Independent Pricing and Regulatory Tribunal
New South Wales

Review of Essential Energy's prices for water and sewerage services in Broken Hill

From 1 July 2019

Final Report
Water Pricing

May 2019

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The Independent Pricing and Regulatory Tribunal (IPART)

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1 Executive Summary

The Independent Pricing and Regulatory Tribunal of NSW (IPART) has completed its review of the prices for Essential Water's[1] water and other services to customers in Broken Hill and the surrounding areas of Menindee, Sunset Strip and Silverton. We have determined the maximum prices Essential Water can charge from 1 July 2019 for its:

- Water supply services
- Sewerage services
- Trade waste services, and
- A range of its miscellaneous and ancillary services.[2]

In the concurrent WaterNSW pipeline review, we have reviewed the prices WaterNSW can charge Essential Water for the water transportation services provided by the Murray River to Broken Hill Pipeline (the Pipeline) from 1 July 2019.[3]

In this report, we outline our decisions on Essential Water's efficient costs of providing water and other services, the share of costs (including the Pipeline costs) that will be recovered from customers through prices, and our recommended share of costs to be funded by the NSW Government. It also explains how we reached these decisions and how our prices compare to Essential Water's proposed prices. We have set prices taking into account the NSW Government's commitment that prices will not increase in real terms (ie, excluding the effects of inflation) as result of the Pipeline. Bills for most residential customers will increase by less than inflation.

The new prices are expected to apply from 1 July 2019.

Throughout this report, prices are presented in $2018-19, unless stated otherwise.[4] This means these prices, and the difference between them and current (2018-19) prices are expressed in real terms (that is, excluding the impact of inflation).

1 Essential Water is part of Essential Energy's Network Operations division and operates under a ring-fencing waiver granted by the Australian Energy Regulator (AER).

2 We have deferred regulating prices for any recycled water services Essential Water provides until the next review of its water and wastewater services (see Section 10.4).

3 IPART, Review of prices for WaterNSW's Murray River to Broken Hill Pipeline from 1 July 2019 – Final Report, May 2019.

4 The Final Determination accompanying this Final Report presents prices for the 2019 determination period in $2019-20 (which are the IPART determined prices listed in this Final Report in $2018-19, adjusted to $2019-20 using inflation of 1.3%). This means that prices for the first year of the 2019 determination period (2019-20) apply as they are presented in the Final Determination. However, prices that apply from the second year of the 2019 determination period will need to be adjusted for future inflation, based on changes in the Consumer Price Index (CPI). The Final Determination specifies the method Essential Water must follow when adjusting prices that apply from the second year of the 2019 determination period for future changes in CPI.

1.1 Overview of our decisions and their impacts

We have made a decision to set prices for three years, from 1 July 2019 to 30 June 2022 (the 2019 determination period).[5] Under our decisions, most prices will remain constant or fall slightly, excluding the rate of inflation:

- Water prices will remain constant for almost all customers.
- Sewerage prices will be slightly lower in real terms for all residential customers, and most non-residential customers.

This means that bills for most residential customers and the mines will increase by less than inflation. Bills for non-residential customers will also increase by less than inflation, except for those subject to trade waste charges.

There are three groups of customers that will see real price increases (ie, increases above the rate of inflation):

- Trade waste prices will gradually increase towards the prices in the Department of Industry's (DoI's) Liquid Trade Waste Regulation Guidelines.[6] In general, customers who receive trade waste services currently do not pay for these services, and their bills will gradually increase to be more cost-reflective. Trade waste customers represent around 3% of all customers in and around Broken Hill.
- Water usage prices for chlorinated water and some untreated water customers[7] will increase by more than inflation to better reflect Essential Water's costs in supplying these services. Chlorinated and untreated water customers make up less than 1% of the total number of customers in Broken Hill and surrounding areas.

In addition, under our decisions:

- The structure of sewerage service prices for residential customers will change to improve equity and cost reflectivity between residential and non-residential customers.
- Essential Water will generate about 15% less revenue per year than it proposed (on average), to maintain its existing network.

Our pricing decisions mean that we recommend a NSW Government subsidy of $23 million per year on average (or $68 million in total) over the 2019 determination period. This is to reflect the NSW Government's commitment to subsidise the efficient costs of the Pipeline such that prices for end use customers do not rise in real terms as a result of the Pipeline (see Section 1.1.6).

5 We last set maximum prices for Essential Water in 2014 from 1 July 2014 to 30 June 2018 (the 2014 determination period). These prices continue to apply until 30 June 2019, because we deferred setting prices until the cost implications for Essential Water of the Murray River to Broken Hill Pipeline were clearer. For more information, see: IPART, Broken Hill Water and sewerage services price review deferred, Media Release, 14 November 2016.

6 NSW Department of Industry, Liquid Trade Waste Regulation Guidelines, April 2009.

7 These are offtake customers who currently receive untreated water directly from the Menindee, Stephens Creek and Umberumberka pipelines.

1.1.1 Most prices will remain broadly constant

Essential Water proposed that all water prices increase by an average of 4.2% per year (in real terms). However, under our decisions:

- Water service prices for residential and non-residential customers will remain broadly the same in real terms over the determination period.
- Treated water usage prices will also remain the same in real terms over the determination period. More than 95% of Essential Water's customers receive treated water.
- Chlorinated water usage prices will gradually increase towards the untreated water usage price, to make them more cost-reflective.
- The untreated water usage price levied on offtake customers who currently receive water directly from the Menindee, Stephens Creek and Umberumberka pipelines (currently $0.78 per kL) will gradually increase towards the price for other untreated water customers, to better reflect the cost of supplying untreated water to these customers.
- Sewerage service prices will decrease by 24% for non-residential customers (and 3% for residential customers). The relative difference is because we have introduced a deemed sewerage usage component for residential customers.[8] We have made this price structure change to promote more equitable and cost-reflective prices between residential and non-residential customers (see Chapter 9).

In addition, we have set fixed and variable charges for trade waste, to encourage Essential Water to recover trade waste costs from customers who impose these costs, rather than from all customers. Although our 2014 Determination set prices for trade waste, Essential Water did not levy these charges on customers in practice (except for the mines). We consider that Essential Water should levy trade waste charges on all trade waste customers in the 2019 determination period, and consult customers to better understand the impacts of these charges on them and inform its proposed trade waste prices at its next price review.

We have made some changes to the draft decisions in our Draft Report, to take into account stakeholder submissions and updated information provided by Essential Water. Specifically, we decided to:

- Gradually transition the price for untreated water customers on the Menindee, Stephens Creek and Umberumberka pipelines towards the price for other untreated water customers, to reduce bill shock, and
- Maintain the water service charges to the mines at current (2018-19) levels in real terms (ie, excluding the effects of inflation) to account for stakeholder feedback, more detailed water usage data from Essential Water which showed that historical water usage has been broadly stable over the past two determination periods, and uncertainty around the impact of the Pipeline on the mines' share of total future water consumption.

Our decisions on water and sewerage prices are set out in Table 1.1 and Table 1.2, respectively.

8 Residential customers will pay a fixed (or deemed) sewerage usage charge of 90 kL per year annum multiplied by the sewerage usage charge. Non-residential will continue to pay a sewerage usage charge based on water usage multiplied by their discharge factor, multiplied by the sewerage usage price.

Table 1.1 IPART's decisions on water prices ($2018-19 – ie, without inflation)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2021-22
Service Charges ($/year)					
Residential	327.68	327.68	327.68	327.68	0.0%
Non-residential[a]					
– 20mm connection	327.68	327.68	327.68	327.68	0.0%
– 25mm connection	512.00	512.00	512.00	512.00	0.0%
– 40mm connection	1,310.72	1,310.72	1,310.72	1,310.72	0.0%
– 100mm connection	8,192.01	8,192.00	8,192.00	8,192.00	0.0%
Mines ($ 000s)					
– Perilya	2301.55	2301.55	2301.55	2301.55	0%
– CBH	555.17	555.17	555.17	555.17	0%
Usage Charges ($/kL)					
Treated	1.80	1.80	1.80	1.80	0%
Chlorinated[b]	1.16	1.22	1.28	1.34	16%
Untreated – pipeline[c]	0.78	0.86	0.94	1.02	31%
Untreated – Non-pipeline[d]	1.58	1.58	1.58	1.58	0%

a The meter based charges are set with reference to the 20mm meter charge based on the following formula: (meter size)^2 x 20mm meter charge / 400.

b Chlorinated water is supplied to residential and non-residential customers in Silverton.

c Pipeline customers with offtakes from the Menindee, Stephens Creek and Umberumberka pipelines currently receive untreated water for stock and domestic purposes.

d Untreated water is supplied to customers in Broken Hill, including Broken Hill Council and the mines.

Table 1.2 IPART's decisions on sewerage prices ($2018-19– ie, without inflation)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2021-22
Service Charges ($/year)					
Residential[a]	535.73	522.08	522.08	522.08	-3%
Non-residential[b]					
– 20mm connection	765.00	581.25	581.25	581.25	-24%
– 25mm connection	1,195.22	908.21	908.21	908.21	-24%
– 40mm connection	3,060.01	2,325.01	2,325.01	2,325.01	-24%
– 100mm connection	19,125.08	14,531.32	14,531.32	14,531.32	-24%
Usage Charges ($/kL)					
Non-residential	1.28	1.28	1.28	1.28	0%

a We introduced a sewerage usage charge based on a deemed discharge allowance of 90 kL per annum for residential customers (see Section 9.4). This deemed sewerage usage charge has been included in the residential service charge, although it is up to Essential Water whether it separately itemises this charge in its bill to customers.

b Non-residential charges listed here assume a 100% discharge factor. Bills will depend on discharge factors for individual customers.

Note: Sewerage service charges for non-residential customers and mining customers are based on water meter size. The applicable meter charge is set using the formula: (meter size)^2 x 20mm meter charge / 400 x discharge factor. We have calculated service charges for larger meter sizes using this formula.

1.1.2 Bills will increase by slightly less than inflation for most residential customers

Under our prices for residential customers, most customers will see a small increase in their combined water and sewerage bills over the determination period, including the effects of inflation.[9] While actual bill impacts depend on customers' individual water usage, we have estimated indicative impacts for customers with a range of usage (Table 1.3). This analysis indicates that, over three years (to 2021-22):

- A customer in a house or apartment who uses 300 kL of treated water per year will see an increase in their annual bill of around 5% (in nominal terms ie, including inflation).
- A pensioner customer in a house or apartment who uses 300 kL of treated water per year will see an increase in their annual bill of around 6% (including inflation).[10]

9 In calculating indicative bills, we have applied inflation of 1.3% for 2019-20 and then forecast inflation of 2.5% per year thereafter. This results in a cumulative expected inflation of 6.4% over the 3 years.

10 Pensioners will see their bills increase slightly more, as a percentage, compared to other residential customers. This is because the pensioner rebate of $175 per year (for water and sewerage) is fixed in nominal terms and not indexed in line with inflation. The rebate is provided by Essential Water and funded by the NSW Government.

Table 1.3 Residential annual water and sewerage bills ($nominal – ie, including inflation)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2021-22
Residential – treated water – non pensioner					
200kL	1,223	1,225	1,255	1,287	5%
300kL	1,403	1,407	1,442	1,478	5%
400kL	1,583	1,589	1,629	1,669	5%
Residential – treated water – pensioner					
200kL	1,048	1,050	1,080	1,112	6%
300kL	1,228	1,232	1,267	1,303	6%
400kL	1,408	1,414	1,454	1,494	6%
Residential – chlorinated water (water bills only as no sewerage services are provided)					
200kL	560	580	607	635	13%
300kL	676	704	740	777	15%
400kL	792	828	873	920	16%

Note: Bills are calculated assuming individual 20mm meter connections. Bill impacts include our estimate of cumulative inflation of 6.4% over the 2019 determination period.

Source: Essential Water pricing model, September 2018 (based in $2018-19); IPART analysis.

1.1.3 Bills will remain broadly similar for most non-residential customers

For non-residential customers, the impacts of our decisions on bills will depend on their meter size, discharge factor, and water usage. Our estimates of the indicative bill impacts on businesses with a range of meter sizes and levels of water usage indicate that most customers will see a small bill increase that is below the rate of inflation (Table 1.4) – largely due to the decrease in sewerage service prices.[11] For example, a non-residential customer consuming 2,100 kL of treated water per year will see a bill increase of 0.5% (in nominal terms) in 2021-22 compared to 2018-19.

For some non-residential customers, total bills will increase more if they also pay trade waste charges (see Chapter 10 for further details).

11 Bill impacts would otherwise be higher for businesses, including inflation, if sewerage prices did not decrease.

Table 1.4 Non-residential annual water and sewerage bills ($nominal – ie, including inflation)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2021-22
Non-residential – treated water					
20mm with 250kL usage	1,537	1,427	1,463	1,500	-2%
25mm with 1,000kL usage	4,045	3,893	3,993	4,094	1%
40mm with 2,100kL usage	9,114	8,709	8,933	9,158	0.5%
80mm with 21,000kL usage	70,427	69,236	71,024	72,820	3%
Non-residential – untreated water, non-pipeline customers[a] (water bills only as no sewerage services are provided)					
20mm with 250kL usage	723	732	750	769	6%
25mm with 1,000kL usage	2,092	2,119	2,172	2,226	6%
40mm with 2,100kL usage	4,629	4,688	4,805	4,925	6%
80mm with 21,000kL usage	38,423	38,911	39,884	40,881	6%

[a] See Section 11.3 for impact analysis for pipeline customers receiving untreated water.

Note: Sewerage service charges for non-residential customers are based on water meter size. The applicable meter charge is set using the formula: (meter size)^2 x 20mm meter charge / 400 x discharge factor.

We have calculated service charges for larger meter sizes based on this formula, using a standard discharge factor of 70%, as indicated in Essential Energy's pricing proposal (p 200). Actual bills will depend on discharge factors for individual customers.

Bill impacts include our estimate of cumulative inflation of 6.4% over the 2019 determination period.

Source: Essential Water pricing model, September 2018 (based in $2018-19); IPART analysis.

1.1.4 Bills will increase by slightly less than inflation for mining customers

In our Draft Report, we broadly maintained the approach of our 2014 Determination in setting water prices to the mines. This involved setting the mines' water usage prices at the same level as other customers, and setting their water service prices based on their respective shares of Essential Water's revenue over the previous determination period.

Under this approach, to set the mines' water service prices in the Draft Report, we used the water usage data that Essential Water submitted in its pricing proposal, which resulted in an increase in the mines' service price of around 20% in 2019-20 (after which prices would be constant in real terms over the determination period). This increase was not related to the Pipeline; rather it reflected that the mines' share of historical water usage had increased over the 2014 determination period.

Our final decision, however, is that water service prices for mining customers will remain unchanged at current (2018-19) levels, in real terms, over the 2019 determination period. This means that the mines' water prices will only increase from current levels by the rate of inflation. This decision takes into account:

- Stakeholder feedback received from Essential Water and CBH Resources in response to our Draft Report.

- Updated historical water consumption, which shows that the mines share of historical water consumption has been broadly stable. Essential Water, after the Draft Report, provided IPART with meter-level consumption data. This updated data showed that the mines usage, as a share of total water usage, has been largely stable over the past two determination periods.
- Uncertainty around future consumption. The new Pipeline could result in a structural shift in the share of water demand between mining and non-mining demand. Therefore, basing prices on historical revenue shares might not be appropriate for the 2019 determination period.

Due to the decrease in sewerage service charges, combined water and sewerage bills for the mines are expected to slightly decrease in real terms over the 2019 determination period. That is, they are expected to increase in nominal terms, but by slightly less than the rate of inflation over the 2019 determination period.

1.1.5 Essential Water will recover less revenue than proposed

Our decision is that Essential Water's total notional revenue requirement (NRR) is $139.6 million over the three years to 2021-22. Table 1.5 outlines our decision on the efficient revenue requirement for Essential Water, and the key differences to Essential Water's proposal.

Table 1.5 IPART's decision on Essential Water's revenue requirement ($2018-19)

$ millions	Essential Water's existing network costs	Consequential works costs	Broken Hill Pipeline transportation costs	Total
Essential Water proposed	73.4	*8.4*[a]	*92.8*[b]	*174.7*
IPART's decision	62.6	3.3	73.7	139.6

[a] Essential Water did not propose a NRR for consequential works. We have calculated this based on information provided by Essential Water on capital expenditure, assuming a pre-tax WACC of 4.9%, and an economic life of 98 years for all expenditure.

[b] Essential Water did not propose a NRR for the Pipeline transportation costs. This figure is WaterNSW's proposed NRR for these costs (see WaterNSW pricing proposal to IPART, June 2018, pp 49, 56). We have reviewed the efficient costs of the Pipeline in our concurrent WaterNSW price review of prices for the Murray River to Broken Hill Pipeline from 1 July 2019.

