsequent regulatory year if Eda Ranu and Waterboard over recover in a prior year. Any under recoveries are recouped in the following year in the form of higher tariffs.

A total revenue cap provides the business with a guaranteed level of income and thus reduces revenue risk. It also provides strong incentives to reduce expenditure. However it also has the potential to discourage businesses from undertaking further investment to expand capacity and connect new customers, as the business in doing so may exceed its revenue cap and incur penalties. It therefore relies on using relatively accurate forecasts of customer numbers and demand for water (and sewerage) volumes. In circumstances where this is not the case, the business will potentially face substantial revenue risks. Other attributes of a total revenue cap are:

- there is no causal link formed between revenues and costs, potentially leading to sustained returns higher or lower than the regulatory benchmark; and
- subject to any side constraints imposed on the tariff translation process, it allows for flexibility in tariffs in order to reflect changing costs within different customer segments.

However, a fundamental problem with this approach described above is that a total revenue cap discourages the entity from expanding its network beyond any growth projections that have already been assumed into the forecast costs covered by the revenue path. This is due to the fact that the business incurs the additional cost of connecting an additional non-planned new customer, but does not earn any extra incremental revenue from this new customer given the constraints of the absolute revenue cap. Hence, any form of regulation based on a revenue cap must have reliable and accurate forecasting of demand for water (and sewerage) volumes and growth in new connections. However, consumers can be better off in following years as tariffs are reduced where volume and connection growth exceed the CPI+X settings within the revenue cap formula.

5.2.2. Average revenue cap

Under an average revenue cap approach, a defined limit is placed upon the average revenue that the business is allowed to earn in any year, which is adjusted annually according to the price control formula, which is often of the CPI +/- X form. Under this type of regulation, the Commission is able to choose the parameter that is used to average revenues. For example, the Commission may choose a factor that is linked to demand such as customer numbers, or it could use demand itself, for example kilo litres of water consumption. Under an average price cap, the Commission uses demand as the methodology for averaging revenues. Thus, in one sense, there

is a strong link between an average revenue cap and a maximum average price (“MAP”) cap. However, for an average revenue cap the Commission would normally use the number of customers and set the regulatory control around the average level of revenue that each customer notionally generates.

By using an average revenue cap approach, the problems which are normally associated with a total revenue cap are avoided. As a result it provides the regulated businesses an incentive to realign their operations to minimise costs, expand services through new connections and meet growing customer demand provided the overall level of revenue that each customer contributes on average does not exceed the average revenue cap. As customer demand grows, revenues increase as well, and thus there is less profit risk for the businesses than under a total revenue cap, with the amount of volatility depending upon the level of additional costs. Each additional customer connected effectively generates the average revenue per customer regardless of the actual tariff and usage pattern of that customer whereas the marginal cost of adding a new customer to a network system is usually less than the average revenue that the new customer generates hence making this form of regulation much more attractive compared to a total revenue cap. There is a strong incentive to connect new customers where incremental costs are less than the average revenue cap.

5.2.3. Price cap (Maximum Average Price Cap)

Under this form of regulation, the regulated business has a cap placed upon the weighted average prices which are adjusted annually according to the CPI +/- X formula. Price cap regimes usually involve applying a price cap to the weighted average tariff basket delivered to all customer segments, but it can also be structured to place direct control on the prices (or specific tariffs) of the services provided by the regulated entity (the latter form is less common, than a weighted average tariff basket). This form of regulation is often favored particularly by regulated entities when they are applied in markets which are observed to be experiencing growth. This is due to the fact that as sale volumes grow, the average costs per unit of output of the entity are likely to fall, and the regulated entity can make a greater margin on every additional customer. Usually the regulator tries to estimate the likely growth in new customers and sets prices accordingly without disadvantaging the regulated entity. There are strong incentives to connect new customers and grow their demand for the basic service offered.

The average price cap is often described as a weighted average tariff basket as prices for similar services or services provided by one company are often grouped together. For example, if the Commission adopted an average price cap, it may group prices for water services and sewerage services together. To ensure that revenues are matched to cost the Commission would apply a weighting to each service in the tariff basket. The weight given to services in the tariff basket may be based upon a number of factors. For example, the quantity of services sold or the proportion of total revenue that is contributed by a particular service class. These weights will often be fixed with reference to the year in which the price control is set, or they may reflect actual quantities with a time lag such as the quantity of the service provided in the previous year. Once the Commission identifies the costs of providing this service, it would then monitor compliance with its revenue determination by multiplying the proposed tariffs in any one year by the relative weights described above.

The tariff basket/average price cap has similar properties to the average revenue cap in that businesses have an incentive both to reduce costs and to meet growing customer demand. However, under the tariff basket/average price cap, variations in volumes will yield additional revenues at actual tariff rates rather than at the average tariff rate. The Commission has used average price caps to regulate electricity and telecommunication services in PNG.

The drawback of applying this form of regulation particularly for the water and sewerage business in the PNG circumstances is that, price cap application on water and sewerage would create a greater profit risk for the regulated entity if sales volumes or demand growth are below expectations. However, if usage patterns change such that there is an increase in the average usage by customers or the number of customers beyond that originally expected, price caps can benefit the service provider. It is appropriate to note here that the Commission currently applies a average price cap form of regulation for PNG Power's retail electricity services and Telikom PNG's fixed network services. This is because there is an expectation of high volume growth potential of these businesses which suits a price cap regulation relative to the water and sewerage business. In the electricity and telecommunications environment here is strong incentive to invest, extend the networks and expand the number of connected customers, as well as their usage, to meet the pent up demand. This appears less appropriate for water and sewerage customers, as there are affordability issues and high connection costs to be borne.

5.3. Preliminary View on the proposed form of regulation

Since problems associated with illegal connections are still prevalent, the Commission proposes to maintain its previous decision to provide each water business with the strongest possible incentive to increase the number of billable connections on the network. As such, the Commission proposes to use the average revenue cap regulation in the next regulatory period so that every new connection above the forecasts provided to the Commission and entered into their relevant price path calculations would result in additional revenue to each business, but increases in the demand through each connection provides less benefit to each business.

Therefore, the Commission proposes to continue to use the maximum average revenue cap form of regulation for the water and sewerage services provided by Eda Ranu and waterboard.

The Commission invites Eda Ranu, Waterboard and any interested stakeholders to provide views, comments or written submissions on the appropriateness of the Commission's preliminary views on the form of regulation to apply for water and sewerage services.

The Commission further invites written comments and submissions in support of alternative forms of price regulation discussed in this paper or applied in other jurisdictions which have not been discussed in this Issues Paper that may be necessary for the Commission consider as part of this public consultation process.

6. BUILDING BLOCK APPROACH

The regulatory principles articulated in the previous sections of this Issues Paper and Section 21 of the PRA provided the overall guidance to the Commission in its assessment and determination of costs of providing regulated water and sewerage services and the appropriate rate of return to apply in its 2004 Final Determinations. These principles require the Commission to consider the efficient cost building blocks in determining the price control arrangements and the same will be applied in determining the subsequent price control arrangements. The following building blocks were used to determine the efficient cost of providing water and sewerage services within PNG for the existing price path. Hence total costs for recovery equal the sum of:

- Operating costs;
- Return on assets (asset base multiplied by the rate of return determined using the weighted average cost of capital methodology); and
- Return of assets (depreciation of assets in the asset register).

