4 ESTIMATING REVENUE REQUIREMENTS

It is common practice for monopoly, or near monopoly, providers of goods and services to be subject to government regulation with respect to setting prices, particularly where the goods and services provided are considered to be essential services such as electricity and water.

In the absence of effective competition, regulation of such industries aims to ensure that consumers do not pay more than the efficient cost of providing the goods and/or services, and that the goods and services meet prescribed standards. The framework most commonly used by Australian economic regulators to determine prices for regulated services is referred to as the 'building block' approach.

4.1 Building block approach

The Economic Regulator adopted the building block methodology for the first regulatory period and will continue this approach for the second regulatory period.

Under the building block approach the maximum revenue a regulated business is allowed for each period is determined by summing the following costs ('building blocks') incurred in providing regulated goods and services:

- depreciation;
- operating and maintenance expenditure (Opex) necessary to provide the regulated services; and
- cost of capital - comprising the cost of the debt and equity that together make up the total amount of capital invested in the regulated business.

The value of capital invested in the regulated business is deemed to be equal to the value of the regulated asset base (RAB) ie assets used to provide regulated services. The cost of capital is determined by multiplying the capital invested (RAB) by an appropriate weighted average cost of capital (WACC).

Therefore, under the building block approach, the maximum allowed revenue for each period is calculated as follows:

$$\text{Maximum allowed revenue} = (\text{RAB} \times \text{WACC}) + \text{D} + \text{OM}$$

where:

RAB	=	value of regulated asset base
WACC	=	weighted average cost of capital (return on capital)
D	=	depreciation (return of capital)
OM	=	operating and maintenance expenditure

4.2 Revenue limits

Consistent with the approach adopted in the first water and sewerage price determination investigation the Economic Regulator has calculated three annual revenue limits – upper, lower and statutory.

In calculating TasWater's revenue limits, the Economic Regulator has adopted an approach that is consistent with:

- the National Water Initiative (NWI) pricing principles[1];
- the pricing principles listed in section 68 of the Industry Act; and
- the additional pricing principles expressed in the Pricing Regulations.

4.2.1 National Water Initiative (NWI) revenue limits

The NWI prescribes two revenue limits:

- the upper revenue limit (full cost recovery); and
- the lower revenue limit (sustainability threshold).

Under the NWI, a regulated water and sewerage business should recover revenue at least equal to the lower revenue limit but no greater than the upper revenue limit as this represents the limit above which monopoly profits would be earned.

4.2.2 Statutory revenue limit

The requirements of the Industry Act necessitate a third revenue limit, the statutory revenue limit, in addition to the two revenue limits prescribed under the NWI-.

The statutory revenue limit is the maximum allowed revenue where the cost of capital component is calculated in accordance with section 68(1A) of the Industry Act. Section 68(1A) of the Industry Act requires the rate of return, on assets transferred to the previous regulated entities before 1 July 2011, to incorporate a commercial rate of return on debt and a legislated pre-tax rate of return of three percent on equity. For all other assets, the rate of return will incorporate a commercial risk based rate of return on both debt and equity.

Section 68(1A) of the Industry Act therefore, effectively, requires two separate WACCs and two separate RABs: one for assets transferred to the previous regulated entities before 1 July 2011 and another for assets purchased or constructed by the previous regulated entities and now TasWater after 1 July 2009[2].

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1 Natural Resource Management Ministerial Council, 23 April 2010: http://www.environment.gov.au/water/policy-programs/urban-reform/nwi-pricing-principles.html

2 Amongst other things, the *Water and Sewerage Corporation Act 2012* provided for the transfer of the assets and liabilities of the previous regulated entities to the new regulated entity, TasWater.

TasWater must maintain and roll forward each RAB on an annual basis in accordance with the Economic Regulator's Data Collection Template.

The RAB for existing assets will gradually decline over time as depreciation and disposals reduce the value of those assets, whilst the RAB for new assets will increase in line with Capex on new assets.

During the second regulatory period TasWater should be aiming to:

- ensure that revenue is kept above the lower revenue limit to maintain financial sustainability; and
- transition revenue towards the statutory revenue limit (the maximum revenue permitted under the Industry Act).

Over the long term the statutory revenue limit will become the upper revenue limit as the value of existing assets decrease due to depreciation and disposals.

4.2.3 Statutory revenue limit formula

The annual statutory revenue limit ($R_{STATUTORY}$) is calculated as follows:

$$R_{STATUTORY} = (RAB_{EXISTING} \times WACC_{EXISTING}) + (RAB_{NEW} \times WACC_{NEW}) + D_{NEW} + D_{EXISTING} + OM$$

where:

$RAB_{EXISTING}$	=	value of the regulated asset base in respect of existing assets
$WACC_{EXISTING}$	=	weighted average cost of capital to be applied to existing assets
RAB_{NEW}	=	value of the regulated asset base in respect of new assets
$WACC_{NEW}$	=	weighted average cost of capital to be applied to new assets
D_{NEW}	=	depreciation of the regulated asset base in respect of new assets
$D_{EXISTING}$	=	depreciation of the regulated asset base in respect of existing assets
OM	=	operating and maintenance expenditure

4.2.4 Upper revenue limit formula

The annual upper revenue limit (R_{UPPER}) is calculated as follows:

$$R_{UPPER} = (RAB_{NEW} \times WACC_{NEW}) + (RAB_{EXISTING} \times WACC_{NEW}) + D_{NEW} + D_{EXISTING} + OM$$

where:

RAB_{NEW} = value of the regulated asset base in respect of new assets

$RAB_{EXISTING}$ = value of the regulated asset base in respect of existing assets

$WACC_{NEW}$ = weighted average cost of capital to be applied to new assets

D_{NEW} = depreciation of the regulated asset base in respect of new assets

$D_{EXISTING}$ = depreciation of the regulated asset base in respect of existing assets

OM = operating and maintenance expenditure

4.2.5 Lower revenue limit formula

The annual lower revenue limit (R_{LOWER}) is calculated as follows:

$$R_{LOWER} = Debt + OM + ARA$$

where:

Debt = debt servicing costs

OM = operating and maintenance expenditure

ARA = asset renewal annuity

The lower revenue limit provides an estimate of the minimum revenue TasWater requires to recover the outlays needed to maintain its financial viability.