Source: Essential Water pricing model; IPART analysis.

The NRR reflects Essential Water's total efficient costs of providing water and other services to its customers over the determination period. We established this amount by separately estimating:

- The efficient operating and capital costs Essential Water will incur to provide services via its **existing network,** and any **consequential works** required to service customers as a result of the Pipeline.

- The **transportation costs** Essential Water will incur in obtaining bulk water via the Pipeline. We used our decisions on the prices WaterNSW can charge Essential Water for this service to calculate these costs.[12]

Our final decision on Essential Water's NRR is about $4 million per year lower than our draft decision, because:

- The final prices for bulk water transportation services provided by the Pipeline are lower than our draft prices. This is largely because WaterNSW's actual project costs for the Pipeline were lower than previously forecast.
- Our updated Weighted Average Cost of Capital (WACC) and inflation parameters are lower, which reduces Essential Water's NRR.

We also considered what share of efficient costs should be paid by customers, and what share should be funded by the NSW Government, given its funding commitment for the Pipeline.

Essential Water did not include all the costs of supplying its services

Essential Water proposed that it requires $100.1 million ($2018-19) in revenue from customers over a four year determination period.[13]

However, as it only included the operating and capital costs of maintaining its existing network, this did not include the full costs of providing water and sewerage services to its customers over the next four years. Specifically, it did not include:

- The cost of transporting bulk water through the Pipeline, or
- The cost of consequential works that Essential Water considers are needed as a result of the Pipeline.

Instead, Essential Water proposed that these costs should be passed-through to customers if alternative funding (eg, from Government) was not secured (see Section 3.3).

Lower operating expenditure for Essential Water's existing network

Essential Water proposed total direct operating expenditure of $36.0 million over the 3-year determination period (excluding the cost of transporting bulk water via the Pipeline and corporate overheads).[14]

Our assessment of efficient direct operating costs for this determination period is $31.1 million, excluding the cost of transporting bulk water via the Pipeline and corporate overheads. However, our assessment of total efficient operating costs is $109.8 million, including the efficient costs of transporting bulk water via the Pipeline and corporate overheads (see Chapter 5 for further details).

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12 We are setting maximum prices for WaterNSW as part of a separate, concurrent review that will assess the efficient construction, maintenance and operating costs of the Pipeline. For more information, see: IPART, Review of prices for WaterNSW's Murray River to Broken Hill Pipeline from 1 July 2019 – Final Report, May 2019.

13 Essential Water proposed a four year period for its 2019 Determination. See Essential Water pricing proposal to IPART, July 2018, p 21.

14 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 62.

Lower capital expenditure

Essential Water's proposed capital expenditure for the three year period included:

- $47.4 million for its existing network, excluding consequential works associated with the Pipeline and corporate overheads. The key driver is the proposed replacement of the Wills Street wastewater treatment plant.
- $46.8 million for consequential works (including contingencies and overheads), to be funded by the NSW Government.

Our assessment of Essential Water's efficient forecast capital expenditure for the 2019-22 determination period is:

- $28.7 million for its existing network, excluding consequential works and corporate overheads. This is $18.7 million (or 39%) less than Essential Water's proposal. The majority of this reduction comes from delaying the replacement of the Wills Street wastewater treatment plant.
- $19.9 million for consequential works (including contingencies and overheads), which is 57% less than Essential Water's proposal over the same period.

We have included a total allowance of $28.2 million for capital costs over the three year determination period, comprising a return on capital and return of capital (see Section 4.3 and Appendix F).

1.1.6 We have recommended a NSW Government funding contribution of $68.4 million

The NSW Government has committed to subsidise the efficient costs of the Pipeline, to ensure that prices for end use customers do not rise in real terms as a result of the Pipeline (see Box 1.1 below).

Box 1.1 NSW Government funding commitment

The NSW Government has committed to subsidise the efficient costs of the Murray River to Broken Hill Pipeline (for four years from 2019), to ensure that prices for end use customers do not rise in real terms as a result of the Pipeline.[a]

The intention of this decision is that the Government will fund the Pipeline costs so that any price increases above CPI are not due to the Pipeline. This still leaves open the possibility of price increases for reasons other than the Pipeline.

We have set prices to reflect efficient costs of providing services less any confirmed Government subsidies or grants.

[a] NSW Government, Letter to the Chair – IPART, 21 November 2018. Available at: https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/pricing-reviews-water-services-metro-water-legislative-requirements-prices-for-essential-energys-water-and-sewerage-services-in-broken-hill-from-1-july-2019/letter-from-the-minister-on-the-broken-hill-pipeline.pdf

We have considered the Government's commitment in setting prices. Under our prices, the revenue that Essential Water will recover from customers ($71 million over the three year determination period) is less than the total efficient cost of supplying water and other services to its customers ($139.6 million over the three year determination period). Therefore, we have recommended a NSW Government contribution of $68.4 million be made to Essential Water to recover this difference. This Government subsidy includes $67.5 million for the Pipeline, $148,000 to transition the untreated water usage price for pipeline customers (discussed in Chapter 8) and $770,000 to transition trade waste prices (discussed in Chapter 10). The Government contribution is discussed further in Chapter 4.

Our decisions to implement a few small price structure changes have been made to increase the cost-reflectivity of these charges, and are independent of the Pipeline.

1.2 Structure of this report

The rest of this report provides more information about how we reached our decisions, and how these compare to Essential Water's pricing proposal:

- Chapter 2 outlines the context for the review, including Essential Water's operations, and how this review relates to other recent or concurrent pricing reviews.
- Chapter 3 discusses the decisions we make before setting prices, including the form of regulation, and risk sharing mechanisms.
- Chapter 4 discusses our decisions on the length of the determination period, and our approach to calculating the revenue requirement.
- Chapters 5 and 6 discuss our assessment of efficient operating and capital expenditure for Essential Water.
- Chapter 7 discusses forecast water sales and customer numbers.
- Chapters 8 to 10 set out our price structure decisions and prices for water, sewerage and other services.
- Chapters 11 and 12 presents customer bill impacts of our pricing decisions, and implications on Essential Water and the environment.

Our decisions and recommendations are set out in these chapters, and are also listed below for convenience.

1.2.1 List of decisions

Length of determination period and revenue requirement

Allowance for operating expenditure

Prudent and efficient capital expenditure

Forecast water sales and customer numbers

Water prices

Sewerage prices

Prices for other services

37 To set the maximum prices Essential Water can charge for trade waste services as set out in Appendix I. 121

38 To remove the full revenue from trade waste charges that Essential Water would recover under DoI's guideline trade waste charges from Essential Water's sewerage Notional Revenue Requirement (NRR), as per Table 10.2. 121

39 To set the maximum prices Essential Water can charge for miscellaneous services as set out in Appendix J. 127

40 Not to set effluent water prices, and to accept Essential Water's proposal that 50% of the forecast revenue from effluent water sales is shared with customers. 128

41 To set water prices for all unmetered residential and non-residential customers as: 129

- The standard residential water service charge, plus 129
- A water usage charge for a deemed consumption of 300 kL per year, for the applicable water quality. 129

42 To set sewerage prices for all unmetered residential and non-residential customers as the standard residential sewerage service charge (which includes a deemed usage of 90 kL per year). 129

43 To set water service charges for properties not connected to the water supply system to zero. 130

44 To set sewerage service charges for properties not connected to the sewerage system to zero. 130

1.2.2 Recommendations

Recommendation Page no.

1 That Essential Energy review and revise its approach to forecasting and allocating corporate operating costs to Essential Water for the next pricing review. 51

2 That the NSW Government fund the difference ($68.4 million) between the total revenue to be recovered from customers and the target revenue via a direct contribution to Essential Water. This funding contribution would reflect: 55

- the bulk water transportation costs of the Pipeline such that end-use prices do not increase in real terms as a result of the Pipeline - this is $67.5 million over the three-year determination period
- the shortfall in revenue associated with transitioning the untreated water usage price for pipeline customers over time, to the same untreated water usage price faced by other customers – this is $148,000 over the three-year determination period
- the shortfall in revenue associated with transitioning trade waste prices towards cost-reflective levels – this is $770,000 over the three-year determination period.

2 Context for the review

This chapter provides context for our prices for Essential Water's water and sewerage services. The sections below outline:

- Essential Water's role and its water and sewerage services
- Its current and proposed water supply and sewerage operations
- How bills and median incomes in Broken Hill compare to other areas
- Our considerations in setting maximum prices for this review, and
- Our review process.

2.1 Essential Water's role and services

Essential Water is an operating division of Essential Energy,[15] which is a NSW Government-owned corporation primarily responsible for building, operating and maintaining the electricity distribution network in regional and remote NSW.

Essential Water provides water, sewerage, trade waste and miscellaneous services to around 18,000 people in Broken Hill, Menindee, Sunset Strip and Silverton.[16]

Essential Water's water supply functions are set out in the *Water Management Act 2000*. The sections below provide an overview of Essential Energy's water-related services, while Appendix B provides an overview of Essential Water's regulatory framework.

2.1.1 Water supply services

Essential Water supplies drinking water to nearly 11,000 customers, including about 10,000 residential and 900 non-residential customers (mostly in Broken Hill).[17] It also provides non-potable water to rural users along the Menindee pipeline for stock and domestic purposes, and to mining customers.

Essential Water's largest customer is the mining company Perilya Ltd (Perilya), which in recent years has consumed approximately 25% of the total water supplied by Essential Water.[18] A second mining customer, CBH Resources Ltd (Broken Hill Operations), also operates close to Broken Hill.

Essential Water currently provides the following water services:

- **Treated water** – also known as drinking water or potable water – to Broken Hill and Menindee.

15 Essential Water website, http://www.essentialwater.com.au/#, accessed 3 August 2018.
16 Essential Water pricing proposal to IPART, July 2018, Customer Summary, p 4.
17 Essential Water pricing proposal to IPART, July 2018, p 31.
18 Essential Water Annual Information Return, July 2018.

- **Untreated water** – also known as raw water – to some locations in Broken Hill and Menindee, and to customers along the Menindee, Stephens Creek and Umberumberka pipelines.
- **Chlorinated water** – which is raw water that has been disinfected but not filtered – to customers in Silverton and Sunset Strip.
- **Effluent water** – wastewater or sewerage that has been treated before being re-used or discharged to the environment, and also known as recycled water – to eight customers for a range of non-potable uses, including processing operations, dust suppression and maintaining local amenity.

2.1.2 Sewerage services

Essential Water provides sewerage services to approximately 9,700 properties in the city of Broken Hill, including some houses and other buildings in the Perilya mining lease area.[19] It operates two sewage treatment plants, and after treating, sells around half of this water as effluent water. The remaining half is discharged to the environment through evaporation ponds.

2.1.3 Trade waste and miscellaneous services

In this review, trade waste is defined as wastewater from commercial and industrial customers in which the concentrations of pollutants exceed the level contained in household wastewater. Essential Water provides trade waste services to about 250 non-residential customers in the city of Broken Hill only.[20]

Essential Water also provides a range of miscellaneous services to its water and sewerage customers. These are generally one-off services such as connections and disconnections, replacing damaged services, plumbing inspections, site inspections and building plan approvals. Charges for these miscellaneous services are levied on a relatively small number of customers, and are charged on an as needed basis.

2.2 Essential Water's operations

Essential Water's service area is the most arid in the state, and experiences extreme climatic variations and more frequent drought than coastal areas.

2.2.1 Current water operations

Essential Water is an end water user and is currently licensed to extract 10 GL of water per year from the Menindee Lakes Scheme.[21] Essential Water sources most of its bulk water from the Darling River via a pipeline to the Menindee Lakes. To supply water to Broken Hill customers, water currently sourced from Menindee Lakes is pumped a height of 287 metres

19 Essential Water pricing proposal to IPART, July 2018, p 31.
20 Marsden Jacob Associates, Review of proposed prices for trade waste and miscellaneous prices – Essential Water, February 2019, p 8.
21 It also holds a licence to extract 29 ML per year of raw water for Menindee.

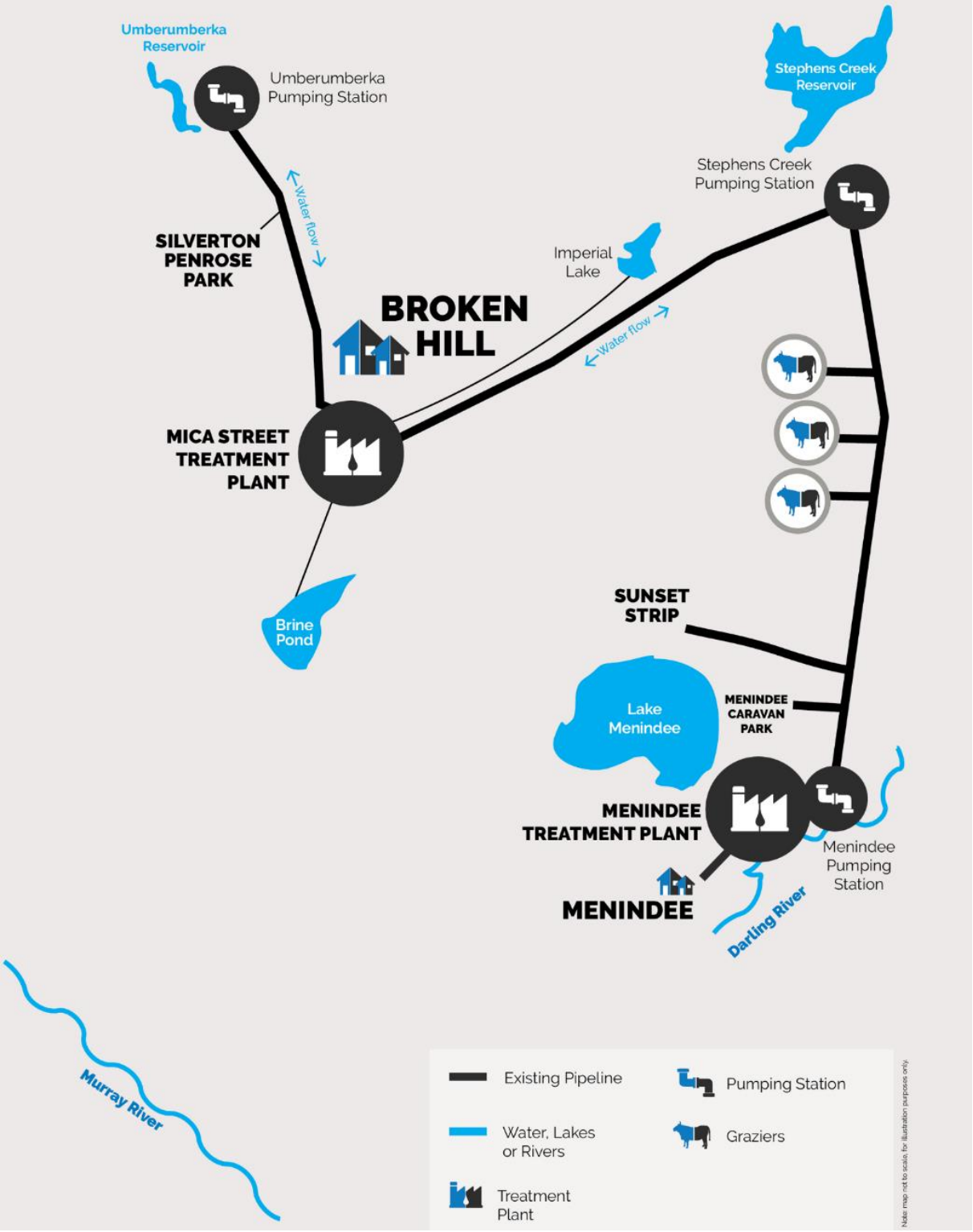
over a distance of 116 km from its source at the Darling River to the Mica Street water treatment plant in Broken Hill.

In addition to the Menindee pipeline, Essential Water currently also manages three other water sources:

- Stephens Creek Reservoir, which has a capacity of 19,000 ML, and can receive water from its own catchment. It is also currently used to store water supplied via Menindee Lakes.
- Umberumberka Dam, which has a capacity of 7,800 ML and receives water from its own catchment.
- Imperial Lake, a small dam with a capacity of 670 ML, which collects from its own catchment, including part of the Broken Hill urban area. It is used as an emergency storage only.

Figure 2.1 shows the current water supply network.

Figure 2.1 Essential Water's current water supply network



Note: Map not to scale, for illustrative purposes only

Source: IPART analysis, based on Essential Water pricing proposal to IPART, July 2018, p. 39.