The building block method of calculating the total efficient costs and hence the revenue requirement is as follows;

Total efficient costs = operating and maintenance costs + return on capital + return of capital ("**depreciation**")

where the return on capital = weighted average cost of capital ("**WACC**") multiplied the by the regulated asset base

where:

- Efficient operating costs include efficient operating and maintenance costs;
- Return on capital includes the return on the regulatory asset base ("**RAB**") where the initial valuation is to be determined; and
- Return of capital is the allowance for depreciation in each year.

This method is referred to as the building block approach as each component is calculated individually and is then combined to determine the total efficient cost. This section discusses each of the components. The annual total efficient costs for both water and sewerage services calculated for Eda Ranu and Waterboard for the current price path are shown in the table below;

Table 6.1 Eda Ranu's total efficient costs (2005 – 2009) as forecast

Year ending 30 June (nominal Kina)	2005 K'000	2006 K'000	2007 K'000	2008 K'000	2009 K'000
Operating Expenditure	55,061	57,822	56,777	55,151	53,659
Depreciation	1,009	1,756	2,448	3,088	3,680
Return on fixed assets (pre-tax)	4,671	9,576	14,032	18,079	21,747
Total Efficient Cost	60,741	69,155	73,257	76,318	79,086

Source: ICC: Water and Sewerage Pricing Review Final Report, November 2004, p.61.

Table 6.2 Waterboard's total efficient costs (2005 -2009) as forecast

Year ending 30 June (nominal Kina)	2005 K'000	2006 K'000	2007 K'000	2008 K'000	2009 K'000
Operating Expenditure	19,900	19,600	19,400	19,200	19,000
Depreciation	2,009	2,253	2,476	2,669	2,832
Return on fixed assets (pre-tax)	7,272	8,713	9,989	11,039	11,871
Total Efficient Cost	29,181	30,566	31,865	32,908	33,703

Source: ICC: Water and Sewerage Pricing Review Final Report, November 2004, p.60.

This Review will involve assessment on whether Eda Ranu or Waterboard has provided the water and sewerage services at efficient costs, and how these costs may change over the regulatory period starting 1st January 2010. The following sections discuss in detail each of the variables in the building block methodology.

6.1. Return on capital

The return on capital which is stated above as return on fixed assets (in Table 6.1 and 6.2) is determined, among other things, by the value of the RAB. It is calculated by multiplying the RAB by the WACC. Discussion on the derivation of WACC is derived is further outlined below.

Before determining a fair and reasonable rate of return on assets, the Commission must first review and make a decision on the value of the RAB. It should also consider the appropriate valuation method of assets and the opening value of the RAB to apply for the forthcoming regulatory period. The discussion concerning this is in the following section.

6.1.1. Regulated Asset Base

6.1.1.1. Current Regulated Asset Base

In the 2004 Review, the Commission explored a number of options for determining valuation of assets for Eda Ranu and Waterboard. These options were;

- o To treat all the investment to date in the water and sewerage networks as a sunk investment and thus valued at zero;
- o Adopt some form of current cost replacement approach which reflects the costs that would have been incurred by a new entrant seeking to engage in water and sewerage business;
- o Adopt a depreciated historical value assessment of the asset base; and
- o Adopt some form of optimised deprival value (“ODV”) as a means of assessing what the value of the asset is to the business.

Having considered all these options, the Commission opted to use ODV approach of asset valuation. The ODV approach was considered most appropriate in 2004 to recognise that the water and sewerage businesses had existing assets in place already and some form of recognition of such was necessary to allocate a monetary value to existing assets as a starting point. The RAB forecasts for Eda Ranu and Waterboard for the current price path are shown below.

Table 6.3 Eda Ranu’s regulated asset base (2005 – 2009) as forecast

Year ending 31 December (nominal Kina)	2005 K’000	2006 K’000	2007 K’000	2008 K’000	2009 K’000
Opening Value	20,734	80,167	143,230	210,303	281,624
Capital expenditure	56,600	56,440	56,440	56,440	56,440
Disposals/Assets written off	Nil	Nil	Nil	Nil	Nil
Depreciation	1,089	2,049	3,083	4,201	5,408
Indexation	3,923	8,671	13,716	19,082	24,787
Closing Value	80,167	143,230	210,303	281,624	357,444

Source: ICCC: Water and Sewerage Pricing Review Final Report, November 2004, p.43.

Table 6.4 Waterboard’s regulated asset base (2005 – 2009) as forecast

Year ending 31 December (nominal Kina)	2005 K’000	2006 K’000	2007 K’000	2008 K’000	2009 K’000
Opening Value	68,152	88,929	114,326	137,342	163,031
Capital expenditure	16,822	20,106	16,336	17,627	13,382
Disposals/Assets written off	Nil	Nil	Nil	Nil	Nil
Depreciation	2,170	2,628	3,119	3,631	4,161
Indexation	6,125	7,919	9,800	11,692	13,578
Closing Value	88,929	114,326	137,342	163,031	185,830

6.1.1.2. Options of the RAB valuation method for the forthcoming period

For the purposes of determining the efficient cost base for the next regulatory period commencing from 1st January 2010, the Commission will consider whether or not it is appropriate to continue using the current method of asset valuation to make a decision on the opening value of the RAB. Hence, in determining the value of the asset base, the Commission is of the preliminary view that the RAB should be based on the actual costs of the assets to the regulated business at least as at 31st December 2009, provided that the assets that are included in the RAB satisfy the prudence tests and only the efficient costs of capital expenditure are included.

The Commission discusses below the options mentioned above to decide on the appropriate asset valuation method before determining the value of the RAB for the subsequent regulatory period. These options are;

Option 1: Sunk investment valuation

This approach has some merits in circumstances where the majority of the infrastructure has been funded by capital contributions through international aid and donor funding. However, the Commission is conscious that customers must pay a price that reflects in part the opportunity cost of investment of funds in this infrastructure to the extent that governments or aid funding has significantly funded the investment. The Commission also recognises the need to establish a process where all prudent future investments funded by the businesses and not through capital grants (aid funding), are able to receive an appropriate return on that investment.

Therefore, the Commission considered this option in the 2004 review and decided not to apply this approach because it considered that to treat the assets as having no value or as sunk investment which will not form part of the price determination process does not provide an appropriate incentive to the business to continue investment in the water distribution network and sewerage treatment facilities as it may be perceived that any new investment will be re-valued at zero in a future regulatory period. The Commission proposes not to apply this approach in the forthcoming regulatory period.

Option 2: Replacement cost valuation

Replacement cost is an example of subjective approach of valuation approach. Unless the regulated business replaces an asset, it cannot be absolutely sure what it would cost to do so. In deciding whether or not this approach is relevant, the Commission will need to consider the following;

- The current replacement cost of the network for both Eda Ranu and Waterboard;
- The age of the assets and their remaining economic lives to determine an appropriate depreciation profile for all the assets in each business and work out their current value; and
- The level of utilisation of each asset in the asset base, with any assets which were not being fully utilised (within the constraints of good engineering practice) requiring some form of optimisation⁶, which would include taking into account those assets which have been built and

⁶ A process to remove that proportion of the asset's value from the RAB which is currently not necessary to deliver services to the projected level of connected customers during the forecast regulatory period.

are now no longer in use, and discounting for those assets which are superfluous to the efficient operational requirements of the businesses.

Under this approach the Commission would need to employ a depreciated optimised replacement cost (“**DORC**”) methodology to arrive at a ‘replacement cost’ estimate. The replacement cost would then be optimised to exclude unnecessary or underutilised assets, and this would then be depreciated to the current age of the assets to provide the DORC which would then become the RAB for pricing purposes.