4.3 Revenue limit components

4.3.1 Regulated asset base

The RAB comprises the value of assets used to provide regulated services and therefore excludes the value of assets used to provide unregulated services which are discussed in section 4.3.1.4.

As discussed in section 4.2.2, section 68(1A) of the Industry Act necessitates calculating two RABs ($RAB_{EXISTING}$ and RAB_{NEW}). Each RAB is split between water

and sewerage assets to enable the Economic Regulator to ascertain whether the revenue from each regulated service relates only to the costs associated with providing that service. The Economic Regulator has not attempted to exclude third party capital contributions made before the previous regulated entities were formed from $RAB_{EXISTING}$ due to difficulties in ascertaining the value of those contributions.

The opening $RAB_{EXISTING}$ and RAB_{NEW} are DORC[3] asset values as at 1 July 2015 which have been rolled forward from 1 July 2009.

For each financial year of the second regulatory period RAB_{NEW} is rolled forward as follows:

Opening RAB_{NEW}

+ Capex

- $Depreciation_{NEW}$

- $Asset\ disposals_{NEW}$

- Third party capital contributions

= Closing RAB_{NEW}

For each financial year of the second regulatory period, $RAB_{EXISTING}$ is rolled forward as follows:

Opening $RAB_{EXISTING}$

- $Depreciation_{EXISTING}$

- $Asset\ disposals_{EXISTING}$

= Closing $RAB_{EXISTING}$

The RABs in each financial year are calculated as the average of the opening RAB (ie the RAB as at 1 July in the relevant financial year) and closing RAB (ie the RAB as at 30 June in the relevant financial year) with the opening RAB value in each financial year equal to the closing RAB from the previous financial year.

4.3.1.1 Capital expenditure (Capex)

Capex is the amount invested in new regulated assets and includes expenditure funded through third party capital contributions but excludes expenditure on assets used to provide unregulated services.

4.3.1.2 Third party contributions

Third party capital contributions are assets contributed by third parties that are not funded by the regulated entity and include developer charges, service introduction

[3] Depreciated Optimised Replacement Cost.

charges and government grants. Third party capital contributions are netted off the value of the RAB as regulated entities are not permitted to receive a return on capital, or return of capital, that they did not fund.

4.3.1.3 Asset disposals

Asset disposals refer to the value of assets which are no longer used to provide regulated services.

4.3.1.4 Assets used to provide unregulated services

The cost of assets used to provide unregulated services (ie unregulated assets) must be recovered from the customers utilising those services rather than from the regulated customer base.

Unregulated services include:

- providing water for irrigation;
- reusing water, discharged from a sewage treatment plant, for irrigation; and
- providing stormwater services via a combined sewerage/stormwater system.

In determining the regulated entity's RAB, the value of unregulated assets and the costs associated with unregulated services, such as providing water for irrigation or providing stormwater services via a combined sewerage/stormwater system, must therefore be excluded using an optimisation approach. Under the optimisation approach, the value of assets used to provide services to both unregulated and regulated customers is adjusted to determine the value of the assets required to service regulated customers only, which is then included in the RAB.

Where reuse water is used for irrigation in accordance with existing contracts, a proportion of reuse assets must be excluded from the RAB to cover the cost of the reuse system based on the following ratio:

$$\frac{\text{Revenue received from reuse customers}}{(\text{Value of assets used to provide reuse water} \times \text{WACC}) + D + OM}$$

where:

WACC	=	weighted average cost of capital[4]
D	=	depreciation associated with reuse assets
OM	=	operating and maintenance expenditure associated with reuse assets

[4] $WACC_{NEW}$ to be used where new assets are used for reuse activities and $WACC_{EXISTING}$ to be used where existing assets are used for reuse activities.

For new reuse schemes or renegotiated reuse contracts, the value of assets excluded from the RAB is calculated on the basis of a ratio proposed by the regulated entity which reflects the average revenue contribution from reuse customers as a proportion of total reuse costs. The ratio proposed by the regulated entity must be justifiable.

4.3.2 Depreciation

Depreciation is the return of the capital invested in an asset over the life of that asset. The regulated entity is required to calculate depreciation using the straight line method. Different useful lives of the assets comprising $RAB_{EXISTING}$ and RAB_{NEW} will result in two depreciation rates which are used to calculate separate depreciation amounts for each RAB roll forward for each financial year of the second regulatory period. In addition the two depreciation amounts are used in calculating the statutory revenue limit (section 4.2.3) and upper revenue limit (section 4.2.4).

Depreciation on existing assets ($D_{EXISTING}$) in each financial year of the second regulatory financial period is calculated as follows:

$$D_{EXISTING} = DR_{EXISTING} \times (\text{Opening } RAB_{EXISTING} - (0.5 \times AD_{EXISTING}))$$

Where:

$DR_{EXISTING}$ = depreciation rate for existing assets

$$= \frac{1}{\text{Average use life of existing assets}}$$

Opening $RAB_{EXISTING}$ = opening value of $RAB_{EXISTING}$ in each financial year

$AD_{EXISTING}$ = existing asset disposals

Depreciation on new assets (D_{NEW}) in each financial year of the second regulatory financial period is calculated as follows:

$$D_{NEW} = DR_{NEW} \times (\text{Opening } RAB_{NEW} + (0.5 \times (\text{Capex} - CC - AD_{NEW})))$$

Where:

DR_{NEW} = depreciation rate for new assets

$$= \frac{1}{\text{Average use life of new assets}}$$

Capex = capital expenditure

Opening RAB_{NEW} = opening value of RAB_{NEW} in each financial year

CC = third party capital contributions

AD_{NEW} = new asset disposals

4.3.3 Operating and maintenance expenditure (Opex)

The three revenue limits include an amount for the efficient costs of operating and maintaining the water and sewerage systems together with the associated administrative costs incurred in providing regulated services. Opex relating to providing unregulated services is excluded from the Opex amount used to calculate the three revenue limits.