2.2.2 The 2015-16 drought

From late 2014 until mid-2016, a prolonged drought contributed to low water levels in the Menindee Lakes. This led to concerns about water security and the imposition of progressively more severe water restrictions in the city during 2015.[22] The low inflows into the lakes also increased the salinity of Broken Hill's bulk water supplies, requiring Essential Water to desalinate its raw water prior to treatment.

On 19 June 2015, the Minister for Industry, Resources and Energy directed Essential Water to construct, operate and maintain the necessary infrastructure to be able to supply 13 ML of drinking water per day to Broken Hill. The NSW Government also provided $13.8 million directly to Essential Water for emergency drought works from the Restart NSW fund.

This project, which incorporated the construction of a new reverse osmosis plant, associated pipeline and brine ponds, was operated from December 2015. Full operation of the reverse osmosis plant ceased in September 2016. Since then, three units were decommissioned and removed, and four remaining units have been run in a care and maintenance mode.

2.2.3 The Murray River to Broken Hill pipeline

The Menindee pipeline construction was completed in 1952. Essential Water indicated in its pricing proposal that the pipeline is nearing the end of its design life and fails regularly, requiring the entire pipeline to be taken out of operation until repair works are completed. When this happens, water supply to customers along the pipeline is interrupted until operation is restored.

On 16 June 2016, the NSW Government announced that it would build a 270 km pipeline from the Murray River to Broken Hill.[23] The then Minister for Regional Water directed WaterNSW, under section 20P of the *State-Owned Corporations Act*, to build a pipeline from the Murray River to the Mica Street Water Treatment Plant in Broken Hill. The Pipeline (Murray River to Broken Hill) has largely eliminated Essential Water's need to access water from the Darling River. WaterNSW has contracted a consortium led by John Holland to construct, maintain and operate the Pipeline. The Pipeline is designed to provide up to 37.4 ML/day of raw water. This is around 130% of Broken Hill's current peak daily water demand, and 270% of its current average day's demand.[24]

WaterNSW is also building a bulk water storage facility, with capacity of 720 ML. This capacity is equal to around 25 days of water at Broken Hill's current peak day's demand.

In addition to the Pipeline, associated pump stations and bulk storage, WaterNSW is also building a number of related capital assets that Essential Water has stated will be gifted to

22 NSW Legislative Council General Purpose Standing Committee No.5, *Water Augmentation*, transcript of hearing 26 October 2016 (testimony of John Coffey, Essential Water) pp 38, 43.

23 NSW Government, New Pipeline to secure Broken Hill water supply, press release, 16 June 2016. Available at: https://www.nsw.gov.au/your-government/the-premier/media-releases-from-the-premier/new-pipeline-to-secure-broken-hill-water-supply/

24 Essential Water annual information return, July 2018. Broken Hill's current peak day's demand for treated and untreated water is around 29 ML/day (highest within the period 2014-18) and average demand is around 14 ML/day (2014-18 period).

Essential Water at no cost. Essential Water understands the Government will fund these assets directly.[25] These additional assets include:

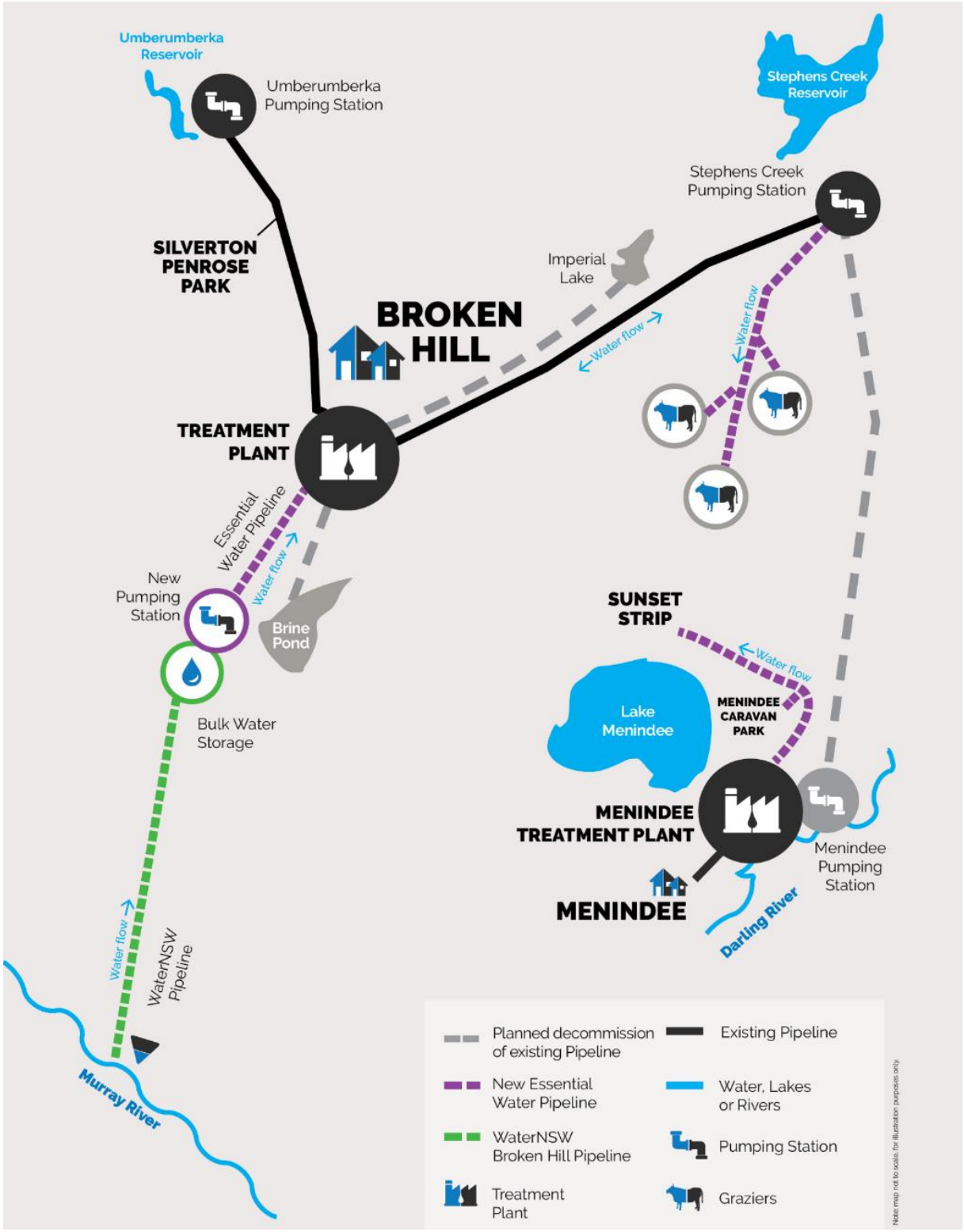
- The final section of the Pipeline and a pump station to transport water around 20 km from WaterNSW's bulk storage to Broken Hill's main water treatment plant at Mica Street, as well as auxiliary works to integrate the Pipeline into the treatment system, and
- Electricity infrastructure needed to power the Pipeline.

2.2.4 Proposed water operations

The completion of the Pipeline **will substantially change Essential Water's water operations for the 2019 determination period**. Essential Water's pricing proposal includes a number of changes to its existing water supply network, which are summarised in Figure 2.2.

25 Essential water pricing proposal to IPART, July 2018, p 57.

Figure 2.2 Essential Water's proposed water operations (including consequential works)



Note: Map not to scale, for illustrative purposes only.

Source: IPART analysis, based on Essential Water pricing proposal to IPART, July 2018, pp. 19, 27, 39, 57, 124, 125, 129, 130.

Once the Pipeline is operational, Essential Water plans to decommission the existing Menindee pipeline. This will have significant flow on impacts for its water operations:

- Customers in Broken Hill and Silverton, as well as mining customers Perilya and CBH, will begin receiving treated and untreated water sourced from the new Pipeline.
- Customers in Menindee and Sunset Strip will continue receiving water from the Darling River. Essential Water has proposed providing customers in Sunset Strip with treated water from a new water treatment plant in Menindee through a new small diameter rising main, and closing the Sunset Strip water filtration plant.
- Customers who currently purchase untreated water from the Menindee pipeline (11 graziers) will begin receiving water from the Stephens Creek reservoir. To enable this, Essential Water has proposed to construct a new pipeline from the reservoir. In effect, these 11 graziers will receive water from the Pipeline (Murray River to Broken Hill), as Stephens Creek reservoir will be filled through this Pipeline.

Essential Water has also proposed upgrades to its existing water supply network during the 2019 determination period. These include:

- Upgrading the Stephens Creek reservoir dam wall to comply with outstanding dam safety requirements
- Recommissioning water filters at the Mica Street Water treatment plant to address the risk of blue-green algae contamination from the new WaterNSW bulk storage
- Decommissioning the Reverse Osmosis (RO) desalination plant, as the risk that water from the Murray River will be excessively saline is lower, and
- Decommissioning Imperial Lake as an emergency water source, because of ongoing dam safety concerns.

In order to access water from the Murray River, Essential Water will update the 10 GL/year high security licence it currently holds for the Menindee Lakes Scheme, with two licenses:

- 8.1 GL per year from the Murray River water source, to supply its customers through the new Pipeline, and
- 0.4 GL per year from the Lower Darling River water source, to supply its customers in Menindee and Sunset Strip.[26]

We are currently reviewing WaterNSW's Murray River to Broken Hill Pipeline services from 1 July 2019, and will determine WaterNSW's efficient costs to transport bulk water. From that review, we have incorporated the efficient costs that Essential Energy will incur to purchase bulk water via the Pipeline.[27]

26 Essential water pricing proposal to IPART, July 2018, p 62.

27 Information on that review is available on our website: https://www.ipart.nsw.gov.au/Home/Industries/Water/Reviews/Rural-Water/Prices-for-WaterNSW%E2%80%99s-Murray-River-to-Broken-Hill-Pipeline-services-from-1-July-2019

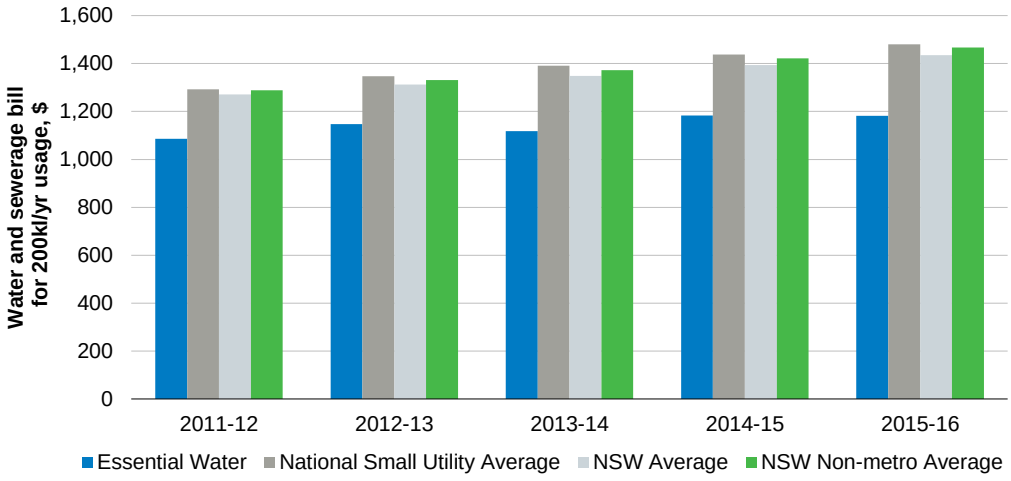
2.2.5 Sewerage operations

Essential Water has two wastewater treatment plants – Wills Street and South Broken Hill. Sewerage is piped through a network of 228 km of reticulation mains and 11 pumping stations to the wastewater treatment plants. Essential Water has proposed to replace the main sewerage treatment plant at Wills Street during the 2019 determination period.

2.3 How bills compare in Broken Hill to other areas

Essential Water's current prices for water and sewerage are lower than the average across NSW and regional water utilities (Figure 2.3).

Figure 2.3 Essential Water bills compared against other utilities ($2015-16)

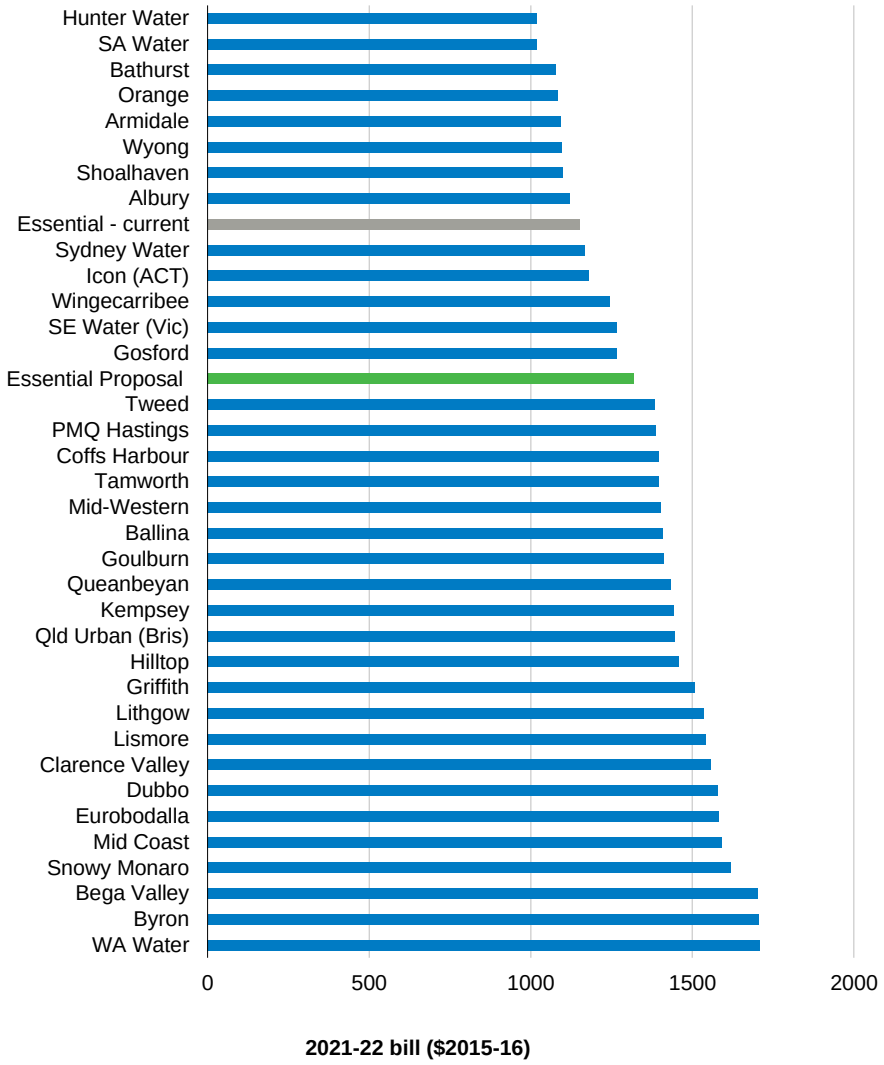


Source: Bureau of Meteorology, Urban National Performance Report, 2016-17.

Figure 2.4 compares Essential Water's current and proposed bills to those of 35 other water utilities. Our analysis suggests that Essential Water's current bills are lower than 27 of these utilities, and our analysis also suggests that if Essential Water's pricing proposal was adopted, bills would be lower than 22 of these utilities by 2021-22.[28]

28 Essential Water pricing proposal to IPART, July 2018, p 15; Essential Water pricing proposal addendum to IPART, September 2018.

Figure 2.4 Essential Water bills and rankings compared against other utilities ($2015-16, real)

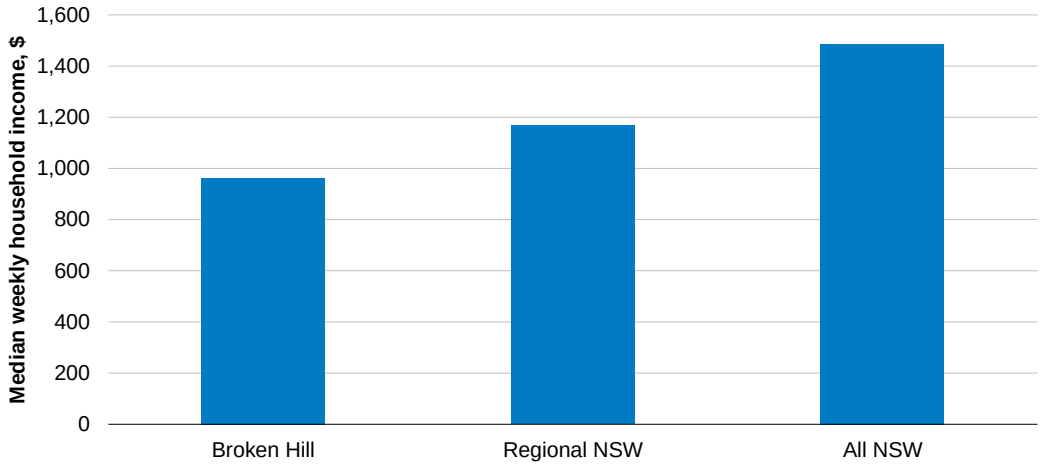


Note: Essential Water's current bill and its proposed for 2021-22 is based on water usage of 200 kL per year.