To adopt a replacement cost valuation, which is optimised, requires exercise of large amount of discretion and engineering judgement as well as significant information regarding the asset register and contributed capital for each of the businesses.

The Commission is of the view that the current replacement cost of assets is not the most appropriate approach to use for water network assets. This is because the valuation of physical assets is based on the current replacement cost of the assets rather than the actual or historical costs of the assets, and this may lead to excessive asset values which when recovered in prices have tariffs rise beyond the affordability levels of the connected customers for what is seen as a basic community service. Replacement cost can be a valid method of valuing assets where there is the potential for obsolescence and rapid changes in the costs of infrastructure. Where the assets cannot easily be sold and transferred to an alternative use, or recovered for sale at scrap value, a DORC valuation is less likely to lead to economically efficient pricing. The nature of water distribution networks is such that the assets are “sunk” and unrecoverable once installed in the ground. The best way to recover these assets is to increase the number of connected customers and to increase their volume usage. This is best achieved through affordable pricing strategies, which also allow cash for additional network extension and new connections. Given the nature of the water and sewerage network in PNG, it is not possible for infrastructure to be sold and transferred to an alternative use or for a new entrant to build an alternative parallel network. Therefore for the reasons mentioned above, the application of replacement cost in the valuation of assets to be included in the RAB for the water and sewerage networks is likely not appropriate.

Option 3: Depreciated historical valuation

Depreciated historic cost of assets represents the original cost of an asset less the straight-line depreciation of the asset over its useful life. Typically, if applied, the methodology accepts without question that historic decision on new capital investment incorporated into the asset base were all appropriate and that no significant market or technology changes have occurred since the assets were constructed that would lead to changed asset designs and functionalities. In effect, depreciated historic cost assumes that all past investment decisions were prudent and that no assets have been stranded since their construction. For the Commission to adopt a depreciated historic value assessment of the asset base, it would need to draw on the asset register and other accounting and operational information held by both businesses. The Commission would need to consider if this approach effectively values the asset at their purchase cost given any potential accounting revaluations. This approach is also usually less costly to implement than a DORC methodology, but does rely on good accounting information being available from the business.

The depreciated historic valuation methodology is generally simple to apply assuming that asset registers are complete and up to date. However, problems arise where asset registers are either incomplete or not available and there are significant movements in inflation, which affect the cost

of inputs sourced from within the country, and currency depreciations, which dramatically affect the cost of inputs sourced from international suppliers.

Option 4: Optimised deprival valuation

The optimised deprival valuation (“**ODV**”) is defined as the cost the asset owner would incur or the revenue that would be forgone if the business is deprived of the assets and its associated revenue. The ODV measures what the value of the asset is to the business operating as designed in its current form.

An ODV approach offers some economic logic, as it allows for the possibility that the value will be based on the value of the future revenue stream to the owner should the owner be deprived of the underlying assets. In this way it recognises not only that the likely future value of the asset as part of an ongoing business, but also that the future revenue stream would be unlikely to equate to the full replacement cost of the asset in its present form. An ODV approach also has the added advantage that it is a better reflection of the cost that a new entrant would pay for an existing asset in operation. That is, a new entrant would only enter the market where it was satisfied that it would earn an appropriate rate of return on any capital investment made to purchase the network. This purchase price might be somewhat below the DORC value where the assets are underutilised or where revenue slippage exists (that is both technical and administrative losses occur) full recovery of costs for services delivered is difficult. As such the ODV approach provides a ‘new entrant’ check against parallel network investment which a DORC approach tries to replicate.

To implement an ODV approach, the Commission would undertake a return on assets test (“**RAT**”), as a means of estimating the likely revenue that could be generated by the asset in its existing form (taking into account the demand projections that were made at that time). This revenue stream could then be discounted back to the implied value of the asset base for the purposes of the ODV assessment and the pricing arrangements which result from this value.

6.1.1.3. Proposed RAB valuation method for the forthcoming period

In the initial price review (2004 determination), the Commission has decided to use the ODV approach as there was a lack of historical and operational asset information leading to a potentially high cost impost were a full DORC valuation imposed. In undertaking this Review, the Commission’s proposal is not to change its current decision on the method of asset valuation for these water assets unless there is opposition from the regulated business that proves that the current method of valuation does not provide an accurate estimate of their asset value. An alternative approach would also require access by the Commission to detailed accounting and engineering information, which may not be available within the time frame required for the Review.

The Commission invites Eda Ranu, Waterboard and any interested stakeholders to provide submissions and/or comments on whether the proposed approach of valuing assets for the forthcoming regulatory period is appropriate. The Commission is also willing to consider other methods of asset valuation and as such invites further submission from stakeholders in this regard.

6.1.2. Roll-forward of RAB

Having considered an appropriate method of re-valuing the assets through this public consultation process, the Commission should be able to determine the opening value of RAB to apply for the beginning of the 2010 regulatory year. This opening RAB value could be considered as a roll over of closing value of the 2009 regulatory year resulting from the previous 2004 regulatory calculation, or a roll forward of the previous 2004 starting value to the end of 2009, or a new RAB could be

determined for the first year of the next regulatory period using the chosen re-valuation methodology.

The method of determining the opening value of the RAB for the regulatory period commencing 1st January 2010 is a critical decision for the Commission. In the *roll forward* approach, the closing RAB from the last year of the previous regulatory period is determined by taking the 2004 opening value and adding any prudent capital expenditures, subtracting straight-line depreciation and subtracting any asset disposals. While this method is a straight forward process, the Commission is conscious that the forecast capital expenditure for the current price path may differ from the actual capital expenditure undertaken during the current regulatory period. The Commission is considering whether to take into account these discrepancies between the actual and forecast capital expenditures and adjust the total efficient RAB accordingly. The Commission has addressed this issue in its 2004 Final Determination and decided that for the upcoming regulatory period, the Commission will assess the actual capital expenditures over the current regulatory period against a prudence test including assessment of any investment decision according to all available information. Furthermore, in the 2004 Final Determination, the Commission decided that it will undertake a new calculation of the RAB to ensure that the RAB is rolled forward to include the most up-to-date information available.

The Commission is seeking comments and submissions from Eda Ranu, Waterboard and any interested parties on the proposed method of calculating the opening RAB for initial year of the upcoming regulatory period commencing 1 January 2010.

Another issue then arises when the Commission has to roll forward this opening RAB for each of the regulatory years in the regulatory period starting 1st January 2010. The approach previously taken was an indexed RAB roll forward for the forecast period which is determined by taking the 2010 opening RAB value, indexing it for inflation, adding any forecast capital expenditures in nominal terms, subtracting straight-line depreciation and subtracting any forecast asset disposals in nominal terms. The issue arises that the roll forward analysis could be undertaken in either “real” terms or in “nominal” terms through the application of indexing.

The Commission proposes to use its previous approach to the roll forward of forecast RAB, which includes indexation of the RAB.

The Commission is seeking comments and submissions from Eda Ranu, Waterboard and any interested parties on the proposed method of calculating the roll forward of the forecast RAB for each year of the upcoming regulatory period commencing 1 January 2010.

6.1.3. Overview of WACC calculation

As indicated in section 6.1 of this Issues Paper, return on capital is derived by multiplying the RAB and the weighted average cost of capital (“**WACC**”). Having proposed the manner in which to calculate the opening value of the RAB for the forthcoming regulatory period, the Commission must also decide on the appropriate WACC to use in the building block approach.