Opex consists of:

- Operating costs – expenditure incurred in operating the water and sewerage system, including the cost of collecting, treating, testing, and pumping water and sewerage and also include royalties, chemicals, power and labour.
- Maintenance costs - the direct expenditure on maintaining the water and sewerage systems and includes materials, internal labour costs, and contractor costs. Total maintenance expenditure will vary with the type, age and general condition of the assets.
- Regulatory costs - including charges imposed by the various industry regulators and internal costs incurred in complying with regulatory obligations.
- Administration costs - including all expenditure on overhead costs, salaried staff costs (including costs of planning and engineering staff) and other items such as Board costs but excludes depreciation and interest costs except where interest paid relates to security deposits.

4.3.4 Weighted Average Cost of Capital (WACC)

The return on capital is calculated using the WACC which is the weighted average of the cost of debt and cost of equity. In line with accepted regulatory practice, a benchmarked debt to equity ratio is used in calculating the WACC to ensure customers do not bear the cost associated with an inefficient financing structure.

The WACC can be set on a real or nominal, pre-tax or post-tax basis. There is little consistency across Australia in terms of the type of WACC adopted for the water and sewerage sector. Therefore the Economic Regulator has decided to use a real pre-tax WACC as was used in the first water and sewerage price investigation.

As discussed in section 4.2.2, section 68(1A) of the Industry Act requires the calculation of two separate WACCs: $WACC_{NEW}$ and $WACC_{EXISTING}$.

4.3.4.1 WACC $_{NEW}$

$WACC_{NEW}$ incorporates a commercial risk adjusted cost of debt and return on equity and is used in calculating the statutory revenue limit (section 4.2.3) and the upper (section 4.2.4) revenue limits. The WACC is converted from a nominal to a real measure. Throughout this draft report the real WACC (shown below as "$WACC_{NEW\ REAL}$") is referred to as $WACC_{NEW}$.

$WACC_{NEW}$ is calculated as follows:

$$\text{WACC}_{\text{NEW NOMINAL}} = \text{Rd x G} + \text{Re x} \left(\frac{1}{(1 - t(1 - \gamma))} \right) \text{x} \left(1 - \text{G}\right)$$

$$\text{WACC}_{\text{NEW REAL}} = \left(\frac{\left(1 + \text{WACC}_{\text{NEW NOMINAL}}\right)}{\left(1 + i\right)} \right) - 1$$

where:

Re	=	cost of equity (post-tax)
	=	$\text{Rf} + \beta_e \text{ x } (\text{MRP})$
Rd	=	pre–tax cost of debt
MRP	=	market risk premium
Rf	=	risk free rate
t	=	corporate tax rate
β_e	=	equity beta
G	=	gearing ratio
i	=	forecast inflation (annual average over regulatory period)
γ	=	gamma - represents the proportion of imputation credits which can be utilised by shareholders and varies between 0 and 1

4.3.4.2 $WACC_{EXISTING}$

The statutory revenue limit (section 4.2.3) requires a WACC, to be applied to existing assets incorporating a real pre-tax cost of equity of three per cent per annum. Therefore, $WACC_{EXISTING}$ is calculated by replacing the formula for $WACC_{NEW\ NOMINAL}$ in section 4.3.4.1 with the following:

$$WACC_{EXISTING\ NOMINAL} = (Rd \times G) + (Z \times (1 - G))$$

where:

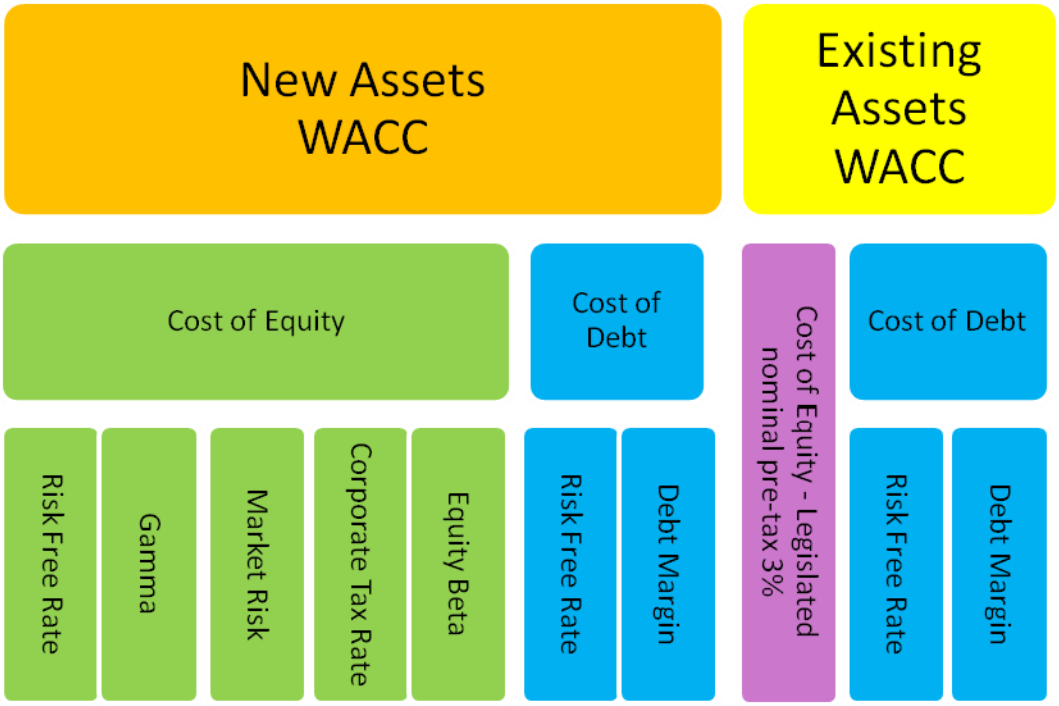
Z = Statutory pre-tax return on equity replacing $Re \times \left(\frac{1}{(1 - t(1 - \gamma))}\right)$ in the $WACC_{NEW}$ formula.

Rd = pre-tax cost of debt

G = gearing ratio

The various components used to calculate each of $WACC_{EXISTING}$ and $WACC_{NEW}$ are shown diagrammatically in Figure 4.1.