Source: Essential Water pricing proposal to IPART, July 2018, p 43; Essential Water pricing proposal to IPART, Addendum, September 2018; 2015-16 NSW Water Supply and Sewerage Benchmarking Report, p 116.

We also note that median household incomes in Broken Hill are substantially lower than those in regional NSW and NSW as a whole (see Figure 2.5). We further analyse how affordable bills are in Broken Hill, compared to other areas and relative to gross household median income, in Appendix C.

Figure 2.5 Gross median weekly household income, Broken Hill, regional NSW and all NSW ($2016)



Source: ABS, Census of Population and Housing, Australia, 2016.

2.4 Our general approach to setting prices

When setting prices, we balance our preference for prices to be cost-reflective against a range of other factors, including customer affordability and government funding commitments. Box 2.1 outlines our principles in setting prices.

Box 2.1 Our pricing principles

In setting maximum prices for regulated water businesses our overarching principle is that prices should be cost-reflective. This means that:

- Prices should only recover sufficient revenue to cover the prudent historical and efficient forecast costs of delivering the monopoly services. Prices for individual services should reflect the efficient costs of delivering the specific service.
- Price structures should match cost structures, whereby:
  - Usage charges reference an appropriate estimate of marginal cost (ie, the additional cost of supplying an additional unit of water or sewerage services), and
  - Fixed service charges recover the remaining costs.
- Customers imposing similar costs on the system pay similar prices.

Prices that are cost-reflective promote the efficient allocation and use of resources – such as water, and the capital invested to provide water supply services – by sending accurate signals to customers about the cost of services. For example, they discourage wasteful or unnecessary water usage.

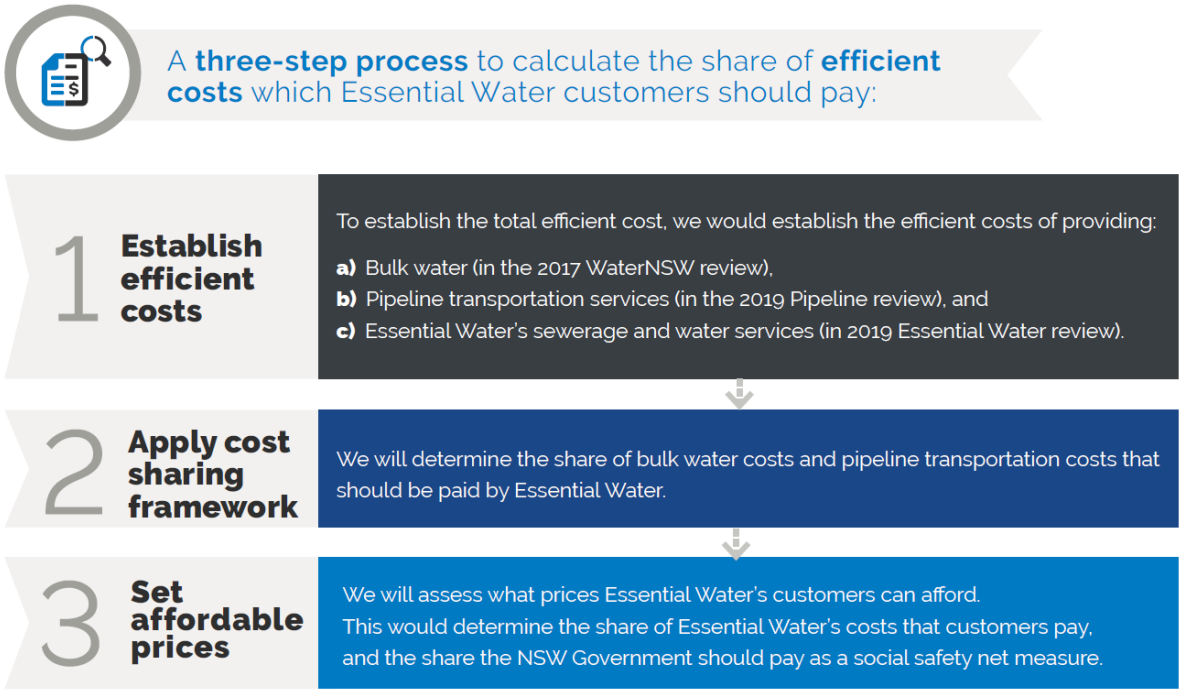
Prices that are cost-reflective also promote efficient investment in water infrastructure and service provision – by ensuring that the regulated business cannot recover capital that is invested inefficiently or unwisely from the prices paid by customers.

However, we also consider other factors when setting prices, including customer impacts. For example, we may assess that customers cannot afford to fund the full efficient costs of delivering water and sewerage services. In other words, sometimes prices may not be fully cost-reflective.

In our Issues Paper, we proposed to establish efficient costs and set affordable prices by taking the following three steps (Figure 2.6):

1. Establish the **total efficient cost** required to deliver Essential Water's services over the 2019 determination period. This would ensure that Essential Water and WaterNSW only recover the efficient costs of providing these services.
2. Apply our **cost sharing framework** to decide what share of the efficient cost of the Pipeline (Murray River to Broken Hill) should be notionally allocated to Essential Water's customers.
3. Consider **what is affordable for customers**, before setting prices to recover the customers' actual share of Essential Water's efficient costs. This would assess the share of efficient costs that should be met by the Government as a safety net measure to ensure that water and sewerage prices remain affordable.

Figure 2.6 Framework for establishing efficient costs and setting affordable prices



In applying this framework, we have considered the NSW Government's commitment to price stability. In November 2018, the NSW Government advised us of its decision to subsidise the costs of construction and efficient operation and maintenance costs required for the Murray River to Broken Hill Pipeline for the next four years from 2019-20 to 2022-23 to ensure that prices for end use customers do not rise in real terms as a result of the Pipeline.[29] It also advised that it is also considering whether the subsidy will extend to the consequential works that Essential Water has proposed be undertaken as a result of the Pipeline.

29 NSW Government, Letter to the Chair – IPART, 21 November 2018. Available at: https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/pricing-reviews-water-services-metro-water-legislative-requirements-prices-for-essential-energys-water-and-sewerage-services-in-broken-hill-from-1-july-2019/letter-from-the-minister-on-the-broken-hill-pipeline.pdf

In determining what prices should be paid by Essential Water's customers, we decided to maintain constant prices for most customers, and recommended that the difference between the total efficient costs of supplying services to customers, and the amount actually recovered from customers, is funded by a NSW Government contribution to Essential Water. At the same time, we have also introduced some price structure changes to improve the cost-reflectivity of these prices, consistent with our price setting principles.

In addition, as mentioned previously, in Appendix C we further analysed how affordable bills are in Broken Hill compared to other areas, taking into account the relative level of incomes in Broken Hill. This analysis suggests there could be some scope to increase prices in real terms without bills becoming unaffordable for customers.

2.5 Our review process

We are the principal economic regulator in New South Wales. Our main functions are set out in the IPART Act. Among other responsibilities, we determine the maximum prices for declared government monopoly services provided by water utilities, such as Sydney Water Corporation, Hunter Water Corporation and Essential Water.[30, 31]

In determining maximum prices, we have considered the matters under section 15 of the IPART Act (see Appendix A). Section 15 requires us to consider a range of matters when determining prices, including the costs of providing the services, customer affordability, environmental impacts and service standards.

What this review is about

This report sets out our decisions and reasons for the maximum prices that Essential Water can charge for its water, sewerage and miscellaneous and ancillary services over the 2019 determination period.

As discussed previously, the substantial change to Essential Water's operations is purchasing bulk water from WaterNSW's Murray River to Broken Hill Pipeline. Therefore, our decisions on the maximum prices that Essential Water can charge for providing water services to its customers in Broken Hill are affected by other reviews, briefly outlined in Figure 2.6. Essential Water's efficient costs to deliver water services include its own existing water network costs, in addition to the costs from the following reviews:

30 Under s 11(1) of the IPART Act, we investigate and report on each declared monopoly service provided by these utilities that falls within the scope of the *Independent Pricing and Regulatory Tribunal (Water Sewerage and Drainage Services) Order 1997* (NSW).

31 We are also currently reviewing prices for the Central Coast Council's water, sewerage and stormwater drainage services from 1 July 2019. Information on that review is available on our website: https://www.ipart.nsw.gov.au/Home/Industries/Water/Reviews/Metro-Pricing/Prices-for-Central-Coast-Council-from-1-July-2019

- 2019 WaterNSW's Murray River to Broken Hill Pipeline review – this concurrent review determined the maximum prices that WaterNSW can charge for the transportation services it provides to deliver bulk water from the Murray River to customers, including Essential Water. The cost of the transportation services have been included in Essential Water's operating costs. However, water prices have not increased in real terms due to the Pipeline transportation costs – and we have recommended that the amount not recovered from prices is funded by a NSW Government contribution to Essential Water.
- 2017 WaterNSW's Rural Bulk Water services review – in this review we set the maximum prices that WaterNSW can charge for the bulk water supplied from the Murray River that is transported by the Murray River to Broken Hill Pipeline.
- 2016 Water Administration Ministerial Corporation (WAMC) review – in this review we set the maximum prices that WAMC can charge for water management services, including for the Murray River.[32]

Steps in our review

We have considered all submissions received in response to our Draft Report and Determination, prior to releasing our Final Report and Determination. The steps we took in this review is outlined in Table 2.1 below.

Table 2.1 Review timetable

Task	Timeframe
Received Essential Water's pricing proposal	13 July 2018
Released IPART's Issues Paper	25 Sep 2018
Received submissions to the Issues Paper	30 Oct 2018
Held Public hearing	20 Nov 2018
Received letter from the Minister on the NSW Government's funding commitment for the Murray River to Broken Hill Pipeline	21 Nov 2018
Released Draft Report and Draft Determination	2 Apr 2019
Received submissions to the Draft Report	24 Apr 2019
Released Final Report and Determination	30 May 2019

Note: These dates are indicative and are subject to change.

In making our decisions, we have considered all submissions received through the review and all the matters we are required to under section 15 of the IPART Act. As part of our review process, we have undertaken extensive investigation and public consultation. We:

- Received Essential Water's pricing proposal in July 2018. This proposal outlined the expenditure necessary to maintain service levels and respond to regulatory requirements as well as its proposed plan to recover this expenditure.
- Released an Issues Paper in September 2018 which set the context of the review and discussed issues that we sought views on from the public and stakeholders.
- Invited stakeholders to make submissions on the Issues Paper and the utility's proposal by October 2018.

32 WAMC's charges recover the costs of water planning and management and apply to regulated rivers, unregulated rivers and groundwater areas. The Murray River is a regulated river to which WAMC's charges apply.

- Held a public hearing on 20 November 2018 that discussed the issues raised by Essential Water and other stakeholders.
- Engaged independent consultants to review Essential Water's proposed:
  - Operating expenditure, capital expenditure and asset lives (Aither)
  - Water sales and customer numbers (Frontier Economics)
  - Prices for trade waste and miscellaneous services (Marsden Jacob Associates).
- Released a Draft Report and Draft Determination and invited stakeholders to make submissions in response to the draft decisions by 24 April 2019. We received six submissions, including one from Essential Water.
- Released a final Report and Determination.

Our reports, stakeholder submissions, the transcript from the public hearing, and consultants' reports are available on our website (www.ipart.nsw.gov.au).

3 Decisions we made before setting prices

This chapter discusses the decisions we need to make before setting prices. It discusses Essential Water's proposal and our final decisions on:

- The form of regulation, or method, we use to set prices
- Mechanisms to promote future efficiency savings
- Potential adjustments to address sources of revenue and cost risks for the utility, and
- The treatment of exempt properties.

Our final decisions are unchanged from our draft decisions. Stakeholders did not comment on these decisions, in response to our Draft Report.

In Chapter 4 we discuss the elements of our building block approach we use to establish the revenue Essential Water requires to deliver its services efficiently.

3.1 Set maximum prices to provide certainty

We made a decision

1 To set maximum prices for each of Essential Water's services in each year of the determination period (a price cap).

The 'form of regulation' we adopt is the set of methods we use to regulate prices for monopoly services. These methods include how costs are assessed, whether prices are directly or indirectly controlled, and how we encourage the utility to be more efficient.

The form of regulation can determine how much discretion the regulated entity has to adjust its prices within a regulatory period, and how frequently we review or adjust prices, and how risks and rewards are shared between the regulated business and its customers.

There are several forms of price control and each provide different incentives to the regulated entity to deliver its services more efficiently, and different distributions of risk between the regulated entity and its customers. Some of the most common forms are summarised in Box 3.1.

Box 3.1 Different forms of price controls

The different forms of price control include the following:

- **Price cap** – Maximum prices are determined at the start of the determination period and adjusted each year for inflation. This approach provides predictable prices for customers, but the regulated entity bears volume-related risk to the extent that price structures do not perfectly match the utility's cost structures. (The utility will not face volume-related risk if its fixed price is set to recover its fixed costs, and its usage price is set to recover its variable or marginal costs.)
- **Revenue cap** – A regulated entity receives its total revenue allowance for a regulatory period, irrespective of the volume of regulated services provided. Customers bear any volume-related risk through price increases or decreases over the regulatory period.
- **Weighted average price cap** – A maximum average price is set for each group of the utility's prices for the first year of the determination. A formula can also be determined for adjusting this average price in each subsequent year of the regulatory period. The regulator can also set limitations on the amount by which some or all individual prices within the groups can increase during the determination. Utilities then have the freedom to rebalance prices (increase or decrease individual prices), so long as the weighted average of the prices is less than or equal to the maximum average price, and they comply with any limitations imposed. The accuracy of volume forecasts will significantly affect the overall revenue that the utility is able to earn while keeping within the weighted average price cap.[a]
- Hybrid of the revenue and price cap controls – a price control is in place but additional measures to mitigate the risk of the utility under or over-recovering its revenue requirement are also used.

a IPART, Form of Economic Regulation for NSW Electricity Network Charges, Discussion Paper, August 2001, pp 5-6.

3.1.1 Essential Water's proposed form of regulation

Essential Water proposed that a price cap should continue to be the form of price control in the 2019 determination period, whereby IPART sets maximum prices for its services. This is because it considers the current price cap method to be fit-for-purpose for Broken Hill. Essential Water argues that alternative forms of regulation would be too costly to develop and apply, given the relatively small size of its water and sewerage business.

Essential Water suggested that revenue risks related to variations in forecast and actual volume of water sales could be managed through a demand volatility adjustment mechanism (discussed in Section 3.3.1).

3.1.2 IPART's analysis

We agree that the current form of regulation (ie, price caps) is appropriate, as it provides certainty and stability for both customers and Essential Water. We note that no alternative forms of regulation were raised by stakeholders.

3.2 Introduce an efficiency carryover mechanism to promote future efficiency savings

We made a decision

2 To introduce an Efficiency Carryover Mechanism (ECM) for Essential Water's 2019 determination.

Our decision to maintain the current price cap form of regulation means that we set maximum prices that reflect our best estimate of the efficient costs Essential Water will incur to deliver regulated services over the determination period, less our recommended NSW Government contribution for the Pipeline.

Therefore, if Essential Water is able to be more efficient during the determination period, our current approach would allow Essential Water to keep these savings during the determination period. If these cost savings are permanent, they are then passed onto customers through lower prices (reflecting lower costs) at the **next** price determination. This is referred to as 'incentive regulation', because the business has a financial incentive to achieve cost savings during the determination period.

A shortcoming of our current approach to incentive regulation is that the financial reward for achieving cost savings reduces over the determination period, as we get closer to the next price determination (when costs are re-assessed and prices are set to reflect the latest estimate of efficient costs). This means Essential Water has an incentive to delay savings from the latter years of one determination period to the beginning of the next.

To address this shortcoming, an Efficiency Carryover Mechanism (ECM) allows permanent efficiency gains (ie, cost decreases) to be held by the utility for a specified period (eg, three years) before they are passed on to customers, regardless of when they are achieved within a determination period. This equalises the incentive to make permanent efficiency savings over a determination period. As a result, this removes the incentive to defer identifying cost savings to the beginning of the following regulatory period. This allows customers to benefit from efficiencies sooner.