The WACC represents the opportunity cost of capital to the regulated business. That is, the WACC is the return the regulated business could have earned had it invested in the next best alternative investment with the same level of risk characteristics. In setting the WACC, the Commission seeks to set a rate that adequately compensates the businesses for providing water and sewerage services. The Commission recognises that a rate of return below the cost of funds in the financial markets would make it unattractive for the industry to seek external financing to undertake further investment to develop the industry. On the contrary, setting a rate of return too high would lead to the industry earning a return in excess of its capital costs, and make tariffs less affordable than they need to be for consumers.

The formula for the WACC calculation is outlined below;

$$WACC = R_e * E/V + R_d*(1-T)*D/V$$

where:

- R_e = return on equity
- R_d = return on debt
- T = tax rate
- E = market value of equity
- D = market value of debt
- V = market value of debt plus equity (D + E)

The return on debt (R_d) is calculated by adding a debt margin to the risk-free market rate.

$$R_d = R_f + DM$$

where:

- R_f is the risk free market rate; and
- DM is the debt margin

The return on equity (R_e) as indicated in the above WACC formula is derived by using the well accepted Capital Asset Pricing Model (“**CAPM**”) and the formula is outlined below;

$$R_e = R_{f_{\text{international}}} + \beta_e \times (R_m - R_f)$$

where:

- R_{f_{international}} is the risk free rate;
- β_e (equity beta) is a measure of correlation between an business’s risk and that of the overall market;
- R_m is the market rate of return; and
- R_f is the risk free rate in PNG

The international risk free rate (R_{f_{international}}) is calculated as follows;

$$R_{f_{\text{international}}} = [(1 + R_f) / (USA_{CPI}) \times (1 + PNG_{CPI}) \times (1 + CRP) - 1]$$

where;

- R_f is the risk free rate in USA;
- USA CPI is the inflation rate in USA;
- PNG CPI is the inflation rate in PNG; and
- CRP is the country risk premium assigned for PNG.

The international risk free rate is used due to lack of an appropriate traded government bond in PNG that has a maturity of 10 years or longer. For the current regulatory period, the Commission has adopted the 10 year US government bond rate plus an allowance for the country risk premium and an adjustment which removes the implied USA inflation and adds back the PNG inflation. The Commission in using this approach has applied a risk free rate of 12.9% for the current price directions for both Eda Ranu and Waterboard.

According to the CAPM formula, the return on equity for a particular business is derived by adding the international risk free rate to the product of the equity beta and the Market Risk Premium

(i.e. difference between the market return and the risk free rate). The margin, that is the equity beta (β_e), reflects how risky a business is relative to the overall market.

The WACC formula ensures that the firm earns a return that is able to meet the cost of debt and equity. The WACC formula can be rearranged to reflect a pre-tax real WACC or pre-tax nominal WACC. Depending on the building block methodology chosen, the form of the WACC used may need to be changed to ensure that there is financial consistency with the roll forward methodology adopted. The variables that must be calculated in order to calculate the WACC are discussed below.

6.1.3.1. Equity Beta

The equity beta (β_e) represents the degree of riskiness of a business compared to the overall market. Equity beta is estimated by assessing the movement in a particular business's share price relative to the average of the overall market. Therefore, the equity beta indicates the level at which the business's risk correlates with the risk that of the market as a whole. A low equity beta (less than 1.0) indicates that the stock is less volatile, and reacts less to movements in the average market. An equity beta of 1.0 means that the stock moves inline with the market and an equity beta greater than 1.0 means that the stock is more sensitive to any moves by the market. Ultimately, the equity beta incorporates the market's perceptions of the risk of that business in comparison to the rest of the market.

The value of equity beta has a significant effect on the value of WACC and it could be said that there is a positive relationship with the value of equity beta and the WACC because the WACC increases as the value of equity beta increases. This is because increase in the value of equity beta indicates that there is increase in the level of the sensitivity of stock to movements in the overall market thus indicating an increase in the level of risks. Therefore the WACC has to increase to compensate the investors in taking the associated in investing in the business.

Normally, in countries where there are mature financial markets, equity betas of unlisted companies would be derived from examining the equity betas of similar companies listed on the share market. Unfortunately, in PNG, there is no access to such market information and the PNG (Port Moresby) stock exchange is characterised by low volume of trading and there is no comparable water businesses listed on the stock market. Hence, the Commission estimates the appropriate equity beta for Eda Ranu and Waterboard from market beta information on water businesses in other jurisdictions.

However, in using equity beta information from other jurisdictions, the Commission needs to remove the effects of the different taxation regime and the businesses debt to equity ratio (representing financial risk) from the observed data. In the 2004 Final Determination the Commission used the Monkhouse formula to de-lever the observed equity betas to an asset beta. The re-leverage equity beta is required to represent the risks of investing in this type of business in PNG and therefore the cost of equity goes into the WACC calculation. The Monkhouse formula is shown below.

$$\beta_e = \beta_a + (\beta_a - \beta_d) \times \left(1 - \frac{R_d}{(1 + R_d) \times t} \right) \times \frac{D}{E}$$

Where β_a is the correlation between return to assets of the business and the market (known as asset beta) and β_d is the correlation between the return to debt and the debt generally in the market (known as debt beta).

The Commission, in determining the 8.7% equity beta for the current price, used the above formula and was also guided by regulatory decisions in other jurisdictions and its own judgement given the difficulty in obtaining readily available market data from PNG and other sources.

The problem of obtaining market data to calculate equity beta for the water businesses in PNG is still prevalent and decisions regarding equity beta would have to be made on benchmark firm comparison. As such, the Commission is considering applying the Monkhouse formula and also using benchmarking approach to determine the equity beta for the coming regulatory period.

The Commission invites comments and submissions from Eda Ranu, Waterboard and any interested parties on its preferred options to use Monkhouse formula to determine the equity beta for purpose of calculating WACC for the next regulatory period.

6.1.3.2. Gearing Ratio

In order to construct the WACC, a gearing ratio needs to be determined to apply the appropriate weights within the WACC. Gearing is defined as the proportion of debt to equity in the total capital structure of the business. The Commission could use a long-term industry average for the gearing levels, or a capital structure deemed to an efficient structure given the risks faced by the business rather than the actual ratio faced by the regulated entity. This approach is usually adopted by regulators to ensure that the regulated business is not rewarded for inefficiency in its capital structure.

In the current price path, the Commission adopted a gearing ratio of 60 percent debt to 40 percent equity in the calculation of WACC for both Eda Ranu and Waterboard. This decision was made on the basis that an efficient company would source an appropriate level of funds from debt because it is cheaper than funds sourced from equity. In making this decision, the Commission also seeks to ensure that this ratio does not prevent Eda Ranu or Waterboard from holding a lower gearing ratio whilst ensuring that consumers do not pay extra for inefficient gearing ratio.

For the for coming regulatory period, the Commission is considering maintaining the same level of gearing ratio given the relatively immature capital market in PNG unless there is strong evidence from the water businesses that their commercial environment has changed over the years and that the proposed gearing level is not appropriate for them.

The Commission therefore seeks comments from Eda Ranu, Waterboard and any interested parties on the appropriate gearing ratio used to determine the WACC for the forthcoming regulatory period.

6.1.3.3. Debt Margin

The debt margin represents the percentage premium above the nominal risk-free interest rate to secure debt financing. It reflects the risk in the regulated business's ability to pay back debt. The debt margin is related to the current interest rates on corporate bonds, the maturity of the debt on issue, the assume capital structure and the credit rating. It also relates to the sovereign risks seen by investment in a particular country.