Figure 4.1 components of the WACC for new and existing assets



4.3.5 Asset renewal annuity

The Asset Renewal Annuity (ARA) is the annualised average cost of maintaining the operating capacity of existing infrastructure assets. The ARA provides an estimate of the amount of funds required to meet future Capex needs converted to an annuity so that the relevant funds can be accumulated consistently and equitably over a long period thereby avoiding sudden significant variations in funding needs.[5]

[5] The ARA is based on estimating the funds required to replace the assets as distinct from depreciation which apportions the cost of the assets over their useful lives.

As investment in infrastructure assets is generally “lumpy” rather than being able to be added to in regular small increments, an annuity is used to smooth out the year to year variations in asset refurbishment and replacement expenditure.

The ARA is part of the calculation of the lower revenue limit and is calculated using the following formula:

$$\text{ARA} = \text{NPV} \times \left(\frac{r}{(1-(1+r)^{-n})} \right)$$

where:

NPV = the net present value of projected asset renewal and replacement expenditure

r = the discount rate

n = the number of years

As occurred for the first regulatory period with the previous regulated entities, the Economic Regulator directed TasWater, via the PSP Guideline, to include Capex required to achieve regulatory compliance in its ARA on the basis that achieving regulatory compliance (ie operating legally) is considered necessary to achieving a financially viable operation.

The discount rate used in calculating the NPV for the ARA is $WACC_{NEW}$.

4.3.6 Debt Servicing Costs

The lower revenue limit includes the regulated entity’s actual debt servicing costs rather than the benchmark level of debt used calculating the WACC as the lower revenue limit is the minimum revenue required to be financially viable. Debt servicing costs applicable in calculating the lower limit are total debt servicing costs for each financial year of the second regulatory period apportioned on the ratio of the value of regulated assets to the value of total assets.

4.4 Economic Regulator’s assessment of TasWater’s proposed revenue limit components

This section assesses TasWater’s revenue limit components as provided in its Data Collection Template and proposed Price and Service Plan and explains the Economic Regulator’s proposed approach to, and results from, calculating each of the components having regard to:

- the information contained in Jacobs’ final report;
- the information in TasWater’s Data Collection Template; and
- TasWater’s responses to the Economic Regulator’s queries about the data provided in the Data Collection Template.

As outlined in section 2.3, the Economic Regulator commissioned Jacobs to undertake an independent review[6] of TasWater's proposed Opex and proposed Capex (including asset values). In particular, Jacobs was required to examine whether it considered:

- there was a need for TasWater to spend the amounts proposed (ie was the expenditure prudent?); and
- whether the amount spent was the most cost effective approach to achieving the desired outcomes (ie was the expenditure efficient?).

4.4.1 Capex

Table 4.1 shows the Capex values from TasWater's Data Collection Template and the Capex values from Table 9 of TasWater's proposed Price and Service Plan. The differences between the two sets of figures are due to the inclusion of third party contributions in the Data Collection Template figures.

Table 4.1TasWater's proposed Capex ($'000s)

	2015-16	2016-17	2017-18
Proposed Price and Service Plan	110 000	110 000	110 000
Data Collection Template	117 745	117 939	118 138

Jacob's review identified that TasWater has, and the three previous regulated entities also had, under-spent on capital projects compared to their respective Capex forecasts. In addition, Jacobs questioned the efficiency of TasWater's proposed Capex based on its review of a sample of TasWater's capital projects. Jacobs also discounted the Capex in TasWater's proposed Price and Service Plan by 2.5 per cent to express the figures in real 2014-15 dollars as shown in the following table:

Table 4.2 Jacobs' discounting of TasWater's proposed Capex ($'000s)

	2015-16	2016-17	2017-18
TasWater proposed (nominal)	110 000	110 000	110 000
Jacobs (real 2014-15$)	107 250	104 570	101 960

Based on the findings of its review, Jacobs recommended reducing TasWater's proposed Capex in 2015-16 by $10.73 million and increasing TasWater's proposed Capex in 2017-18 by $10.73 million.

Jacobs explained that the recommended decrease in 2015-16 reflected:

- TasWater's current low level of committed expenditure;

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[6] Jacobs Group Australia, *Review of the Tasmanian Water and Sewerage Corporation's Operating Expenditure and Capital Expenditure (including asset values), Final Report, 2 December 2014.*

- the approval delays associated with some of the projects Jacobs had sampled; and
- TasWater's history of under delivering capital projects.

Jacobs also explained that the recommended increase in 2017-18 recognised that TasWater had demonstrated to Jacobs' satisfaction that there was a genuine need for the proposed Capex to occur (ie the expenditure was prudent) and was an acknowledgment of TasWater's focus on both increasing its capacity to deliver capital projects and in developing business cases in relation to high priority projects.

The Economic Regulator has accepted Jacob's recommendations with respect to variations in TasWater's Capex allowance for the first and third years of the second regulatory period. Based on TasWater's comments on the Economic Regulator's Draft Report the Economic Regulator has reviewed the calculation of the annual Capex allowances and has made a number of minor adjustments to the Capex allowances shown in the Draft Report to correct indexation errors. The Capex values the Economic Regulator has used in determining TasWater's two RABs are specified in the following table.

Table 4.3 Economic Regulator's Capex allowances ($'000s) ($2014-15)

	2015-16	2016-17	2017-18
Jacobs' Capex recommendation	96 530	104 570	112 690
Less: unregulated Capex[7]	921	970	0
Economic Regulator's Draft Report proposed Capex	95 609	103 600	112 690
Economic Regulator's Capex allowances	95 687	103 776	112 878
Breakdown of Economic Regulator's Capex allowances:			
Water	42 370	46 064	47 612
Sewerage	53 317	57 712	65 266

4.4.2 Third party contributions

Table 4.4 shows TasWater's proposed third party contributions, namely gifted reticulation assets. The Economic Regulator noted in its Draft Report that TasWater's forecast total revenue (Table 28 of TasWater's proposed Price and Service Plan) included government grants which are not included in third party contributions in its Data Collection Template for the purpose of determining its RABs.

[7] As provided in TasWater's Data Collection Template.