Further information on our ECM is discussed in Appendix D.[33] The ECM only applies to operating expenditure.

3.2.1 Essential Water's proposal

In its pricing proposal, Essential Water acknowledged the efficiency benefits of an ECM. However, it proposed not to adopt an ECM as part of the 2019 determination, because the relatively small size of Essential Water's business would likely see the benefits of the ECM outweighed by the increased administration costs associated with the introduction and ongoing reporting of an ECM. Essential Water also raised concerns about the increased complexity of the mechanism.

33 Further information is also available in our 2016 Sydney Water final report (see IPART, *Review of prices for Sydney Water Corporation – Final Report, June 2016*, p 53).

3.2.2 IPART's analysis

Our decision will provide Essential Water with the option to seek an efficiency carryover if it identifies permanent cost savings to its operating expenditure. Our view is that introducing an ECM will provide an efficiency incentive and give Essential Water the option of applying for it. Since Essential Water can choose whether to use the ECM, it does not automatically increase its administrative costs. Therefore, we have decided to introduce an ECM as an option, to encourage Essential Water to be more proactive in pursuing efficiency gains.

Any savings identified by Essential Water will need to be assessed by IPART. For an ECM to apply:

1. Essential Water will have to include details of efficiency savings in its next pricing submission, and be able to demonstrate these are permanent efficiency improvements, and
2. IPART will assess the efficiency gain and the appropriate level of funds to be carried forward.

To apply the ECM we also need to decide on the duration (ie, the holding period) that the business will retain the permanent efficiency gains, before they are passed onto customers. Holding all else equal, a longer holding period will incentivise the business to make larger investments to find and deliver permanent efficiency savings. On the other hand, a longer holding period will delay when customers benefit from the savings. In addition, if there are savings available that require little if any investment, setting a longer holding period will have little impact other than providing the business a larger share of the overall benefit.

While it is possible to have a holding period that differs from the length of determination period, we consider that setting the ECM holding period equal to the length of the determination period, provides the appropriate incentives (ie, 3 years in the case of Essential Water's 2019 determination). This means that the ECM will apply to efficiencies made in years one and two of the 2019 Determination (see Appendix D). This is because:

- Essential Water will make its next pricing submission at the end of the second year or beginning of the third year of the 2019 determination period.
- We will undertake our review during the third year, with two years of actual expenditure available.

Efficiencies found in the third year could be assessed and incorporated into our pricing determination for the subsequent period, provided a future Tribunal decides to allow an ECM in the subsequent determination.

This is the same method that applies to other utilities where we have allowed an ECM.

Our final decision is the same as our draft decision, and we did not receive comment from Essential Water on our draft decision. We also did not receive comment from any other stakeholders about the ECM.

3.3 Managing revenue and cost risks

As outlined in Section 3.1, by setting maximum prices for Essential Water's services, we will provide certainty for customers over the determination period. However, Essential Water will bear risk to the extent that its price structures do not perfectly match its cost structures and there is a difference between actual sales volumes and forecast sales volumes. To address this risk, Essential Water proposed a demand volatility adjustment mechanism.

Essential Water also faces the risk that its actual costs may vary from its forecast costs due to uncertain events. To manage this risk, Essential Water has proposed cost pass-throughs for four potential events.

We discuss these proposals and our decisions below.

We made decisions

3 To introduce a demand volatility adjustment with a ±5% materiality threshold.

4 Not to accept Essential Water's proposal to introduce cost pass-through mechanisms for its four proposed events.

3.3.1 Demand volatility adjustment

Actual water sales will depend on a number of factors that can vary unexpectedly, including weather patterns and population changes. Therefore, we note that there is risk in setting prices based on a forecast of water sales, as actual sales may vary and are difficult to predict accurately.

To address this risk, Essential Water proposed a mechanism to automatically adjust its revenue in subsequent determination periods if actual water sales are 5% higher or lower than forecast (ie, a demand volatility adjustment with a ±5% materiality threshold).

In the 2014 Determination for Essential Water, we decided to consider a demand volatility adjustment to Essential Water's revenue requirement at the 2019 Determination depending on how water sales actually varied compared with forecast, rather than pre-determining an adjustment dependant on a fixed threshold.

Despite its actual water sales being lower than forecast over the 2014 determination period,[34] Essential Water has not proposed to trigger a demand volatility adjustment, because:

- The prioritisation of NSW Government funded emergency drought infrastructure meant Essential Water offset some lost water revenue by delaying planed capital expenditure.
- Applying a demand adjustment would increase prices that might not be affordable for Essential Water's customers.

34 Essential Water submitted that its actual water sales were lower than forecast by 12% over the 2014 determination period, excluding water sales to the mines. Including water sales to the mines, we calculate that total water sales were lower than forecast by about 4% over the same period.

IPART's analysis

In the Issues Paper, our view was that it is preferable to retain the approach in our 2014 Determination, ie, to retain flexibility in terms of whether prices are adjusted at the next price determination to account for sales volatility over the 2019 determination period.

Our final decision is to accept Essential Water's proposal for a demand volatility adjustment, with a ±5% materiality threshold. Essential Water will still need to apply to trigger the adjustment at the next determination period (ie, starting 2022-23), if the materiality threshold is met.

The demand volatility adjustment gives IPART flexibility to adjust Essential Water's revenue in the following determination period if actual water sales are more than 5% higher or lower than forecast. In the case where actual sales are lower than forecast (eg, if one of the mines were to significantly decrease its water consumption or shut down over the 2019 determination period), we will consider whether:

- Essential Water's costs could decline with reduced demand
- The revenue shortfall should be recovered from customers, or
- There is an economic case for 'stranding' some of Essential Water's assets.

Introducing a demand volatility adjustment is consistent with our decisions in the 2016 Determinations for Sydney Water and Hunter Water.

We did not receive comment from any other stakeholders specifically related to the demand volatility adjustment mechanism.

3.3.2 Cost pass-through events

Essential Water proposed cost pass-throughs for four potential events that it considers are "unexpected" or "uncontrollable". Under its proposal, some or all of the actual cost of these events would be passed through to customers via prices (or in the event there are savings, customers would benefit via lower prices). This would transfer risk from Essential Water to its customers. The four cost pass-through events Essential Water proposed are for:

1. **Regulatory change events** – to address revenue gained or lost through a change in the regulatory, legal or tax environment.
2. **Drought relief events** – to recover costs for government directed drought relief measures.
3. **A Murray River to Broken Hill Pipeline event** – if costs associated with the Pipeline as incurred by WaterNSW and passed through to Essential Water are materially higher than those allowed by IPART, and
4. **A consequential works event** – if separate NSW Government funding is not secured.

The specific proposed triggers for each of these four events are presented in Appendix E.

Essential Water proposed a materiality threshold of 2.5% of its Notional Revenue Requirement (NRR).[35] That is, a cost pass-through would apply if one of the triggers resulted

[35] The NRR represents our view of the total efficient costs of providing Essential Water's regulated services in each year of the determination period.

in its revenue or costs changing by more than ± 2.5% of the NRR. In this event, Essential Water proposes that some or all of these costs would be recovered from customers through prices.

Stakeholder comments

Stakeholders raised concern about the proposed cost pass-through events.

The Broken Hill City Council submitted that the pass-through events are not appropriate given NSW Government commitments to fund the Pipeline.

The Public Interest Advocacy Centre (PIAC) also considered that it is inappropriate for Essential Water to implement cost pass-throughs and further increase cost-pressures because the Pipeline will reduce the risk of Essential Water having to address a drought. Furthermore, it considered that a regulatory change is a standard risk for all regulated businesses and not a special issue for Essential Water.

IPART's analysis

We have assessed Essential Water's proposed cost pass-through events against our criteria, which are outlined in Box 3.2 below.

Box 3.2 Criteria for cost pass-through mechanisms

We consider that cost pass-through mechanisms should only be applied in situations where:

- There is a trigger event (to activate the cost pass-through), which can be clearly defined and identified in the price determination.
- The resulting efficient cost associated with the trigger event can be fully assessed including whether there are other factors associated with the trigger event that fully or partially offset the direct cost of the event. Under the IPART Act, the costs to be passed through must be specified in the price determination.
- The resulting cost is assessed to exceed a materiality threshold.
- The regulated business cannot influence the likelihood of the trigger event or the resulting cost.
- The mechanism is symmetric in that it applies equally to cost increases and cost decreases (in cases where the risk can result in both cost increases and cost decreases).
- It is clear the cost pass-through will result in prices that better reflect the efficient cost of service both before and after the trigger event occurs.

Our view is that these four events do not justify a cost pass-through mechanism. In particular:

- We note that our framework for establishing Essential Water's efficient costs does not eliminate the risk of regulatory change events. If we were to implement a cost pass-through event to eliminate these risks, there would be no incentive for the utility to plan for and engage with potential regulatory changes. We consider it is important to provide an incentive for Essential Water to potentially influence the likelihood, and the resulting cost, of potential regulatory changes.
- The new Pipeline has been built to provide a reliable source of water, which means that Broken Hill will be less affected by drought. Therefore, the cost of drought relief events are unlikely to be material going forward.
- We do not consider the Pipeline and consequential works to be unexpected or uncontrollable events. Under our decisions we have incorporated our best estimate of the efficient costs to Essential Water of these events. We consider that there is scope for Essential Water to pursue further efficiencies in these areas and hence influence the resulting costs.

Further, we consider that if an event does have a material adverse impact on Essential Water's financial position, it is more appropriate to consider the case for an early review and determination.

3.4 Treatment of exempt customers

We made a decision

5 Not to recover the foregone revenue from exempt customers from Essential Water's other customers.

Certain water users are exempt from water service charges under NSW legislation (eg, schools, churches and hospitals).

Our approach for State Owned Corporations (including Essential Water) is that we do not include the expected shortfall in revenue due to exempt properties in their NRR, when setting prices. That is, we set prices assuming there are no exempt properties. This ensures that other water customers do not bear the costs of providing exemptions. Our view is that the funding of such exemptions (and other community service obligations) is a matter between the NSW Government and each State Owned Corporation.

Essential Water does not support this approach, because it does not consider it appropriate to fund exemptions through separate NSW Government funding. However, it is unclear to us why it is not appropriate. Essential Water has proposed funding these exemptions through existing pricing arrangements or by introducing cost-reflective tariffs for exempt customers.

Our decision remains that Essential Water should seek NSW Government funding for these exemptions, and that they should not be funded by other water customers. Furthermore, IPART does not determine which properties are exempt from water service charges under NSW legislation.

Our decision is consistent with our approach for the other State Owned Corporations that we regulate (eg, Sydney Water and Hunter Water).

We did not receive comment from other stakeholders about the treatment of exempt customers.

4 Length of determination period and revenue requirement

This chapter outlines the next decisions we made when determining prices – the length of the determination period, and the amount of revenue to be recovered through prices over this period.

To decide on the amount of revenue to be recovered, we first calculated Essential Water's Notional Revenue Requirement (NRR) in this determination period. The NRR represents our view of the total efficient costs of providing Essential Water's regulated water, sewerage and other services in each year of the determination period. Then, we calculated the revenue that Essential Water should recover from customers through an appropriate combination of usage (variable) and service (fixed) charges. Finally, we calculated the difference between the revenue recovered from prices, and Essential Water's NRR. We recommend that this difference is funded via a Government funding contribution to Essential Water.

The sections below provide a summary of our decisions, then discuss how and why we reached those decisions, including our consideration of Essential Water's proposal, stakeholders' comments and the NSW Government's decision that end use prices for customers will not increase in real terms as a result of the Pipeline. Chapters later in this report provide more detail on how we reached our decisions on prices.

4.1 Summary of our decisions

We decided to:

- **Set prices for three years.** This balances the increased uncertainty of forecasts as a result of the major changes to the Broken Hill water network, against the need to reduce regulatory burden.
- **Set an NRR of $140 million over this period.** This reflects the full efficient cost of providing water, sewerage and other services to Broken Hill customers.
- **Recover $71 million from end use customers over this period.** This reflects our decisions on prices, including our consideration of the Government's commitment that prices will not increase in real terms as a result of the Pipeline.
- **Recommend that the difference of $68 million over the period should be funded as a Government contribution to Essential Water.**

In setting the NRR, we also discuss our decisions:

- To set a Weighted Average Cost of Capital (WACC) of 4.0%, by applying our 2018 WACC method.
- To adopt a 60% gearing ratio, to reflect the risks that an efficient benchmark business would face in supplying water to the Broken Hill market.
- To account for changes in the cost of debt through a regulatory true-up in the following period, which would promote price stability for customers.
- To adopt a 30% tax rate for this review.
- To broadly accept Essential Water's proposed approach for recovering corporate overhead costs.

Our final decisions are broadly unchanged from our draft decisions, except that we have updated the WACC and inflation parameters to reflect more up-to-date financial information. We did not receive specific comments from stakeholders in response to these draft decisions.

4.2 Length of determination period

We made a decision

6 To adopt a 3-year determination period from 1 July 2019 to 30 June 2022.

For each water pricing review, we decide on the length of the determination period. In general, this length can be between one and five years. In deciding on the appropriate length, we considered the range of factors outlined in Box 4.1.

Essential Water submitted that it was a relatively small business and that pricing reviews impose a proportionally large regulatory burden. Therefore, it considered that a 4-year period would be reasonable in providing it with regulatory certainty and financial stability.[36]

For this review, we consider that a 3-year determination period is appropriate, rather than a 4-year period as proposed by Essential Water, because:

- **The major changes to Broken Hill's water supply reduced the confidence we can place in forecasts.** The Pipeline is a significant new asset that will deliver bulk water to Essential Water. The key areas of uncertainty are the actual volume of water that Essential Water will demand from the Pipeline, and the efficient cost of the consequential works. Further, there is uncertainty over some of Essential Water's proposed capital projects. This includes the timing and costs involved in potentially replacing the Wills St sewerage treatment plant (see Chapter 6 for further discussion).

36 Essential Water pricing proposal to IPART, July 2018, p 49.

- **This determination length appropriately balances risk and regulatory burden.** Whilst a shorter determination period can create greater regulatory burden for Essential Water, the revenue allowances that we set are more likely to be cost-reflective over a shorter period given the uncertainty (and the risks involved) in the significant change in operating environment for Essential Water, and the potential cost involved in possibly replacing Wills St sewerage treatment plant. A shorter determination period will provide opportunity for Essential Water to better understand the changes to its operating environment and allow it to better investigate the efficiency of proposed expenditures, prior to IPART potentially adopting a longer determination period in the next price review.

Box 4.1 Factors we consider in deciding the length of a determination

In general, the factors we consider when deciding the length of a determination period are:

- The confidence we have in the utility's forecasts
- The risk of structural changes in the industry
- The need for price flexibility and incentives to increase efficiency
- The need for regulatory certainty and financial stability
- The timing of other relevant reviews, and
- Stakeholders' views.

Longer determination periods have several advantages over shorter periods. For example, a longer period: provides greater stability and predictability (which may lower a utility's business risk and assist investment decision making); creates strong incentives for a utility to increase efficiency; and reduces regulatory costs.

However, longer determination periods also have disadvantages. These include: increased risk associated with using inaccurate data to set prices; possible delays in customers benefitting from any efficiency gains; and the risk that changes in the industry will impact the effectiveness of the determination.

We note that the NSW Government has made a commitment to fund the efficient costs of the Pipeline for four years, ie, until 30 June 2023 (discussed in Section 1.1). Our decision does not impact the NSW Government's commitment, and will mean that consumers have certainty over funding of the Pipeline for the first year of the subsequent review (the 2022 Essential Water price review). In setting prices at the 2022 price review, we will consider the efficient costs in providing water and sewerage services in Broken Hill (including the ongoing efficient costs of the Pipeline), any potential NSW Government decisions regarding the Pipeline costs beyond 30 June 2023, as well as what is affordable for end use customers.

Our decision is also to set a 3-year determination period for the Pipeline.[37] We consider it useful to align these two reviews. Whilst we did not receive stakeholder submissions directly commenting on this issue, concerns have been raised about the impact of the Pipeline costs on final water prices in Broken Hill.[38] Given that the Pipeline represents a substantial portion of

37 IPART, Review of prices for WaterNSW's Murray River to Broken Hill Pipeline from 1 July 2019 – Final Report, May 2019.

38 For example, Broken Hill City Council, Broken Hill City Council's submission to Essential Water's water and sewerage services in Broken Hill from 1 July 2019 and WaterNSW's Murray River to Broken Hill Pipeline services from 1 July 2019, October 2018, p 3.

costs in providing water services in Broken Hill, we consider it appropriate to align these reviews to provide consumers greater certainty over final prices and hence bill impacts.