It is difficult for the Commission to determine the credit rating for the water businesses in PNG based on the limited financial data previously available and given that they are Government owned. The determination of credit rating is usually done by specialised credit rating firms such as Standards and Poor's and others. However, the Commission may use the other approach of determining a credit rating by benchmarking credit rating relevant to the water business in other jurisdictions and similar non-water businesses in PNG.

All other things being equal, higher credit ratings should result in a business having a lower required debt margin. The debt margin depends on the riskiness of the business, a business with low risk is able to secure debt financing at a cheaper rate than a business with more risk. The debt margin is then added to the risk free market rate to determine a return on debt (Rd) required by debt providers.

The regulated businesses are generally characterised as low risk with strong steady cash flows. The Commission considers that Waterboard is a government owned business as well as Eda Ranu to some extent and therefore these businesses might be able to secure debt financing at lower interest rates from aid agencies. As such, in the current price directions, the Commission benchmarked the credit rating of the water businesses in PNG and based on its own assessment and judgement determined a debt margin of 2%.

For the forthcoming regulatory period, the Commission proposes to use the same benchmarking approach to the assessment of credit rating to determining a debt margin.

The Commission invites Eda Ranu, Waterboard and any interested parties to provide comments and or submissions on the proposed approach to determine a credit rating and setting a debt margin for purpose of calculating the WACC for the upcoming regulatory period.

6.1.3.4. Taxation

In deciding on the appropriate tax rate for the calculation of WACC for the current regulatory period, the Commission considered two options. These options were to apply either a statutory tax rate or a business effective tax rate. The Commission decided to use the statutory tax rate of 30% rather than the business effective tax rate. This is because the business effective tax rate is difficult to either measure or calculate, and given the relatively high costs associated with engagement of independent taxation experts to model the rate and that these costs would outweigh any potential benefit.

The Commission proposes to maintain the current approach to select a tax rate and that is to use the statutory tax rate in the calculation of WACC for the coming regulatory period.

The Commission invites Eda Ranu, Waterboard and any interested parties to provide comments or submissions on the proposed tax rate regime in calculating the WACC for the next regulatory period.

6.1.3.5. Market Risk Premium

The market risk premium (“MRP”) reflects the additional return over and above the risk free rate that an investor would expect to earn by holding a well-diversified portfolio of assets.

The derivation of a MRP reflects the circumstances in the market. The market for equity in the PNG economy has limited coverage and volume of trading, and debt markets remain immature and lack secondary trading volumes, and hence the MRP is not readily apparent from the available data on the PNG markets. While there are some equity funds available in PNG, most of the equity funding is raised off shore. It is also important in this process to differentiate between the factors that may have been included in the derivation of the risk free rate when addressing the issue of the MRP. It would be inappropriate to include the country risk premium (“CRP”) in both the derivation of the risk free rate and in the MRP.

There is an on-going debate in financial and regulatory circles about the level of the MRP. While the regulators in Australia and the UK (amongst a number of countries) have used a 6% MRP over

recent years, there is some research that suggests that this rate in fact is falling, and is possibly down as low as 4%. At the same time, there is argument that in developing countries and emerging markets the rate may be rising, and could be as high as 8%. The Commission notes that there is not a general consensus in the financial literature of what is the appropriate rate, other than to note that there is degree of disagreement over the number.

The Commission has used a MRP of 6% for the current price directions, which assumes a developed country MRP and adjustment of country specific risks through application of a separate CRP factor applied to the risk-free rate, and is considering maintaining this percentage for the next price direction.

The Commission seeks comments and submissions from Eda Ranu, Waterboard and any interested parties on the appropriate MRP in determining the WACC for the forthcoming regulatory period.

6.2. Return of capital

As part of the building block approach to estimating total costs to be recovered in tariffs, allowance must also be made for the regulated business to recover the investment in water infrastructure over its operating life. This cost is referred to as “depreciation” or “return of capital”. In the current price direction, the Commission used the straight line methodology of depreciation as it considered this methodology to be consistent with its other regulatory decisions as well as of those in international jurisdictions, which is simple and transparent to apply. While applying the methodology for the current price path, the Commission used an average asset life of 35 years for existing assets and 70 years for new assets and it considered that this appropriately spreads the depreciation costs of the assets over the length that the assets, on average, are likely to be in service and therefore capable of returning a rate of return.

The Commission is proposing to maintain the straight line methodology of depreciation for the forthcoming regulatory period.

The Commission is seeking comments and submissions from Eda Ranu, Waterboard and any interested stakeholders on the proposed methodology of depreciation to be used in setting tariff over the forthcoming regulatory period.

6.3. Operating and maintenance expenditure

Operating and maintenance expenditure is also a significant part of the building block approach. In determining the appropriate level of forecast operating and maintenance expenditure, the Commission would have regard to the current efficiency level of operating and maintenance expenditure of the regulated business, measurement of its productivity and the historical perspectives on its service performance. In addition, the Commission must seek to ensure that there is continuous improvement in service delivery and also that the regulated business continues to improve its cost efficiency in the future.

Operating and maintenance expenditure for provision of water and sewerage services includes recurrent operating costs such as maintenance works and wages and other costs not related to specific capital expenditures. Because of the re-current nature of operating costs, previous operating costs could be useful in forecasting the operating costs for the forthcoming regulatory period. The Commission seeks to ensure that the forecasts for the forthcoming regulatory period should reflect efficient costs of operating. The efficient operating expenditure forecasts for the current price direction for Eda Ranu and Waterboard are included above in Table 6.1 and 6.2 respectively.

For the purpose of this inquiry, the Commission will assess the current forecast operating expenditure as outlined in Table 6.1 and 6.2 for Eda Ranu and Waterboard respectively against their actual operating costs and determine what would be the efficient costs over the next regulatory period. The Commission will review these forecast to determine;

- o 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;
- o Whether the forecasts allow for improvements in service quality and performance over the forecast regulatory period;
- o Whether any assumptions made by the water utilities as to efficiency gains that may be made over the period are appropriate; and
- o Whether the cost forecasts of the water businesses should be adjusted to incorporate an efficiency gains over and above those already contemplated

Therefore, the Commission invites Eda Ranu and Waterboard to use the template in Appendix 2 and 3 respectively and provide the following;

- 1. the actual operating and maintenance expenditure incurred during the current regulatory period (2005 – 2009), this may include budget estimates for the remaining months of 2009; and**
- 2. forecast of efficient operating and maintenance costs for the next regulatory period (2010 – 2014).**

6.4. Capital Expenditure

Capital expenditure usually refers to the expenditure on tangible or physical, long-life assets, which include planning and construction costs of infrastructure works. This could relate to costs associated with planning and re-construction of a dam or a sewer treatment plant. Capital expenditure is often characterised by a one-off nature as capital works are undertaken during a specific time but will provide service over an extended period of time.

The capital expenditures which underlie the current Price Orders for both Eda Ranu and Waterboard are shown in Table 6.5 and 6.6 respectively.