Table 4.4 TasWater's proposed third party contributions ($'000s)

	2015-16	2016-17	2017-18
Third party contributions	7 745	7 939	8 138

Due to the correction of indexation errors, the third party contributions in this Final Report vary slightly from those shown in the Economic Regulator's Draft Report.

The Economic Regulator's approved third party contributions for the second regulatory period are shown in Table 4.5.

Table 4.5 Economic Regulator's third party contributions ($'000s) ($2014-15)

	2015-16	2016-17	2017-18
Reticulation assets	7 556	7 556	7 556
Government grants	6 340	1 784	1 740
Total Third Party Contributions	13 896	9 340	9 296

4.4.3 Depreciation

Table 4.6 shows TasWater's average useful life for new and existing assets as provided in its Data Collection Template. Jacobs' review noted that, due to a lack of detail about the assumptions TasWater had adopted in calculating the useful lives for its assets, it was unable to validate the asset lives provided in Table 19 of TasWater's proposed Price and Service Plan. Jacobs also questioned the adoption of a relatively short 40 year asset life for new asset headworks.

Table 4.6 TasWater's proposed average useful life – existing and new assets (years)

	Average useful life – existing assets	Average useful life – new assets
Water	36.9	40.1
Sewerage	35.6	36.3

For its Draft Report the Economic Regulator reviewed the data provided by TasWater and recalculated the useful lives of TasWater's infrastructure assets based on TasWater's data and using a value weighted average rather than a straight average. The resultant useful lives are shown in Table 4.7. The Economic Regulator's recalculated regulatory depreciation allowances for new assets and existing assets and for combined new and existing assets are reflected in Table 4.8 and Table 4.9 respectively for each year of the second regulatory period.

Table 4.7 Economic Regulator's average useful lives and depreciation rates for existing and new assets

	Average useful – existing assets (years)	Depreciation rate (%)	Average useful life – new assets (years)	Depreciation rate (%)
Water	42.3	2.36	57.5	1.74
Sewerage	39.4	2.54	56.7	1.76

Table 4.8 Economic Regulator's calculation of depreciation for new assets (D_{NEW}) ($'000s) ($2014-15)

	2015-16	2016-17	2017-18
TasWater	14 711	18 197	21 641
Economic Regulator	8 044	9 629	11 365
Variation	(6 667)	(8 568)	(10 276)

Table 4.9 Economic Regulator's calculation of depreciation for existing assets ($D_{EXISTING}$) ($'000s) ($2014-15)

	2015-16	2016-17	2017-18
TasWater	75 030	75 030	75 030
Economic Regulator	63 398	63 398	63 398
Variation	(11 632)	(11 632)	(11 632)

In its submission on the Economic Regulator's Draft Report, TasWater considered that the Economic Regulator's approach to calculating the regulatory depreciation allowances was incorrect. TasWater was also of the view that the proposed reduction in the annual depreciation allowances may impact on TasWater's ability to undertake renewals and may lead to future step changes in the depreciation allowance which in turn may result in price increases for customers.

The Economic Regulator considers that its use of a value weighted average approach is appropriate noting that this approach is used by regulators in other jurisdictions in both the water and other sectors.

Industry experts have consistently recommended the adoption of a value weighted average approach[8] whilst industry regulators such as the Australian Competition and Consumer Commission (ACCC) have accepted those recommendations in determining prices for regulated entities[9].

This approach is also considered to be the most appropriate as failing to calculate useful lives on a value weighted average approach gives greater weighting to relatively lower value and shorter life corporate assets at the expense of the much higher value and longer life infrastructure assets.

Additionally, because of the expected long lives of infrastructure assets, the application of a value based weighted average approach delivers intergenerational equity in that it ensures that the costs of that infrastructure are met by both current and future customers as both groups benefit from the availability of those assets.

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8 See for example, Deloitte Access Economics' report to the Australian Competition and Consumer Commission, *Final report – asset lives for State Water's 2014 pricing proposal*, 9 December 2013 and The Allen Consulting Group's Report to the Economic Regulation Authority, Western Australia, *Review of Asset Values, Costs and Cost, Allocation of Western Australian Urban Water and Wastewater Service Providers Water Corporation*, April 2005 (page 14).

9 ACCC, *Final Decision on State Water Pricing Application: 2014-15 – 2016-17*, June 2014.

The Economic Regulator therefore disagrees with TasWater's approach and considers that contrary to TasWater's views, adoption of TasWater's approach would be more likely to result in step changes in depreciation and consequentially a greater likelihood of future price volatility for customers.

The Economic Regulator also requested a copy of TasWater's Asset Register and conducted a review of the Register in an attempt to verify the basis for TasWater's proposed asset lives.

The Economic Regulator's analysis of the Register indicated that, with respect to some asset categories, the useful lives appeared to be longer than the useful lives proposed by the Economic Regulator in its Draft Report which, if adopted, would result in lower regulatory depreciation allowances than proposed in the Economic Regulator's Draft Report.

However, the Economic Regulator does not intend making further adjustments at this time due to the current level of uncertainty about, and therefore confidence in, information relating to TasWater's assets ie the Economic Regulator has decided to adopt the same asset lives regulatory depreciation allowances as it had proposed in its Draft Report. The regulatory depreciation allowances for new assets set out above in Table 4.8 vary slightly from those reflected in the Economic Regulator's Draft Report due to the impact of the minor changes made to third party contributions as outlined in section 4.4.2 of this Final Report.

The Economic Regulator considers that the issue of asset useful lives and the associated regulatory depreciation allowances will need to be revisited during the next price determination investigation ie the methodology adopted in calculating regulatory depreciation for the second regulatory period should not necessarily be seen as setting a precedent for future regulatory periods.

4.4.4 WACC – new and existing assets

TasWater's proposed Price and Service Plan indicated that TasWater intended adopting the following parameters:

- six per cent for the market return;
- an equity beta of 0.65;
- 60 per cent gearing;
- 30 per cent corporate tax rate; and
- 50 per cent for gamma.