4.3 Calculating the notional revenue requirement

We made a decision

7 To set the Notional Revenue Requirement (NRR) as shown in Table 4.1.

As for previous water utility reviews, we have used our standard 'building block' method to calculate the NRR. This method involves estimating, for each year of the determination period:

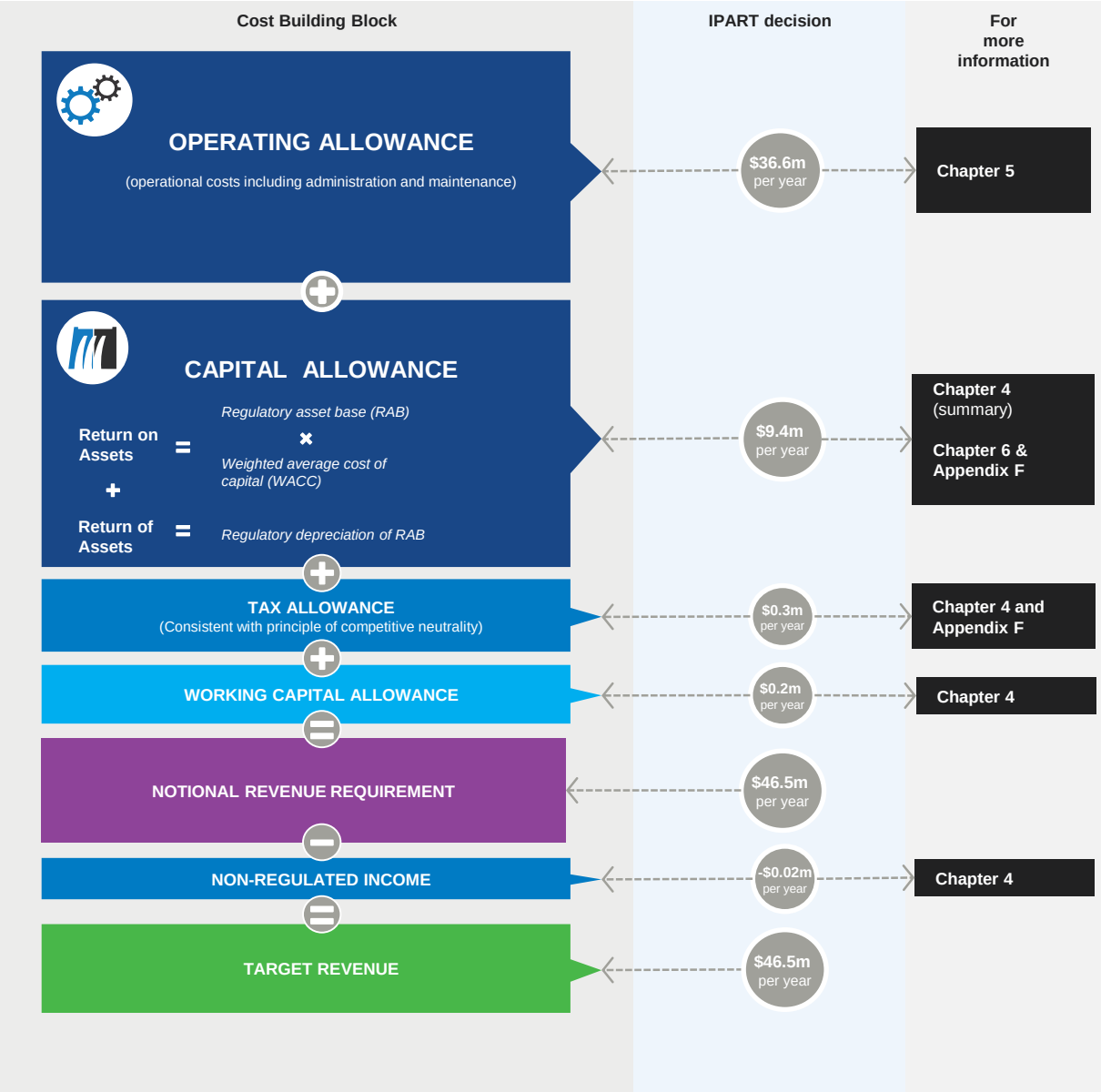
- An operating expenditure allowance
- A capital allowance, which comprises a return on the assets Essential Water uses to provide its services and a return of these assets (or regulatory depreciation)
- A tax allowance
- A working capital allowance, and
- Any 'non-regulated' revenue Essential Water is forecast to earn from non-regulated services it provides using its regulated assets.

We have also decided how Essential Water's corporate overhead costs should be apportioned to its operating and capital expenditure.

In Section 4.5 we discuss our decision on how the NRR should be recovered from customers, and our recommendation that the difference between the revenue from customers and the target revenue should be recovered through a Government funding contribution to Essential Water.

As Figure 4.1 illustrates, the sum of the allowances, minus 50% of the non-regulated revenue, equals Essential Water's target revenue. The target revenue is the amount of revenue Essential Water is to recover from maximum prices we have set in its determination, and our recommended Government funding contribution to Essential Water.

Figure 4.1 The building block model



Note: Totals are average amounts each year and may not add due to rounding.

Table 4.1 IPART's decision on Essential Water's NRR, inclusive of the Pipeline costs and consequential works ($millions, $2018-19)

	2019-20	2020-21	2021-22	Total
Operating expenditure	**37.0**	**36.6**	**36.2**	**109.8**
Operating expenditure excluding the Pipeline costs	*12.6*	*12.2*	*11.9*	*36.7*
Pipeline costs	*24.4*	*24.4*	*24.4*	*73.1*
Capital costs	**8.6**	**9.5**	**10.1**	**28.2**
Return on assets	*5.8*	*6.5*	*6.9*	*19.1*
Return of assets (regulatory depreciation)	*2.7*	*3.0*	*3.2*	*9.0*
Return on working capital	**0.2**	**0.3**	**0.2**	**0.7**
Tax allowance	**0.1**	**0.2**	**0.7**	**1.0**
Total NRR	**45.8**	**46.5**	**47.3**	**139.6**
Less non-regulated revenues (50%)	0.02	0.02	0.02	0.05
Target revenue	**45.8**	**46.5**	**47.2**	**139.5**

Note: Totals may not add due to rounding. Non-regulated revenue is $0.02 million per year, and totals $0.05 million from 2019-22.

We have assessed Essential Water's pricing proposal for each of the building block items, and our decision is that Essential Water's total notional revenue requirement is $139.6 million over the three years to 2021-22.

Our final decision on the NRR is slightly lower than our draft decision, because:

1. Our final prices for bulk water transportation services provided by the Pipeline are lower than our draft prices.
2. Our updated WACC and inflation parameters are lower.

Our decisions on each of the building block items over the 2019 determination period are outlined below, and are discussed in more detail in the remainder of this report.

4.3.1 Operating expenditure

The operating expenditure allowance represents our estimate of Essential Water's forecast efficient operating, maintenance and administration costs. This is $109.8 million over the 3-year period, and includes the efficient costs of the Pipeline.

The reasons for our decision on operating expenditure is discussed in Chapter 5.

4.3.2 Capital allowance

Our capital allowance ($28.2 million over three years) is not intended to recover Essential Water's proposed investments in new assets over the period. Instead, it comprises:

- **A return on assets.** This amount represents our assessment of the opportunity cost of the capital invested in the assets used to provide its regulated water and sewerage and businesses – that is, its Regulatory Asset Base (RAB) – and aims to ensure that Essential Water can continue to make efficient capital investments in the future.
- **A return of these assets (or regulatory depreciation)**. This allowance recognises that by providing services to customers, a utility's assets will wear out over time, and therefore aims to ensure that the costs of the assets are recovered from users over time.

Establishing the capital allowance is more complex than the operating expenditure allowance. Broadly, we calculate the return on assets by multiplying the value of the RAB over the determination period by an efficient rate of return (the WACC). We calculate regulatory depreciation by applying a straight-line depreciation method to the RAB – that is, the cost of assets are recovered evenly over assumed economic life. We made decisions on the following inputs to these calculations:

1. The value of RAB at the start of the regulatory period (the opening value) and the start of each year of the determination period.
2. The efficient rate of return over the determination period, or the Weighted Average Cost of Capital (WACC).
3. The appropriate asset lives for Essential Water's assets.

Decision on value of the RAB

We made a decision:

8 To set Regulatory Asset Base (RAB) values as shown in Table 4.2.

Table 4.2 IPART's decision on Essential Water's RAB values ($millions, $2018-19)

	1 July 2019	1 July 2020	1 July 2021
Water	90.9	111.5	118.3
Sewerage	44.1	45.8	47.3
Non-system assets	0.0[a]	1.5	2.3
Total	**135.0**	**158.8**	**167.9**

[a] Our decision is to create a non-system RAB for corporate assets from 1 July 2019, hence the starting value is zero.

To make this decision, we established the **opening value** for the RAB, using the RABs we set when we last reviewed Essential Water's prices in 2014, and assessed Essential Water's actual capital expenditure over the determination period compared to the forecast capital expenditure. We also assessed Essential Water's proposed expenditure for the 2019 determination period to determine how much expenditure is efficient and used these findings (among other inputs) to **roll forward** the value of the RAB in each year of the 2019 determination period.

Chapter 6 discusses our assessment and findings on Essential Water's prudent historical and efficient forecast capital expenditure in detail, including Essential Water's proposed consequential works. The RAB values are slightly lower than our draft values, because we

have applied updated inflation rates.[39] Box 4.2 and Appendix F provide more information on our approach and inputs for rolling forward the RAB.

Box 4.2 Summary of the RAB calculation

The RAB represents the value of Essential Water's assets on which we consider it should earn a return on capital and an allowance for regulatory depreciation (a return of capital). We assess the RAB at each price review to:

1. Adjust capital expenditure in the current determination period to reflect Essential Water's **actual prudent**[a] expenditure, when rolling forward the RAB to the start of the new determination period, and
2. Add our efficient **capital expenditure allowances** for the forthcoming determination period, when rolling forward the RAB to determine RAB values for each year of the new determination period.

Chapter 6 explains our tests for prudency and efficiency of past and forecast expenditure.

We make some further minor adjustments to the RAB. We:

- **Deduct cash capital contributions** to ensure that customers do not pay for a return on or return of capital expenditure that the utility has not funded itself. (These are contributions from third parties such as developers or government grants, for the purpose of capital expenditure.)
- **Deduct the regulatory value of disposed assets**, that is, when Essential Water sells or writes off an asset that is included in the RAB, it needs to be removed so that customers don't continue to pay a return on and of the asset that is not used to provide the services.
- **Deduct regulatory depreciation allowed in the previous determination,** to account for the difference in the forecast expenditure in the previous determination and the actual expenditure. (Doing this should provide an incentive to not overestimate capital expenditure forecasts.)

For this review, we also adjusted for the tax treatment of past cash capital contributions.

Appendix F provides more details on the RAB inputs.

a What we assess as 'prudent' expenditure may differ from Essential Water's total actual expenditure.

Decisions on the WACC

We made decisions:

9 To set the Weighted Average Cost of Capital (WACC) at 4.0%.

10 To set a gearing ratio of 60% when calculating the Weighted Average Cost of Capital (WACC).

11 To account for annual changes in the cost of debt through a regulatory true-up in the following determination period.

To make our decision on the Weighted Average Cost of Capital (WACC) we applied our standard WACC methodology, which we updated in 2018 after an extensive review and broad stakeholder engagement.[40] This resulted in a real post-tax WACC of 4.0%. This compares to

39 In establishing Essential Water's NRR, we indexed its RAB from 2013-14 to 2018-19, so that the RAB value is maintained in real terms (this is our standard modelling approach for our water pricing reviews). For our Draft Report, we applied an estimate of inflation of 2.5% for 2018-19, but for our final decision we have updated this estimate to 1.7% (the Bloomberg mean consensus forecast for the year ending 30 June 2019). Our updated estimated has slightly decreased our final RAB value compared with our Draft Report.

40 IPART, Review of our WACC method, Final Report - Research, February 2018.

a draft WACC of 4.2%, while Essential Water proposed WACC values ranging from 4.5% to 4.1% over the determination period. The difference between our draft and final WACC parameters reflects a timing difference only; our draft decision was based on information to January 2019, while our final decision uses information to March 2019.

Box 4.3 provides a broad outline of how we reached our decision on the WACC. Appendix F provides more information about the inputs we used in applying our WACC method.

In our 2018 WACC review, we made a number of decisions that would improve our method for estimating the equity beta. We also made decisions to publish more information for stakeholders on how we estimate the equity beta, and to give stakeholders the opportunity to propose additional industries for the equity beta calculation.

We are developing a new process for estimating the equity beta, which includes the improvements we decided in the 2018 WACC review, as well as automating the extraction of financial market data and calculation of the equity beta.

We have not applied our new method to estimate the equity beta in this review, as we are still developing this process and we have not yet consulted with stakeholders on the new method.[41] To that end, we have released a Fact Sheet on our website which explains and seeks feedback on our new method to estimate the equity beta (until July 2019).[42]

We will have regard to the equity beta estimated with this method along with other evidence on beta in our future WACC decisions.

Box 4.3 How we reached our decision on the WACC

The WACC is our estimate of the efficient cost of capital to Essential Water. It is a hypothetical benchmark of a business' efficient cost of debt and equity. It is a weighted average to take account of the relative shares of debt and equity that a firm might have.

We use the WACC to calculate the return on assets that we allow the business, by applying it to the value of Essential Water's regulatory asset base (RAB). If we set a WACC that is too high, then customers would pay too much for the services and we risk encouraging too much investment in that business. If we set the WACC too low, then we risk the financial viability of the firm and encouraging too little investment. Neither of these outcomes is in the long-term interest of consumers.

To set the WACC, we use our established methodology that involves defining a benchmark entity and applying market-based parameters, including the risk-free rate, debt margin, market premium risk and inflation forecasts. See Appendix F for the parameter values we used to make our decision.

Set a gearing ratio of 60%

To calculate the WACC, we decided on the appropriate gearing ratio (that is, what mix of debt and equity a benchmark efficient business would use to fund Essential Water's assets). Essential Water proposed maintaining our 2014 Determination gearing ratio of 55% to reflect

41 With that said, we note that our new process currently generates a similar equity beta estimate (0.74) to the value (0.7) we adopted as part of our final WACC decision.

42 IPART, Estimating Equity Beta, Fact Sheet, April 2019. Available at: https://www.ipart.nsw.gov.au/Home/Industries/Special-Reviews/Reviews/WACC/WACC-Methodology-2017

the higher relative risk that Essential Water faced compared to metropolitan water utilities.[43] It submitted that this was due to the characteristics of the market it operates in, which are:

- Falling water demand due to a declining population, and
- A high degree of customer concentration risk from a few large customers (mines) and little opportunity for substitution if the mines no longer require Essential Water's services.

We have reconsidered the gearing ratio, given our updated assessment of the risks a **benchmark business** would face in supplying water to customers in Broken Hill and purchasing most of its bulk water from a separate water supplier. We note that:

- In 2015, the Australian Government listed Broken Hill as Australia's first "heritage city", ie, a commitment to Broken Hill's ongoing existence as a city.[44] This commitment supports the existence of a water and sewerage market in Broken Hill.
- In November 2018, the NSW Government announced that it will subsidise the efficient costs of the Pipeline (for four years from 2019) to ensure that prices for end use customers do not rise in real terms as a result of the Pipeline.[45] This will reduce the risk that residents and businesses would exit the market.

We consider that the NSW Government's commitment and announcement would extend to a benchmark business operating in Broken Hill, which would thus have a reduced level of risk (its revenues would be less affected by a declining market and concentration in a few large customers). Therefore, our decision is to adopt a gearing ratio of 60% for Essential Water's WACC, consistent with the gearing ratio we have adopted for other regulated water utlities in recent reviews.

True-up for annual changes in the cost of debt

We also decided to account for annual changes in the cost of debt – one of the components of the WACC – through a regulatory true-up in the following determination period. In our recent review of our WACC method, we decided to transition to a trailing average cost of debt. We consider that this approach will allow regulated businesses to better manage their refinancing risk, while maintaining their incentives for efficient investment.

However, implementing a trailing average approach involves updating the cost of debt at the start of each year within a regulatory period. To do this, we need to decide in each price review whether annual changes in the cost of debt will:

- Flow through to prices in the subsequent year, or
- Be cumulated and passed through via a regulatory true-up in the subsequent regulatory period.