Table 6.5: Eda Ranu’s capital expenditure forecasts (2005 – 2009)

Year ending 31 December (nominal Kina)	2005 K’000	2006 K’000	2007 K’000	2008 K’000	2009 K’000
Capital expenditure	56,600	56,440	56,440	56,440	56,440
Revised capital expenditure ⁷			5,938	1,249	11,457

Source: ICCC: *Water and Sewerage Pricing Review Final Report, November 2004, p.43.*

ICCC: *Review of Eda Ranu’s Current Pricing Arrangement, December 2007, p.15.*

Table 6.6: Waterboard’s capital expenditure forecasts (2005 – 2009)

Year ending 31 December (nominal Kina)	2005 K’000	2006 K’000	2007 K’000	2008 K’000	2009 K’000
Capital expenditure	16,822	20,106	16,336	17,627	13,382

Sources: ICCC: *Water and Sewerage Pricing Review Final Report, November 2004, p.43.*

⁷ The Commission undertook a review into Eda Ranu’s price path in terms of its capital expenditure (CAPEX) earmarked for the Port Moresby Sewerage Upgrade Project (PSSUP) as directed by the Minister for Treasury. The Commission found out from this review that Eda Ranu did not incur the PSSUP CAPEX which was built into the initial price path. As such, the Commission amended Eda Ranu’s CAPEX as shown in row 2 of Table 6.5 and amended its price path accordingly.

In the current regulatory period, Eda Ranu and Waterboard have identified their capital expenditure programs to be undertaken over this period and include these projects into the RAB. However, Eda Ranu did not incur the large proportion of its capital expenditure earmarked for its Port Moresby Sewerage System Upgrade Project and as such the Commission revisited its capital expenditure and amended it accordingly for the last three years of the current regulatory period (see table 6.5 above). The Commission in its December 2007 review of Eda Ranu's capital expenditure program, flagged that while it had reduced the revenue path allowed for Eda Ranu (by reducing the positive X Factor allowed in the CPI+X formula), it expected Eda Ranu to collect surplus cash from its customers and that this should be evident in its bank accounts, and be ready to apply to the sewerage treatment capital expenditures once these ramped up in the next regulatory period. The Commission puts Eda Ranu on notice, that it will undertake a detailed review of this issue during the current Review process for the regulatory period commencing 1st January 2010.

The Commission expects that in submitting the proposed capital expenditures for the next regulatory period, the regulated businesses would include all capital expenditure incurred in the period 2005 to 2009, and all future capital expenditures they plan to undertake. The Commission is conscious that there are mixed incentives for the regulated businesses to either forecast capital expenditures which are prudent and efficient to operate the network efficiently or over forecast the expected costs of the capital works. The regulated business may have the incentive to over forecast costs of capital because it perceives it will receive a return on and a return of all projects the regulator includes in the RAB for the duration of the regulatory period, and thus achieve revenues higher than are really required.

Nonetheless, the Commission seeks to provide an environment where the regulated business is encouraged to invest efficiently in the infrastructure by providing an adequate rate of return on any investment whilst discouraging inefficiency over investment in the infrastructure. The Commission will assess these plans for efficiency and will include the efficient capital costs into the RAB.

The Commission invites Eda Ranu and Waterboard to use the template in attachment Appendix 2 and 3 respectively and provide their actual capital expenditures for the current regulatory period from 2005 to 2009 and the planned capital expenditures they envisage undertaking in the forthcoming regulatory period from 2010 to 2014.

6.5. Service standards

Service Standards are important to the regulator to assess whether the regulated business is providing efficient services to the customers at the prevailing tariff. This is because service standards affect total efficient costs or the revenue requirement. Service standards are performance indicators in which the regulated business must set to achieve over time within the regulatory period and continue to improve thereafter.

In the 2004 determination, the Commission required Eda Ranu and Waterboard to establish a service standard mechanism and identify their performance indicators which should form their service standards. As part of this service standard mechanism, Eda Ranu and Waterboard were to develop a Customer Service Contract ("CSC") by 2005. Eda Ranu and Waterboard both developed their CSCs and set in place these contracts in 2006. As part of this process, each of the water entity was required to provide an annual monitoring report to the Commission on whether they are meeting the targets which they have set. No such reports have been provided to the Commission as Eda Ranu and Waterboard made known to the Commission it is the first time to be providing such reports and that they would first have to establish in-house procedures to keep a regular updates on the performance indicators and then would provide the reports accordingly.

The Commission considers that the period (from 2006 to 2008) was sufficient for these water entities to establish their reporting procedures and provide a report on their service standards according to their respective performance indicators. Therefore, the Commission requires Eda Ranu and Waterboard to provide the overall performance reports from 2005 up to the end of 2008. The Commission will use the reports to assess whether Eda Ranu and Waterboard have met their service standard requirements.

For the forthcoming regulatory period, the Commission would require Eda Ranu and Waterboard to review their performance indicators, and if need be, identify new performance indicators which are achievable. The Commission also flags that given the lack of progress of development and reporting on the CSC that it is proposing to include a revenue path penalty for the regulatory period commencing 1st January 2010, on delivery and regular reporting on CSC performance.

The Commission requests Eda Ranu and Waterboard to provide overall performance reports from 2005 to current. In addition, the Commission invites any interested parties to comments or submissions on the service standards of Eda Ranu and Waterboard, and how the Commission might incorporate a penalty on each organisation where they fail to meet their previous commitment to providing regular service performance reports.

7. PRICING ISSUES

7.1. Pricing Structure

Given the different operating structure of the two water business and their physical operating environment (Eda Ranu and Waterboard), their pricing structures differs accordingly to reflect these circumstance. The differences in the pricing structures between Eda Ranu and Waterboard are prevalent in the consumption band and the category of customer.

7.1.1. Waterboard's pricing structure

Waterboard has an extensive infrastructure network in PNG and provides water and sewerage services in all the towns of the 19 provinces of PNG except for Goroka, Vanimo, Kerema, Mendi and Kieta. It does not categorise its customers for water supply while for sewerage it categorises its customers into industrial and non-industrial groups. This arrangement is such that regardless of whether a customer is using water for household purposes or for business, the tariff for water consumption is the same. However for sewerage, Waterboard recognises that industrial customers dispose more waste into their network than the non-industrial customers and therefore apply different tariffs. The Table 6.7 below shows Waterboard's customer groups and the consumption band and the current tariff.

Table 6.7: Waterboard's current pricing structure

SERVICES	2009 Prices (in Kina)
1. Water Supply	
1.1 0 to 12 Kilolitres	8.60 (minimum charge)
1.2 13 to 30 Kilolitres	3.00 per kilolitre
1.3 Above 30 kilolitres	3.10 per kilolitre
1.4 Water Tankers per 10 kilolitres	31.00 per 10 kilolitres
2. Sewerage	
2.1 Non Industrial Customers	
2.1.1 0 to 12 Kilolitres	7.20 (minimum charge)
2.1.2 Above 12 Kilolitres	0.72 per kilolitre
2.2 Industrial Customers	1.25 per kilolitre
2.3 Sludge Tankers per 10 kilolitres	7.20 per 10 kilolitres
3. Connections	
3.1 Standard Connections	Free
3.2 Non Standard Connection	At cost
3.3 Reconnection – Water	45.00 per reconnection
4. Standby Fees	
4.1 Standby Fee – Water	1.38 per kilolitre
4.2 Standby Fee – Sewerage	0.72 kilolitre

In the 2004 review, the Commission considered the possible introduction of differential pricing for Waterboard in different regions it is operating as this pricing arrangement would more accurately reflect the actual costs of providing water and sewerage services in the various regions of its operations. However, Waterboard did not make a firm or official proposal at that time as it was still investigating the usefulness of and potential benefits of adopting a differential pricing arrangement. The Commission would encourage Waterboard to bring forward such proposals should it have had time to assess what changes might be able to be implemented from the 1st January 2010.

7.1.2. Eda Ranu's pricing arrangement

Eda Ranu is operating only in the National Capital District but has a large number of customers compared to Waterboard. Table 6.8 below shows Eda Ranu's customer groups, consumption bands and the current tariff.