TasWater also proposed adopting the following methodology for calculating the risk free rate and debt risk premium:

- Calculate the risk free rate as close as possible to the start of the regulatory reset period using the simple averages of Reserve Bank of Australia (RBA)

data for the 10-year Commonwealth Government bond rate over the previous 40 business days and over the previous 10 years.

- Calculate the debt risk premium as close as possible to the start of the regulatory reset period using the simple averages of the BBB credit (debt) margin over the previous 40 business days and over the last 10 years, using RBA data.

Applying its approach, TasWater calculated the $WACC_{NEW}$ and $WACC_{EXISTING}$ as shown in Table 4.10 and Table 4.11 respectively.

Table 4.10 TasWater's Parameters for $WACC_{NEW}$

Parameter	Description	Proposed value
Re	cost of equity (post tax)	8.26%
Rd	pre-tax cost of debt	6.87%
MRP	market risk premium	6.00%
Rf	risk free rate	4.36%
T	corporate tax rate	30.00%
β_e	equity (beta)	0.65
G	gearing ratio	60.00%
i	forecast inflation	2.50%
γ	gamma	50.00%
$WACC_{NEW}$		5.37%

Table 4.11 TasWater's Parameters for $WACC_{EXISTING}$

Component	Description	Proposed value
Rd	pre-tax cost of debt	6.87%
G	gearing ratio	60.00%
Z	statutory pre-tax return on equity	3.00%
i	forecast inflation	2.50%
$WACC_{EXISTING}$		2.75%

In its Draft Report, the Economic Regulator proposed maintaining, market return, equity beta, gearing, corporate tax rate and gamma as adopted for the first regulatory period (ie six per cent, 0.65, 60 per cent, 30 per cent and 50 per cent respectively).

With respect to the risk free rate and the debt risk premium, Australian economic regulators use a number of diverse approaches to determine these parameters. Furthermore, economic regulators may use a different approach for different industries due to specific legislative requirements.

In recent years regulated entities have been lobbying regulators that the debt incurred by the benchmark firm should reflect an efficient debt financing and risk

management policy. Such a policy would be based on issuing debt at different points in time with a staggered maturity profile. Therefore the effective interest cost of an unregulated business is likely to be a mix of current and past interest rates. Consequently regulated entities claim a point in time estimate does not reflect actual debt issuing practices.

Whilst the Economic Regulator acknowledged the arguments in favour of incorporating a historic component in the debt component, the Economic Regulator also notes the Economic Regulation Authority's (ERA) view that incorporating past interest rates into the cost of debt is akin to a cost pass through. This leaves customers exposed to interest rate risk and has the potential to result in costs of debt out of line with the market and distorting Capex incentives.

The approaches currently being considered or applied by Australian regulators in determining the cost of debt component of the WACC include:

- a 'trailing average' methodology;
- a trailing average methodology with a transitional period;
- the mid-point of the 40 trading day average and a 10-year average of the yield on 10-year Commonwealth Government securities (CGS);
- 40 trading day average of the yield on 10-year CGS; and
- 40 trading day average of the yields on a portfolio of BBB corporate bonds.

In the absence of any consensus among economic regulators, for its Draft Report the Economic Regulator proposed calculating the risk free rate as the mid-point of the 40-day trading average of the 10-year CGS and a time weighted average of the 10-year CGS with a 10-year averaging period.

With respect to the debt risk premium, the Economic Regulator proposed, in its Draft Report, using the credit spreads for Australian non-financial corporations as published by the RBA. As the RBA's corporate credit spread is available monthly the Economic Regulator noted that it intended taking the last two observations available prior to making its final Price Determination. The WACCs adopted in the Economic Regulator's Draft Report used the RBA data for 12 December 2014 and are shown in Table 4.12 and Table 4.13.

Table 4.12 Economic Regulator's proposed parameters for $WACC_{NEW}$

Parameter	Description	Proposed value
Re	cost of equity (post tax)	7.63%
Rd	pre-tax cost of debt	6.01%
MRP	market risk premium	6.00%
Rf	risk free rate	4.36%
T	corporate tax rate	30.00%
β_e	equity (beta)	0.65
G	gearing ratio	60.00%
i	forecast inflation	2.50%
γ	gamma	50.00%
$WACC_{NEW}$		4.58%

Table 4.13 Economic Regulator's proposed parameters for $WACC_{EXISTING}$

Component	Description	Proposed value
Rd	pre-tax cost of debt	6.01%
G	gearing ratio	60.00%
Z	statutory pre-tax return on equity	3.00%
i	forecast inflation	2.50%
$WACC_{EXISTING}$		2.25%

In its submission on the Economic Regulator's Draft Report TasWater raised concerns about the use of different methodologies for calculating the risk free premium and the debt risk premium. The Economic Regulator has reviewed its methodology for calculating the cost of debt and, noting the continued lack of consistency between regulators with regards to calculating the risk free premium and the debt risk premium, has decided, for the sake of simplicity, to use the same methodology to calculate both the risk free premium and the debt risk premium ie a combination of time weighted average and point in time methodology.

Using the RBA data for 10 April 2015 and applying the revised methodology set out above, the Economic Regulator has calculated the final parameters for the WACCs for the second regulatory period as set out in Table 4.14 and Table 4.15.

Table 4.14 Economic Regulator's final parameters for $WACC_{NEW}$

Parameter	Description	Proposed value
Re	cost of equity (post tax)	7.18%
Rd	pre-tax cost of debt	5.81%
MRP	market risk premium	6.00%
Rf	risk free rate	3.28%
T	corporate tax rate	30.00%
β_e	equity (beta)	0.65
G	gearing ratio	60.00%
i	forecast inflation	2.50%
γ	gamma	50.00%
$WACC_{NEW}$		4.26%

Table 4.15 Economic Regulator's final parameters for $WACC_{EXISTING}$

Component	Description	Proposed value
Rd	pre-tax cost of debt	5.81%
G	gearing ratio	60.00%
Z	statutory pre-tax return on equity	3.00%
i	forecast inflation	2.50%
$WACC_{EXISTING}$		2.13%

4.4.5 Opening regulatory asset base (New Assets)

TasWater calculated its opening RAB for new assets as follows:

Table 4.16 TasWater's Proposed Opening RAB new assets ($'000s) ($2014-15)

	Water	Sewerage
1 July 2015 Opening RAB	272 028	196 249

As discussed in section 4.4.1 Jacobs' review identified that TasWater's actual Capex was less than its forecast Capex with Jacob's identifying that TasWater and its predecessors had underspent approximately $64 million over the first regulatory period. Consequently, for its Draft Report the Economic Regulator recalculated TasWater's opening RAB (New Assets) as at 1 July 2015 to factor in the difference between actual and forecast Capex during the first regulatory period. The adjustment applied to TasWater's opening RAB (New Assets) has been calculated as follows:

(a) Determine the difference between the closing RAB value for 2014-15 for new assets in the first regulatory period and the closing RAB value for new assets for 2014-15 as provided by TasWater in its Data Collection Template. This provides the amount of under-spent Capex already factored into the opening RAB (New Assets).