For this review, we decided that annual changes in the cost of debt should be cumulated and passed through via a regulatory true-up in the subsequent regulatory period. While the two options are equivalent in present value terms to customers and the business, we prefer the

43 Essential Water pricing proposal to IPART, July 2018, p 169.
44 https://www.environment.gov.au/heritage/places/national/city-broken-hill [accessed 15 January 2019]
45 NSW Government, Letter to the Chair – IPART, 21 November 2018. Available at: https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/pricing-reviews-water-services-metro-water-legislative-requirements-prices-for-essential-energys-water-and-sewerage-services-in-broken-hill-from-1-july-2019/letter-from-the-minister-on-the-broken-hill-pipeline.pdf

regulatory true-up for this review because it would provide certainty to customers about their prices over the 2019 determination period. If the true-up is smoothed over the next regulatory period, we do not expect that price shocks would be any more likely under this approach compared to an annual update. Essential Water proposed that annual changes to the cost of debt should be passed through to prices each year.[46]

Our final decisions on WACC parameters are consistent with our draft decisions, and we did not receive specific comment from Essential Water in response to the draft decisions.

Decisions on depreciation method and asset lives

To calculate the regulatory depreciation allowance (return of assets), we applied a straight-line depreciation method to the remaining life of Essential Water's assets. The straight-line method depreciates the value of all assets evenly over their assumed lives and is in line with Essential Water's proposal. We typically use this method in water price reviews, unless the utility proposes a different method and we agree with it.

Chapter 6 discusses our assessment of Essential Water's asset lives – for existing and new assets – in more detail.

4.3.3 Tax allowance

Our decision is to include a tax allowance of $1.0 million over the 3-year determination period, which is similar to Essential Water's proposal.

The tax allowance is not intended to recover Essential Water's actual tax liability over the determination period. Rather, it reflects the liability that a comparable commercial business would be subject to. Including this allowance is consistent with our aim to set prices that reflect the full efficient costs a utility would incur if it were operating in a competitive market (including if it were privately owned). Thus, if we did not include a tax allowance, prices would be too low.[47]

Our approach for calculating this allowance is detailed in Appendix F.

4.3.4 Return on working capital

Our decision on the NRR includes a working capital allowance of around $0.7 million over the 3-year period, compared to Essential Water's proposed allowance of $0.04 million.

The working capital allowance ensures that Essential Water recovers the costs it incurs due to the time delay between providing a service and receiving the money for it (ie, when bills are

46 Essential Water pricing proposal to IPART, July 2018, p 57.

47 This approach to pricing monopoly services is consistent with the principle of 'competitive neutrality'. Through the Competition Principles Agreement (1995), the Australian and all State and Territory Governments have agreed to implement competitive neutrality policies as part of the National Competition Policy reform package. 'The objective of competitive neutrality policy is the elimination of resource allocation distortions arising out of the public ownership of entities engaged in significant business activities: Government businesses should not enjoy any net competitive advantage simply as a result of their public sector ownership.' Source: *Competition Principles Agreement – 11 April 1995 (As amended to 13 April 2007, section 3a)*, available at: https://www.coag.gov.au/about-coag/agreements/competition-principles-agreement).

paid). To calculate this allowance, we applied our standard approach to calculating the appropriate amount for working capital. In summary, this involves:

1. Calculating the net amount of working capital the business requires, using the formula:

   working capital = receivables – payables + inventory + prepayments

2. Calculating the return on this amount by multiplying it by the nominal post-tax WACC.

More information on our standard approach can be found in our working capital Policy Paper on our website.[48]

4.3.5 Non-regulated revenue

Essential Water has been receiving about $0.05 million per year over the 2014-15 to 2017-18 period from the sale of treated effluent[49] (it has ranged from $0.03 million to $0.08 million each year). The treated effluent is sold to customers for use in operations, dust suppression and irrigation.

Our decision is to accept Essential Water's forecast revenue of $0.03 million per year as being reasonable and its proposal that 50% of the revenue (ie, $0.016 million) should be deducted from its notional revenue requirement. The rationale for sharing the revenue is that it gives Essential Water a financial incentive to pursue more revenue where appropriate – while ensuring that 50% of the benefits will eventually flow on to customers through lower prices. This is our standard approach for the metropolitan utilities we regulate.

4.3.6 Corporate costs

We made a decision:

12 To broadly accept Essential Water's proposed approach to calculating corporate operating costs, but apply the allocation rates recommended by our expenditure consultant, Aither.

We recommend:

1 That Essential Energy review and revise its approach to forecasting and allocating corporate operating costs to Essential Water for the next pricing review.

We have broadly accepted Essential Water's proposed approach to calculating corporate operating costs – that is, as a percentage of total direct operating and capital expenditure for water and sewerage services.[50] However, we have not accepted its proposal to maintain the percentage allocation rate at 18% per year over the 2019 determination period.[51]

Our expenditure review consultant, Aither, noted that Essential Water's proposed allocation rate of 18% per year appeared to be based on IPART's 2014 Determination.[52] It also found although Essential Water's proposal indicated that efficiencies in its wider business had

48 IPART, Working Capital Allowance Policy Paper Final Report, November 2018.
49 Effluent water is not suitable for human consumption and may only be re-used under specific environmental conditions.
50 Essential Water pricing proposal to IPART, July 2018, p 146.
51 Essential Water pricing proposal to IPART, July 2018, p 147.
52 Aither, Essential Water expenditure review – Final Report, January 2019, p 69.

resulted in lower overall costs, this was not evident in its proposed corporate operating costs.[53]

Aither recommended:

1. That Essential Water's approach of calculating corporate operating expenditures as a percentage of direct expenditures is reasonable, but
2. A reduced allowance for corporate operating costs (by decreasing the allocation percentage by 0.5 percentage points each year) would be appropriate. This is because there was a lack of information in Essential Water's submission regarding its forecast corporate operating costs, so Aither could not assess whether the amount being allocated to the Essential Water business was efficient.[54]

Aither also recommended that Essential Water should undertake a more robust approach to forecasting its corporate operating costs going forward. Specifically, Aither recommended that Essential Water should undertake a bottom-up assessment of its corporate related functions to better establish its forecast operating cost needs:

> Future corporate overhead costs should not simply be based on a blanket application of a pre-determined allocation rate and applied to forecast direct costs, because a pre-determined allocation rate has no relationship with actual corporate overhead costs.[55]

Aither's views on this issue echoed those of our expenditure review consultants for the 2014 Determination.[56]

We have accepted Aither's recommendations and as such have applied loadings of 17.5% for 2019-20, 17% for 2020-21 and 16.5% for 2021-22 to all direct operating and capital expenditure for both water and sewerage. We recommend that Essential Energy should continue to pursue efficiencies in its corporate operating costs and identify a more accurate way of attributing corporate overheads to Essential Water at its next pricing review.

Essential Water also proposed to include, for the first time, corporate capital expenditure (also known as non-system assets) as part of its RAB.[57] We have also largely accepted this proposal (see Chapter 6 for details).

Table 4.3 below sets out our decision on corporate operating costs (allocated across operating and capital expenditure). The difference between Aither's recommended corporate overheads and our decision reflects the different decisions on direct capital and operating expenditure allowances (see Chapters 5 and 6 for details).

53 Ibid, p 69.
54 Ibid, p 69.
55 Ibid, p 66.
56 SKM, Strategic Management Overview and Review of Operating and Capital Expenditure for Essential Water's water and sewerage business in Broken Hill – Final Report, January 2014, pp. 104-105.
57 Essential Water pricing proposal to IPART, July 2018, Metro Water Model.

Table 4.3 IPART's decision on Essential Water's corporate overheads ($2018-19, excluding consequential works)

$million	2019-20	2020-21	2021-22	Total 2019-22
Essential Water proposed				
Capital expenditure	2.1	3.1	2.7	7.9
Operating expenditure	2.2	2.1	2.1	6.5
Total	**4.3**	**5.2**	**4.9**	**14.4**
Aither recommended				
Capital expenditure	1.7	1.0	0.7	3.5
Operating expenditure	1.8	1.7	1.6	5.2
Total	**3.5**	**2.7**	**2.4**	**8.6**
IPART's decision				
Capital expenditure	1.7	1.0	1.6	4.3
Operating expenditure	1.8	1.8	1.7	5.3
Total	**3.6**	**2.8**	**3.3**	**9.6**

Note: Columns may not sum due to rounding.

Source: Essential Water pricing proposal to IPART, July 2018, pp 121, 140; Essential Water Expenditure Review Final Report, Aither, January 2019, p71.

4.4 Comparison of IPART's NRR with Essential Water's proposal

As Table 4.4 sets out, our decision on total NRR for the 3-year determination period is $139.6 million. This comprises of:

- $62.6 million for maintaining Essential Water's existing network (15% less than Essential Water's proposal of $73.4 million)
- $3.3 million for consequential works (compared to Essential Water's proposal that costs be funded by the Government or passed through to customers), and
- $73.7 million for bulk water transportation services via the Pipeline (compared to Essential Water's proposal that costs be funded by the Government or passed through to customers).

Essential Water did not include the bulk water transportation costs of the Pipeline and consequential works in its proposal.[58] However, it proposed to pass through these costs to customers if they were not funded by the NSW Government.[59]

58 Essential Water pricing proposal to IPART, July 2018, pp 18, 25.
59 Essential Water pricing proposal to IPART, July 2018, p 59.

Table 4.4 IPART's decision on notional revenue requirement compared to Essential Water's proposal ($2018-19)

$millions	2019-20	2020-21	2021-22	Total 2019-22
Essential Water's proposal (excluding the Pipeline transportation costs and consequential works costs)				
Essential Water's proposal	24.2	23.9	25.3	73.4
IPART's decision on existing network costs (A)	**20.6**	**20.9**	**21.2**	**62.6**
Difference	*-3.7*	*-3.0*	*-4.2*	*-10.9*
IPART's decision				
Pipeline transportation costs **(B)** [a]	24.5	24.5	24.7	73.7
Consequential works costs **(C)** [b]	0.7	1.1	1.5	3.3
Total IPART's decision (A+B+C)	**45.8**	**46.5**	**47.3**	**139.6**

[a] Transportation costs via the Murray River to Broken Hill Pipeline have been taken from the concurrent WaterNSW price review, and are passed through to Essential Water as operating costs.

[b] These values represent the NRR for our recommended consequential works capital expenditure and operating costs, and include a tax allowance and allowance for working capital.

Note: Totals may not add due to rounding.

Source: Essential Water pricing proposal to IPART, July 2018, pp 179-180; Essential Water pricing proposal to IPART Addendum, September 2018; IPART analysis.

The main reasons for the difference between the existing network costs in our NRR and Essential Water's proposed existing network costs are that we have allowed for:

- Lower efficient operating expenditure (-$6.1 million) due to reductions in labour, materials, hire services and electricity costs, and ongoing efficiency improvements (see Chapter 5), and
- A lower return on capital (-$3.0 million) due to a lower WACC of 4.0% compared with Essential Water's proposed declining WACC of 4.5% to 4.1%, and lower efficient forecast capital expenditure excluding the cost of the consequential works (see Chapter 6).

4.5 Essential Water's revenue from tariffs and the NSW Government's funding contribution

The next step in our approach to determining prices was to decide how Essential Water's target revenue is to be recovered.

We made a decision:

13 To set Essential Water's prices for water and sewerage services, trade waste, miscellaneous and ancillary services to recover the revenues set out in Table 4.5 from customers over the 3-year determination period.

We recommend

2 That the NSW Government fund the difference ($68.4 million) between the total revenue to be recovered from customers and the target revenue via a direct contribution to Essential Water. This funding contribution would reflect:

- the bulk water transportation costs of the Pipeline such that end-use prices do not increase in real terms as a result of the Pipeline - this is $67.5 million over the three-year determination period
- the shortfall in revenue associated with transitioning the untreated water usage price for pipeline customers over time, to the same untreated water usage price faced by other customers – this is $148,000 over the three-year determination period
- the shortfall in revenue associated with transitioning trade waste prices towards cost-reflective levels – this is $770,000 over the three-year determination period.

Our decision reflects our forecast that prices for water and other services will recover $71.1 million over the 3-year determination period.

We have then recommended that the difference of $68.4 million between revenues recovered from customers and the target revenue should be funded by the NSW Government, as a direct payment to Essential Water. When making this recommendation, we have considered the NSW Government's funding commitment to subsidise the cost of the Pipeline such that end use prices for customers will not increase in real terms as a result of the Pipeline.

Our recommended Government funding contribution is slightly lower than in our Draft Report because Essential Water's NRR is lower. In turn, the reduction in Essential Water's NRR reflects that:

- Our final prices for bulk water transportation services provided by the Pipeline are lower than our draft prices, and
- The WACC and inflation are lower.

These two factors offset two other final decisions, which (holding all else constant) slightly increase our recommended Government funding contribution:

1. We now recommend the shortfall between the costs of treating trade waste and the revenue that Essential Water can actually recover from trade waste prices under our determination should be recovered from the Government, for the next three years. This change was made in response to feedback from Essential Water, and is addressed in detail in Chapter 10. To promote transparency, we have separately identified the cost of transitioning to cost-reflective trade waste prices as a separate amount.
2. Our decision to maintain water service charges for the mines in real terms over the determination period. Our reasons for this change are discussed in detail in Chapter 8.

Other elements of our recommended Government contribution are largely unchanged.

Table 4.5 IPART's decision on how Essential Water's NRR is to be recovered ($millions, $2018-19)

	2019-20	2020-21	2021-22	Total
Total revenue from customers	**23.7**	**23.7**	**23.7**	**71.1**
Revenue from water and sewerage tariffs	*23.5*	*23.5*	*23.4*	*70.4*
Non-regulated revenue[a]	*0.0*	*0.0*	*0.0*	*0.0*
Trade waste revenue	*0.1*	*0.1*	*0.2*	*0.4*
Miscellaneous and ancillary services revenue	*0.1*	*0.1*	*0.1*	*0.3*
NSW Government contribution	**22.1**	**22.8**	**23.6**	**68.4**
Affordability contribution[b]	*21.8*	*22.5*	*23.3*	*67.7*
Trade waste transition contribution	*0.3*	*0.3*	*0.2*	*0.8*
Essential Water's NRR	**45.8**	**46.5**	**47.3**	**139.6**

a Non-regulated revenue is $0.02 million per year, and totals $0.05 million over 2019-22.

b The NSW Government affordability contribution also includes $55,440 in 2019-20, $49,280 in 2020-21 and $43,120 in 2021-22 to transition usage prices for untreated water pipeline customers.

Note: The amounts shown for the NSW Government contribution are net of any tax implications. The NSW Government contribution amount is effectively calculated as a residual from our decision on Essential Water's NRR *less* revenue from prices.

We have maintained the price of water services, in real terms, for all residential customers in Broken Hill such that water bills will increase by inflation only over the 2019 determination period. However, we have also updated our sewerage price structures to remove cross-subsidies, which means that for the majority of customers, water and sewerage bills will increase by less than inflation over the 2019 determination period.

For chlorinated and untreated water (pipeline) customers, water bills will increase in real terms due to our decision to increase their usage charges to better reflect Essential Water's costs in providing these services.

Chapter 8 and Chapter 9 contain further detail on our decisions on price structures and on prices, incorporating the NSW Government's funding contribution.

5 Allowance for operating expenditure

This chapter sets out our assessment of Essential Water's efficient level of operating expenditure. As discussed in Chapter 4, it is our view of the efficient level of operating costs Essential Water will incur in providing its services over the 2019 determination period. These costs include labour, energy, hire services, energy, materials, plant and fleet.

To inform our decision on operating expenditure, we engaged Aither to review the efficiency of Essential Water's proposed operating expenditure.

This chapter also includes an overview of how we established Essential Water's costs for accessing water from the Pipeline. These costs are about three quarters of Essential Water's operating expenditure allowance and is the largest change to its NRR over the 2019 determination period.

5.1 Summary of IPART's decision

We made a decision

14 To set the efficient level of Essential Water's operating expenditure as shown in Table 5.1.

Table 5.1 IPART's decision on Essential Water's efficient operating expenditure ($millions, $2018-19)

	2019-20	2020-21	2021-22	Total 2019-22
Operating expenditure excluding the Pipeline and consequential works				
Essential Water's proposal				
Water	9.5	8.9	9.0	27.4
Sewerage	2.9	2.8	2.9	8.6
Corporate overheads	2.2	2.1	2.1	6.5
Total	**14.6**	**13.8**	**14.0**	**42.5**
Aither recommended				
Water	8.1	7.9	7.8	23.8
Sewerage	2.2	2.2	2.2	6.6
Corporate overheads	1.8	1.7	1.6	5.2
Total	**12.1**	**11.9**	**11.6**	**35.6**
IPART's decision				
Water	8.3	8.1	8.0	24.4
Sewerage	2.3	2.2	2.2	6.7
Corporate overheads	1.8	1.8	1.7	5.3
Total	**12.4**	**12.1**	**11.9**	**36.4**
Operating expenditure including the Pipeline and consequential works				
IPART's decision				
Water	32.8	32.6	32.3	97.8
Sewerage	2.3	2.2	2.2	6.7
Corporate overheads	1.8	1.8	1.7	5.3
Total	**37.0**	**36.6**	**36.2**	**109.8**

Note: Columns may not sum due to rounding.