Table 6.8 Eda Ranu's current pricing structure

CUSTOMER CLASSIFICATION	SERVICES	
	Water 2009 Prices (in Kina)	Sewerage 2009 Prices (in Kina)
Class 1: Statutory Authorities/Government		
Access Charge (per annum)	60.00	60.00
Monthly consumption 0.1 – 15 kl (per kl)	0.90	0.20
15.1 – 35 kl (per kl)	1.80	0.77
>35 kl (per kl)	3.78	0.77
Class 2: Commercial/Industrial/Non-Commercial and High End Users		
Access Charge (per annum)	60.00	60.00
Monthly consumption 0.1 – 15 kl (per kl)	0.90	0.20
15.1 – 35 kl (per kl)	1.80	0.77
>35 kl (per kl)	3.78	0.77
Class 3.1 : Single Meter High Covenant Residential – Non Owner Responsible		
Access Charge (per annum)	60.00	60.00
Monthly consumption 0.1 – 15 kl (per kl)	0.90	0.20
15.1 – 50 kl (per kl)	1.80	0.37
50.1 – 150 kl (per kl)	3.78	0.77
Class 3.2 : Single Meter High Covenant Residential – Owner Responsible		
Access Charge (per annum)	60.00	60.00
Monthly consumption 0.1 – 15 kl (per kl)	0.90	0.20
15.1 – 50 kl (per kl)	0.90	0.37
50.1 – 100 kl (per kl)	1.80	0.47
101 – 150 kl (per kl)	3.78	0.47
Class 3.3 : All Low Covenant		
Access Charge (per annum)	60.00	60.00
Monthly consumption 0.1 – 15 kl (per kl)	0.90	0.20
Rebate on lifeline tariff (per kl up to first 15 kl consumption, upon application)	(0.40)	(0.20)
15.1 – 100 kl (per kl)	0.90	0.37
100.1 – 150 kl (per kl)	3.78	0.47
Class 4: Approved Schools		
Access Charge (per annum)	60.00	60.00
Monthly consumption 0.1 – 15 kl (per kl)	1.60	0.47
>15 kl (per kl)	1.60	0.47

As indicated above, Eda Ranu has varying number of consumption bands for each of its customer groups with similar tariff but the total charge for each customer group vary because of the different consumption bands. The Commission notes that although Customer Classes 3.1, 3.2 and 3.3 are identical in the sense that their usage of water is for residential purposes, their consumption bands and the corresponding tariffs differ. Given the identical nature of business of these 3 classes of Eda Ranu's consumers, the Commission is of the preliminary view that there should be no differential pricing for these customers, but would be interested in receiving submissions from Eda Ranu as to why these differences may be justified. The Commission is also interested to know how the customers are classified into these groups and what particular criteria are used to make this judgement.

The Commission is seeking comments and submissions from Eda Ranu, Waterboard and any interested parties on the appropriateness of current pricing structure and customer classification of the two water businesses.

The Commission seeks further comments on any other alternative ways of customer classification that may be considered appropriate for the two water businesses in the PNG circumstances that promote economically efficient consumption of water and use of water assets, and which the Commission can consider as part of this consultation process.

7.2. Life Line tariff

The purpose of having a life line tariff is to allow for low income earners to have access to affordable potable water. Therefore, it is important that water pricing options are flexible to ensure that water for household purposes which include cooking, drinking and cleaning (general hygiene) is available to all Papua New Guineans at a reasonable price relative to the consumers' income and the need to maintain the business as a going concern.

Under the current pricing arrangement, Waterboard treat the first 12 kilolitres of water consumption per month as lifeline tariff and all consumers are given the opportunity to access the lifeline tariff regardless of the paying ability of the customers. In contrast, Eda Ranu regard the consumers residing in low covenant houses in Port Moresby as 'low income earners' and therefore offers lifeline tariff for the first 15 kilolitres of water consumption. Thus, Eda Ranu allows for a rebate of 40 toea per kilolitre of water consumed for the first 15 kilolitres of water for this same category of customer.

Given the current shortage of residential houses in Port Moresby and the rest of the country, most high income residents or those that are able to meet the cost of water and sewerage services are living in low covenant houses. As such, the Commission considers that Eda Ranu's classification of low income earners as those residing in low covenant houses may only partly be applicable. Furthermore, the Commission is of the view that low income earners could be those residing in the ghettos or the so called "Settlements" in Port Moresby. However, these residents do not pay for the use of water as they are in many circumstances engaged in water theft by undertaking illegal connections to their houses. This issue of illegal connection will be discussed in the following section.

The Commission considers that some household users should be given a lifeline tariff for the first batch of kilolitres of water consumed regardless of where the household consumers reside. However, the amount of the lifeline and the level of the first batch of kilolitres could be determined by Eda Ranu and Waterboard with consideration of the costs of providing the service, the classification of the customers, and the amount of kilolitres could vary between these two water entities and their regional presence depending on their cost structures.

The Commission is seeking comments on the current arrangement of lifeline tariff and encourages comments or submissions from Eda Ranu, Waterboard and any interested party on the appropriate approach to setting lifeline tariff in the forthcoming regulatory period.

The Commission is seeking comments and submissions from interested stakeholders on the appropriateness of the current classification of customers qualifying for lifeline tariffs and whether or not there are alternative methods that the Commission could consider.

7.3. Illegal Connections

Despite the existence of the lifeline tariff there is still significant water theft through illegal connections to Eda Ranu's and Waterboard's networks. The act of illegal connection is prevalent in the Settlements but it seems there could be some customers residing in other suburbs who have built new houses who could be engaging in such activities as well. This has greatly impacted on the ability of the water entities' to collect revenues and recover costs and has resulted in losses of their revenues.

In addressing this issue during the 2004 review, the Commission considered two options. First option is to increase the tariff for all paying customers. This option would allow for recovery of costs from the paying customers and this would in turn provide subsidy to those who have illegal access to water. The Commission considered that this would result in the inflation of prices for some users and a considerable savings for illegal users or further encourage paying residents on the fringes of the settlements to tamper with water meters.

The other option was to reduce the revenue that water entities could collect by the amount of the unpaid water bills and value of water taken through illegal connections. A decision to stop from allowing water entities to recover these costs of providing water and sewerage services from the illegal users in some form would result in financial pressure to collect such revenues and/or possible loss of reliability or quality of service to all consumers. This would further represent a far greater loss to the nation and thus this approach be avoided.

However, a midway path was identified. While seeking to reach a final decision in 2004 on this issue, the Commission was seeking to determine the efficient costs of the water entities to ensure that each business is provided with the appropriate incentives to deliver water and sewerage services at efficient costs. However, the Commission considered that the prices are distorted with the relative high incidence of theft of water through illegal connections and it had little choice but to pass on some of the costs of such theft to legal paying customers which resulted in less than efficient price for individual paying customers. At the same time the Commission encouraged the water businesses to look for innovative ways of ensuring the theft was reduced over time and that more consumers accepted responsibility for paying for the services they were using.

The Commission notes the problem of illegal connections is still rife and that at least Eda Ranu has been implementing strategies to change consumer's awareness of this activity. The Commission is of the view that the water entities should be considering implementing further effective strategies to at least recover some costs from areas of illegal connection. The Commission would encourage the water businesses to submit summaries of the strategies they have adopted to change the public's perceptions of water theft and meter installation, and whether these have been effective. Also whether there is a public awareness issue that the Commission could address given its other powers and responsibilities.

The Commission is seeking comments or submissions from the water entities and any interested party on the current regulatory approach undertaken by the Commission in dealing with the issue of illegal connections.