(b) Subtract the difference between the RABs calculated in (a) from the amount of under-spent Capex identified by Jacobs. This is the additional amount of under-spent Capex that is not factored into the opening RAB (New Assets).

(c) Reduce the opening RAB (New Assets) by the amount calculated in (b).

The adjusted Opening RAB for new assets is provided in the following table.

Table 4.17 Economic Regulator's Opening RAB new assets ($'000s) ($2014-15)

	Water	Sewerage
1 July 2015 Opening RAB	251 018	174 792

4.4.6 Regulatory asset bases

Based on the Economic Regulator's proposed RAB components specified in sections 4.4.1 to 4.4.5 above, the Economic Regulator has calculated TasWater's two RABs as follows:

Table 4.18 Economic Regulator's RABs ($'000s) ($2014-15)

	2015-16	2016-17	2017-18
$RAB_{EXISTING}$	2 558 217	2 494 819	2 431 421
RAB_{NEW}	462 683	541 960	630 472

4.4.7 Operating and maintenance expenditure

TasWater's proposed Opex is provided in the following table.

Table 4.19 TasWater's Proposed Opex ($'000s) ($2014-15)

	2015-16	2016-17	2017-18
Opex	160 301	164 676	169 173

Jacobs' review recommended using the Opex for the second year (ie 2013-14) of the first regulatory period expressed in 2014-15 dollars as a base year from which Opex is determined for the second regulatory period. In addition Jacobs also recommended that the base Opex allowance be adjusted to remove annual recurring savings of $5.9 million arising from the merger of the three previous regulated entities into TasWater. Recognising the impacts of TasWater's proposed capital program on future Opex, Jacobs also recommended increases in TasWater's Opex allowances of $700 000 in 2015-16, $1 million in 2016-17 and $1.4 million in 2017-18.

The Economic Regulator also reviewed the actual Opex for the previous regulated entities' for 2012-13 and 2013-14 and notes that the aggregated actual Opex exceeded the previous regulated entities' aggregated Opex forecasts by $11.12 million and $9.24 million respectively. Further, TasWater's forecast Opex for 2014-15 exceeds the aggregate of the previous regulated entities' Opex forecasts by $9.99 million.

In its Draft Report, the Economic Regulator accepted Jacobs' recommendations with respect to Opex and used the 2013-14 financial year as a base and included Jacobs' recommended additional annual allowances to account for the expected additional Opex associated with TasWater's capital program.

In its submission on the Draft Report, TasWater requested the Economic Regulator confirm that the various Opex figures had been expressed correctly and queried the deduction of $3.781 million to account for unregulated Opex.

The Economic Regulator subsequently reviewed and confirmed the accuracy of the Opex figures proposed in its Draft Report including that the figures had been correctly represented in 2014-15 dollars. The Economic Regulator's review also identified that Jacobs' Final Report was referring only to regulated Opex such that the reduction in the 2013-14 base figure to remove the unregulated component of Opex was not required. The Economic Regulator has therefore reversed this adjustment and has calculated TasWater's Opex for the second regulatory period as shown in Table 4.20.

Table 4.20 Economic Regulator's Opex ($'000s) ($2014-15)

	2015-16	2016-17	2017-18
Opex	149 746	150 046	150 446

4.4.8 Value of unregulated assets

The Economic Regulator notes that TasWater's Data Collection Template proposed treating eight per cent of the value of its total assets as unregulated assets. The Economic Regulator questioned TasWater about this and was advised that TasWater had adopted the same percentage of unregulated assets to total assets as the previous regulated entities had relied upon.

However this percentage (and the corresponding unregulated asset values) appears to be relatively high given the Economic Regulator's understanding of TasWater's unregulated activities and the assets involved in those activities (eg the value of the stormwater component of the Launceston Combined System and the value of pumps and pipes used for sewage re-use activities). However, over-estimating unregulated assets would be to the benefit of water and sewerage customers. The Economic Regulator therefore proposes accepting TasWater's estimate of the value of its unregulated assets.

4.4.9 Debt servicing costs

The following table reflects TasWater's calculation of its debt servicing costs for each financial year of the second regulatory period.

Table 4.21 TasWater's proposed debt servicing costs ($'000s)

	2015-16	2016-17	2017-18
Debt Servicing Costs	23 617	25 908	30 564

As noted in its Draft Report the Economic Regulator concluded that TasWater had not apportioned its debt servicing costs on the basis of the ratio of the value of regulated assets to the value of total assets. Therefore, accepting TasWater's proposal that unregulated assets comprise eight per cent of its total assets the Economic Regulator has calculated TasWater's debt servicing costs for each financial year of the second regulatory period as follows:

Table 4.22 Economic Regulator's debt servicing costs ($'000s) ($2014-15)

	2015-16	2016-17	2017-18
Debt Servicing Costs	21 728	23 836	28 119

4.4.10 Asset renewal annuity

The following table summarises TasWater's calculation of its ARA for both water and sewerage.

Table 4.23 TasWater's proposed ARA ($'000s)

	2015-16	2016-17	2017-18
Water	45 511	45 511	45 511
Sewerage	49 679	49 679	49 679
Total ARA	95 190	95 190	95 190

Following the receipt of TasWater's proposed Price and Service Plan, the Economic Regulator sought further clarification from TasWater about its approach to the calculation of its ARA. In response, TasWater advised that it viewed the ARA as an annualised theoretical calculation of the future asset renewal and replacement program required to maintain the operating capacity of infrastructure assets over the life of the regulated entity. TasWater also considered that the ARA does not necessarily equate to the current and forecast Capex allocated to renewals.