The Commission further seeks comments from stakeholders on any other appropriate approaches the Commission could consider in this Review that addresses the problem of illegal connections without necessarily disadvantaging paying customers and the water businesses.

The Commission invites Eda Ranu and Waterboard to submit summaries of strategies that they have adopted to change the public's perceptions of water theft and meter installation and whether these strategies have been effective.

7.4. Leakages

Leakages can occur at different stages of the treatment and distribution of water and there are two main areas where a leakage can occur. First, a leakage can occur within the distribution network and secondly a leakage can occur within the household after it has gone through the water meters. The leakage that is occurring within the distribution network are losses and directly affects the revenues that the business could potentially realise. To manage this leakage, the business may have to set in place processes to help identify where the leakage is occurring and to fix the problem as quickly as practicable.

The leakages that occur within the household or business premises after it passed through the water meter may occur as a result of faulty taps or inappropriate standard of plumbing. Since the water has passed through the meter reading, it would be billed for regardless of whether the consumer has used it or not. Therefore, continuous leakage would increase the amount of bills to be paid and therefore result in an inability of the customer to pay for the bills, and hence reduction in revenue collection by the business.

Having identified the areas where the leakages are occurring, the Commission is of the view that the regulated businesses would still face loss of revenue in either of the areas and therefore to recover the costs of providing water and sewerage services, the businesses must establish a strategic management approach to minimise leakage and this would assist recovery of their costs.

The Commission is seeking comments from Eda Ranu, Waterboard and interested stakeholders including water consumers on the issue of leakages and the appropriateness of strategies currently in place to minimise water leakages and any proposed actions that are considered necessary and which the regulated businesses would take to address this issue.

8. RELATED ISSUES

Access to affordable and reliable clean water and sanitation can contribute significantly to the well being of the country's population which in turn can translated in to increased productivity and hence economic growth for PNG. There are number of social and health related benefits to accessing sufficient water for household purposes and for basic hygiene requirements. There are also other benefits associated with the long term economic development of PNG which are directly linked with the prudent management of water resources. These benefits are referred to as positive externalities as they are benefits which occur in the secondary market which cannot be directly quantified. Therefore, it is important to note that water can be regarded as both an economic and social good and the management of water resources have important development, economic and environmental implications. This section discusses these important interrelationships, their impacts on the PNG economy, and importantly the impact that these relationships have on the costs of managing the water network.

8.1. Social

As noted by the Commission in its 2004 review of water and sewerage prices, access to water and sewerage services represents an essential service throughout PNG, particularly to that part of the population residing in cities and major towns. Desirably all Papua New Guineans, wherever they reside, should have access to potable water of an appropriate standard and access to appropriate sewerage collection and treatment facilities. However, the geography of the country makes this scenario impossible. The Commission expects that capital expenditure plans submitted by each business will in large part address the potential extension of the current networks beyond its existing infrastructure network, but in a manner which takes recognition of the limited financial resources available and the geographic circumstances of PNG.

The positive externalities discussed above often accrue in the form of social benefits. These benefits include reduction in water born diseases, which in turn contribute to reduced pressure and demand on the public health system. Indeed there are numerous international and national water quality standards with which both Eda Ranu and Waterboard are required to observe and comply. However, the Commission recognises that compliance with these standards is costly. As such, the Commission accepts that compliance with these standards is an important cost driver in each business' total efficient costs. The Commission seeks to provide the appropriate incentives to ensure that these service standards are met at the least cost to the PNG economy.

In the April 2003 review of prices for water and sewerage charged by PNG Waterboard and Eda Ranu the Commission noted that the imposition of health standards carried significant costs. Further, the Commission noted in its preliminary analysis that there was insufficient return generated by Waterboard to fund service quality and other health standards. As such the Commission made an allowance for prices to increase by greater than the inflation rate to ensure that both Waterboard and Eda Ranu were provided with sufficient revenue to cover these costs. The Commission is now seeking information from Eda Ranu and Waterboard on their relative compliance with international and national health and quality standards. Further the Commission is interested in receiving information relating to both Eda Ranu and Waterboard's performance from consumers.

The Commission seeks submissions from Eda Ranu and Waterboard on their compliance with international and national health and quality standards. In addition, the Commission also seeks comments from customers on Eda Ranu's and Waterboard's performance relating to social benefits.

8.2. Economic

Water is an important economic good in the Papua New Guinean economy. As such the Commission is aware that any increase in the price of water has the potential to impact on the overall movement of prices as measured by the CPI and the price of other goods and services. While the direct impact of water tariffs upon inflation appears to be minimal, the Commission notes that there are indirect impacts on inflation which are more likely to result in increasing pressure on inflation. This pressure is largely due to the number of businesses which use water as an input in the production of other goods and services, that is, where water is an important factor in the overall costs of production. This is likely to be the case in a number of sectors within the PNG economy including in the hotel, food processing and manufacturing sectors, including soft drink production and breweries.

The Commission is interested in comments from large users of water on all aspects of the pricing of water for the coming five year regulatory period. In particular, the Commission calls for submissions relating to the over impact of an increase in the price of water on the price of goods in secondary markets.

8.3. Environmental

In addition to the traditional economic and social issues associated with water pricing, the Commission notes the increasing importance of environmental issues associated with the provision of water and sewerage services. These environmental issues particularly relate to the provision and treatment of sewerage disposal through the ocean outfalls which are dotted along the PNG coastline. Furthermore, the Commission notes that the potentially high environmental costs of creating dams for additional waterways should not be ignored in the assessment of the costs and benefits of any major new infrastructure works. It is important that appropriate conservation measures be adhered to so as to minimise the business' and consumers' potential impacts on the environment.

Sewerage is currently collected and treated by both Eda Ranu and the Waterboard to at least a primary treatment level. The majority of Waterboard's sewerage is then discharged into a nearby river or the ocean. Meanwhile, Eda Ranu currently treats the majority of collected sewerage at the Waigani Swamp where it receives secondary treatment before it is discharged into the Swamp, which acts as a natural treatment plant by breaking down any remaining wastes via normal biodegradation. The remaining sewerage not treated at the Waigani treatment plant is given primary treatment before being pumped out to sea along a three kilometre ocean outfall pipeline. The Commission understands that Waterboard primarily treats the majority of the sewage collected before discharging it into rivers or the ocean.

The Commission invites comments and submissions from the water businesses, customers and interested parties to provide comment on the appropriateness of the current method of treating sewerage services within PNG.

9. APPENDIX

Appendix 1: Section 21(2A) of the Prices Regulation Act Chapter 320 (Amended)

When making an order under Subsection (1), the Commission shall have regard to:

- A. the need to protect consumers and users of the declared goods or services from misuse of market power in terms of prices, pricing policies (including policies relating to the level or structure of prices) and the standard of the declared goods or services;
- B. the cost of making, producing or supplying the declared goods or services;
- C. the desirability of encouraging greater efficiency in relation to making, producing or supplying the declared goods or services;
- D. the need to ensure an appropriate rate of return on any investment in relation to the declared goods or services;
- E. the borrowing, capital and cash flow requirements of persons making, producing or supplying the declared goods or services;
- F. considerations of demand management and least-cost planning;
- G. existing standards of quality, reliability and safety of the declared goods or services, and the desirability of encouraging improvements in those standards;
- H. the effect any proposed order on general price inflation over the medium term;
- I. the economic and social impact of any proposed order; and
- J. any other matters the Commission considers relevant.

Appendix 2: Data templates for Eda Ranu and Waterboard submissions