TasWater also explained that its annuity was based on a "fully regulated asset base" and essentially represented the amount it should be spending on renewals, as opposed to its forecast Capex which, given its need to focus on compliance in the near future, is based on the remaining funds that can be allocated and delivered each year.

TasWater's responses indicated that it views the calculation of the asset renewal annuities as a theoretical exercise. In its Draft Report, the Economic Regulator

noted that it did not accept TasWater's view or methodology with respect to the calculation of the ARA.

In particular, the Economic Regulator noted that the inputs into TasWater's ARA were based on theoretical expenditure which the Economic Regulator contended is not practically achievable based on both Jacobs' and the Economic Regulator's review of TasWater's past Capex.

As a result, in its Draft Report, the Economic Regulator 're-profiled' each of the water and sewerage ARAs for the second regulatory period as follows:

(a) Use forecast renewal and compliance Capex as per the Data Collection Template for the three years of the second regulatory period.

(b) After three years, reduce compliance expenditure over a seven year period to reflect Jacobs' final report reference to compliance Capex being required for a decade.

(c) After three years, use the forecast renewal Capex for the five financial years from 2013-14 to 2017-2018 as provided in the Data Collection Template and then eight years of adding the annual reduction in compliance Capex to the renewals Capex over the previous eight years.

(d) From 2032 onwards use the combined renewal and compliance Capex from 2016 onwards thereby creating an approximate 17 year renewals cycle based on TasWater's own data which Economic Regulator considers is within TasWater's financial and logistical capabilities.

Applying the methodology outlined in (a) to (d) above, the Economic Regulator's Draft Report ARA was as follows:

Table 4.24 Economic Regulator's proposed calculation of the ARA ($'000s) ($2014-15)

	2015-16	2016-17	2017-18
Water	16 040	16 040	16 040
Sewerage	28 991	28 991	28 991
TOTAL	45 031	45 031	45 031

As to the reasons for the large variation between TasWater's proposed ARA and the Economic Regulator's proposed ARA, the Economic Regulator noted in its Draft Report that it was of the opinion that Capex detailed in TasWater's ARA is not achievable and considers that TasWater has not provided adequate justification for its approach to calculating the ARA.

In its submission on the Draft Report, TasWater provided a narrative as to why the Economic Regulator's proposed ARA was incorrect. However, TasWater did not provide an alternative expenditure profile relevant to, or consistent with, that narrative. Upon request, TasWater subsequently provided a revised ARA which reflected a change in the annuity from 30 years to 60 years, included combined water and sewerage Capex of over $474 million in 2015-16 and resulted in a

proposed annual annuity value of $95.4 million which was slightly higher than the ARA presented in TasWater's proposed Price and Service Plan. The Economic Regulator notes that the $474 million in Capex for 2015-16 relates to TasWater's estimate of the expenditure required to address the backlog of renewals.

The Economic Regulator considers that the additional information provided by TasWater did not address the concerns outlined in the Economic Regulator's Draft Report regarding TasWater's proposed ARA, specifically that the Capex used to calculate the annuities must be realistic and within TasWater's financial and logistical capabilities to deliver. Consequently, the Economic Regulator has decided to apply the same methodology as it applied in calculating the ARA reflected for the Draft Report in calculating TasWater's annual lower revenue limits for the second regulatory period.

However, due to the reduction in $WACC_{NEW}$ between the Economic Regulator's Draft Report and in this Final Report (as explained in section 4.4.4), there has been a consequential decrease in the ARAs TasWater is required to adopt for the second regulatory period as shown in the following table.

Table 4.25 Economic Regulator's calculation of the ARA ($'000s) ($2014-15)

	2015-16	2016-17	2017-18
Water	15 756	15 756	15 756
Sewerage	28 504	28 504	28 504
TOTAL	44 260	44 260	44 260

4.5 Calculation of TasWater's revenue limits

The upper, statutory and lower revenue limits in this section have been calculated using the Economic Regulator's decisions on the revenue limit components as set out in section 4.4.

Table 4.26 Upper revenue limit ($2014-15)

	2015-16	2016-17	2017-18
Total RAB (a) ($'000s)	3 020 900	3 036 779	3 061 893
$WACC_{NEW}$ (b)	4.26%	4.26%	4.26%
Depreciation (c) ($'000s)	71 442	73 027	74 763
O&M (d) ($'000s)	149 746	150 046	150 446
Upper revenue limit = (a x b) + c + d ($000s)	349 784	352 344	355 550

Table 4.27 Statutory revenue limit calculation ($2014-15)

	2015-16	2016-17	2017-18
$RAB_{Existing}$ (g) ($'000s)	2 558 217	2 494 819	2 431 421
$WACC_{EXISTING}$ (h)	2.13%	2.13%	2.13%
RAB_{New} (i) ($'000s)	462 683	541 960	630 472
$WACC_{NEW}$ (b)	4.26%	4.26%	4.26%
Depreciation (c) ($'000s)	71 442	73 027	74 763
O&M (d) ($'000s)	149 746	150 046	150 446
Statutory Revenue Limit = (g x h) + (i x b) + c + d ($000s)	295 455	299 362	303 914

Table 4.28 Lower revenue limit calculation ($2014-15)

	2015-16	2016-17	2017-18
Debt servicing costs (e) ($'000s)	21 728	23 836	28 119
O&M (d) ($'000s)	149 746	150 046	150 446
ARA (f) ($'000s)	44 260	44 260	44 260
Statutory revenue limit = e + d + f ($000s)	215 733	218 141	222 824

A more detailed calculation of the three revenue limits is outlined in Appendix 1.

Chapter 5 of this Final Report compares the revenue limits calculated above against TasWater's forecast of its expected revenue for each year of the second regulatory period.

The Economic Regulator requires TasWater to adopt in its final Price and Service Plan the revenue limit calculations presented in Chapter 4 of this Final Report.