Source: Essential Water AIR, September 2018; Essential Water Expenditure Review Final Report, Aither, January 2019; IPART analysis.

Our decision is to set Essential Water's efficient operating expenditure allowance at $109.8 million over the 2019 determination period, which reflects:

- $36.4 million for Essential Water to maintain its existing network
- $0.3 million for its consequential works, and
- $73.1 million for bulk water transportation costs.

Our final decisions are unchanged from our draft decisions, except for the allowance for bulk water transportation costs, which are taken from the concurrent review of prices for WaterNSW's Murray River to Broken Hill Pipeline services. In maintaining our draft decisions, we considered Essential Water's comments in response to our draft decisions regarding labour costs.

From mid-2019, Essential Water will access the majority of its bulk water from the Pipeline. The costs of transporting water through the Pipeline will become a recurring operating expense for Essential Water.

Essential Water proposed operating costs of $42.5 million, which only included the costs of maintaining its existing network. It did not include bulk water transportation costs from the Pipeline in its operating expenditure forecasts.

We have reduced Essential Water's operational expenditure for maintaining its existing network by a total of $6.1 million over the 2019 determination period, including labour, hire services, materials and electricity (see discussion in Section 5.3).

We have also included operating expenditure for consequential works, which was excluded from Essential Water's proposed prices. To calculate operating expenditure for consequential works, we used information provided in Essential Water's business case, which stated that operational expenditure is 1.3% of direct consequential works capital expenditure. Therefore, we have added $0.3 million to operating costs over the 2019 determination period.

WaterNSW will pass on the costs of supplying bulk water through the Pipeline to Essential Water. Therefore, these bulk water costs are included as operating expenditure in Essential Water's NRR. As discussed in Chapter 4, we have recommended that $68.4 million of Essential Water's total costs over the 2019 determination period should be recovered via a contribution from the Government – to reflect its commitment that end prices will not increase in real terms as a result of the Pipeline.

The following sections outline Essential Water's actual expenditure over the 2014 determination period, its proposed expenditure for the 2019 determination period, the reasons for our decision as well as feedback we received from stakeholders, including Essential Water.

5.2 Essential Water's operating expenditure during the 2014 determination period

Essential Water's actual direct operating expenditure for the 2014 determination period was $55.2 million (see Table 5.2). This is $5.6 million (12%) more than IPART's allowance in the 2014 Determination of $49.1 million. Essential Water attributed much of this variance to unanticipated costs associated with the 2014-16 drought, which included:

- Additional electricity costs from pumping more water than forecast from the Menindee Lakes. This increase in pumping was also compounded by an unanticipated increase in electricity prices.
- Recommissioning and operating the Broken Hill Reverse Osmosis desalination plant.
- A higher allocation of corporate overheads to operating expenditure due to the deferral of capital projects.[60]

Essential Water forecasts that it will spend $14.1 million on operating expenditure in 2018-19. We did not set an allowance for 2018-19 as it was beyond the end of the 2014 determination period.

60 Essential Water pricing proposal to IPART, July 2018, pp 136-138.

Table 5.2 Essential Water's historical operating expenditure, excluding corporate overheads ($millions, $2018-19)

	2014-15	2015-16	2016-17	2017-18	Total 2014 period	2018-19
Actual/ Forecast	11.0	13.3	13.9	16.9	55.2	14.1[a]
IPART allowance	12.5	12.2	12.4	12.0	49.1	N/A
Difference	-1.4	1.1	1.5	4.9	6.0	N/A

[a] Forecast

Note: Columns may not sum due to rounding.

Source: Essential Water pricing proposal to IPART, July 2018, p 135.

5.3 Essential Water's proposed operational expenditure

Table 5.3 presents Essential Water's proposed operating expenditure by component. Most components are expected to increase by between 0% and 11% between 2018-19 and 2022-22 in real terms, except for energy and corporate overheads, which are estimated to fall by 60% and 16% respectively.

Essential Water's proposed total operating expenditure is $42.5 million over the 3-years to 2021-22. Excluding corporate overheads, it is about $12 million per year on average, which is about 12% lower per year compared with its 2014 Determination.

Table 5.3 Essential Water's proposed operating expenditure components (excluding the Pipeline costs and consequential works) ($millions, $2018-19)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2022-22
Labour	5.9	6.6	6.0	6.0	0%
Contractors	1.0	1.0	1.0	1.0	3%
Materials	2.1	2.2	2.1	2.1	4%
Energy	3.9	1.4	1.4	1.5	-60%
Licence fees	0.4	0.3	0.3	0.4	4%
Fleet	0.8	0.9	0.9	0.9	11%
Desalination plant	0.1	0.0	0.0	0.0	-100%
Corporate Overheads	2.5	2.2	2.1	2.1	-16%
Total	**16.6**	**14.6**	**13.8**	**14.0**	**-16%**

Note: Percentage changes may not match column values due to rounding.

Source: Essential Water annual information return, July 2018.

Essential Water's proposal included some cost savings from the Pipeline

Essential Water proposed some operating expenditure savings in the 2019 determination period by:

- Decommissioning the Menindee pipeline and associated pumping stations

- Closing the Sunset Strip water filtration plant and supplying the town with water from a new, larger plant in Menindee
- Decommissioning the Broken Hill reverse osmosis desalination plant
- Reducing fleet and labour costs across the business, and
- Re-allocating cooperate overheads between Essential Energy's water and energy businesses.[61]

However, some of these cost savings would be offset by increased pumping costs for Essential Water's portion of the Pipeline.

Other stakeholder comments

In its submission, the Broken Hill Darling River Action Group considered that Essential Water's proposed operating expenditure savings should be larger than proposed based on the reduced costs from decommissioning the Menindee pipeline, Imperial Lake and potentially Umberumberka Reservoir.[62]

We agree that decommissioning the Menindee pipeline and pump stations will reduce Essential Water's labour and electricity costs. We consider that Aither's recommended allowance for labour costs adequately includes any cost savings from changes in operational and maintenance conditions.

5.4 Reduce Essential Water's operational expenditure by $6.1 million (excluding bulk water transportation and consequential works costs)

We have largely accepted Aither's recommendations on operating expenditure, having considered both Aither's recommendations and Essential Water's response to Aither's draft report. The only exception is that we decided to provide Essential Water a slightly larger allowance for materials costs than recommended by Aither. The reasons for our decisions on each category of operating cost are discussed in the sub-sections below.

Table 5.4 summarises the adjustments we have applied to Essential Water's proposed operating expenditure for the 2019 determination period.

61 Essential Water pricing proposal to IPART, July 2018, pp 139-141.

62 Broken Hill Darling River Action Group, Submission to the Issues Paper – Review of prices for Essential Energy's water and sewerage services in Broken Hill from 1 July 2019, October 2018, p 2.

Table 5.4 Essential Water's proposed operating expenditure ($millions, $2018-19)

	2019-20	2020-21	2021-22	Total 2019-22
Essential Water proposed	14.6	13.8	14.0	42.5
Reduced labour cost	-1.4	-0.9	-1.1	-3.4
Reduced materials cost	-0.2	-0.1	-0.1	-0.4
Reduced hire services cost	-0.3	-0.3	-0.3	-0.9
Increased electricity costs	0.1	0.1	-0.1	0.1
Efficiency improvement	-0.1	-0.1	-0.2	-0.3
Reduction in corporate overheads	-0.4	-0.3	-0.5	-1.2
IPART's decision	12.4	12.1	11.8	36.4
% Reduction to Essential Water's proposal	-15%	-12%	-15%	-14%

Note: Columns may not sum due to rounding.

Source: Essential Water AIR, September 2018; Essential Water Expenditure Review Final Report, Aither, January 2019; IPART analysis.

Overall, our decision represents a 14% reduction to Essential Water's proposal over the 2019 determination period.

5.4.1 Reduce labour costs by $3.4 million

Essential Water's labour allowance provides for the efficient employee costs incurred to maintain and operate its water and sewerage network (labour for administrative functions is included in corporate operational expenditure). Essential Water proposed direct labour costs of $18.6 million ($2018-19) over the 3-years to 2021-22.

Essential Water based its proposal on forecast expenditure in 2018-19 and then escalated labour expenditure by 1.5% per year in nominal terms. This forecast leads to a small decrease in operational costs each year of the determination period in real terms.

Essential Water submitted that it was proposing a reduction of four full-time equivalent (FTE) employees between 2019-22, as a result of decommissioning the Menindee pipeline. However, it is proposing that other labour costs such as salaries and overtime would remain largely constant. Essential Water also submitted that due to the small size of its business, employees often worked across multiple areas, which made it difficult to forecast how operational changes would impact head counts and hence labour costs.

Aither's recomendation

Aither raised several concerns with Essential Water's labour forecasts including:

- It was not evident that Essential Water's proposed labour costs incorporated any reductions in employee numbers, or overtime, due to the Menindee pipeline decommissioning.

- Essential Water's large proposed capital program would be expected to place downward pressure on operational labour costs as labour is capitalised for delivering these projects. That is, as Essential Water has proposed a large capital expenditure program (particularly once consequential works are included), this implies a higher proportion of labour would be allocated to capital expenditure, and a lower proportion allocated to operating expenditure. However, this was not evident in Essential Water's proposal.[63]
- Essential Water's sewerage labour forecasts for 2018-19 varied by 32% over a three month period, raising doubts about the reliability of Essential Water's approach to forecasting labour costs.[64]

To address uncertainties in Essential Water's forecasts for 2018-19, Aither first used Essential Water's actual 2017-18 water and sewerage labour costs as a base for its forecasts.

Aither then recommended reducing Essential Water's proposed labour costs by $4.5 million over three years to account for Essential Water's expected FTE reductions, and a 5% reduction in overtime due to the Menindee pipeline being decommissioned. However, this was partially offset by an increase of $100,000 in 2020-21 to account for redundancy payments. Aither then accepted Essential Water's proposal to escalate labour costs by 1.5% per year in nominal terms.

IPART's decision

Our final decision is to accept Aither's recommendations (see Figure 5.1 below). We agree with using 2017-18 as a base year, and that the labour cost savings due to decommissioning the Menindee pipeline should be included in its forecast expenditure.

In response to our Draft Report, Essential Water submitted that it did not agree with some of Aither's rationale for its recommended cuts to labour costs.

Firstly, Aither noted that it would expect that Essential Water's proposed large capex program would see a higher proportion of labour allocated to capital expenditure. In response, Essential Water stated that almost all of the new capital projects will be outsourced, and that labour that can be capitalised has already been done so.

Aither also found that variances in sewerage labour forecasts leads to doubts about Essential Water's forecasting reliability (eg, sewerage labour costs were reduced by 32 per cent between the June and September 2018 Annual Information Returns). In response, Essential Water stated that it has a small pool of resources and staff are required to cross-over various roles for sewerage and water, and that the 32 per cent variation related to a re-allocation of one FTE between sewerage and water, and does not fairly reflect on the forecasting reliability of the business.[65]

We have considered Essential Water's response. While Aither raised concerns about Essential Water's forecasting ability, and thus used 2017-18 as the base year to forecast labour costs, total labour operating expenditure is similar over 2017-18 and 2018-19, as shown in Figure 5.1

63 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 46.

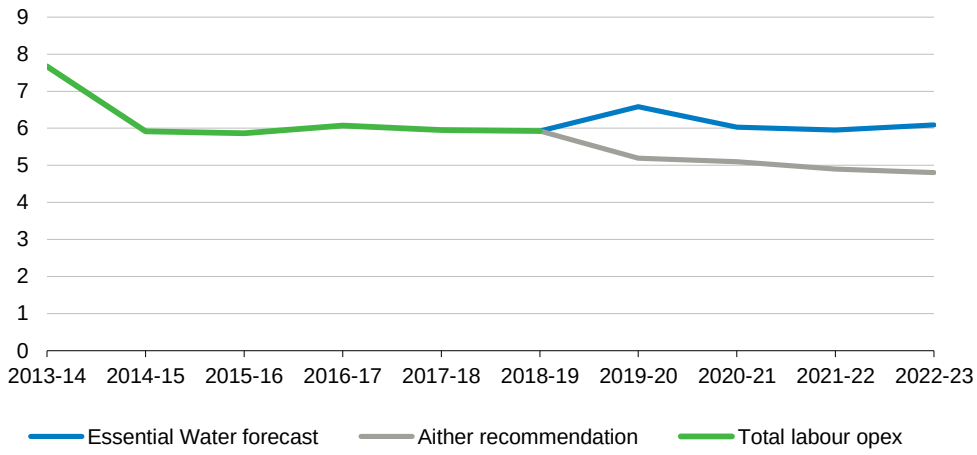
64 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 47.

65 Essential Water, submission to the Draft Report – Review Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, April 2019, p 5.

below. As such, the main drivers of Aither's recommended reductions were to account for Essential Water's expected FTE reductions, plus a 5% reduction in overtime due to the Menindee pipeline being decommissioned. We also note that Aither's comments about Essential Water's proposed large capex program potentially resulting in a higher proportion of labour allocated to capital expenditure, did not form the basis of its recommended reductions.

Therefore, we have maintained our draft decision that Aither's recommended labour cost reductions are reasonable.

Figure 5.1 Historical and proposed labour operating expenditure from 2013-14 to 2022-23 ($ millions, 2018-19)



Source: Essential Water AIR, September 2018; Essential Water Expenditure Review Final Report, Aither, January 2019, p51.

5.4.2 Reduce materials costs by $0.4 million

Essential Water proposed materials costs of $6.4 million over the 2019 determination period, or $2.1 million per year on average. This is $0.4 million (21%) more per year on average than Essential Water's actual materials expenditure over the 2014 determination period after accounting for inflation. Essential Water considered these increases were driven by an increase in the per-unit cost of chemicals, and maintenance of the water and sewerage networks. It also considered it was appropriate to base its cost projections on 2017-18 costs as production costs for chemicals have increased in recent years.

Aither's recommendation

Aither used average actual materials costs over the period 2014-19 as a basis for setting materials costs (given that changes in water consumption year-to-year will introduce some volatility into these forecasts). It then assumed that these costs would remain constant in real terms over the determination period. Aither found Essential Water's proposed 21% increase to be unjustified and inefficient.

IPART's decision

In its response to Aither's draft report, Essential Water provided further breakdown of forecast materials costs, which showed that its costs were driven by an increase in the per unit cost of chemicals, and maintenance of the water and sewerage networks.

We accept Essential Water's argument that materials costs have increased and that 2017-18 is an appropriate year to base its chemical costs on. In addition, Essential Water's actual water consumption in 2017-18 (5,870 ML) is similar to our forecast water consumption in 2019-20 (5,967 ML). Therefore, we have used 2017-18 materials costs as a basis for setting materials costs, and have held this number constant in real terms over the 2019 determination period.

5.4.3 Reduce hire services by $0.9 million

In addition to labour costs, Essential Water also incurs costs for hire services and consultants. Essential Water proposed to spend $3.0 million on hire services or $1.0 million per year on average, over the 2019 determination period. This is $0.3 million (or 25%) higher per year (on average) compared with the 2014 Determination. Essential Water attributes these extra costs to additional consulting costs required for complying with regulatory requirements such as its IPART pricing submission and preparing its mandated Integrated Water Cycle Management (IWCM) plan. It also noted additional planning costs for upcoming capital projects.

Aither's recommendation

Aither considered Essential Water's proposed increase to be unjustified. It noted that although there had been historical spikes in hire service costs related to specific projects, these projects were not ongoing and the expenditure Essential Water was proposing was well above the historical trend. Aither recommended reducing hire services costs to reflect the historical average over the 2014 determination period.

IPART's decision

We have accepted Aither's recommendation as we did not find Essential Water's proposal to be well substantiated. We note that where capital expenditure projects are required, but have not yet been fully scoped, Aither has included an allowance for project planning, including completing detailed businesses cases. This includes the Wills Street Sewerage Treatment Plant and the consequential works for Stephens Creek.

Further, we note that according to the Department of Industry's IWCM Strategy Check List, local water utilities are required to update their IWCM and a Strategic Business Plan every eight years. This means that the historical costs over the previous determination included the costs of updating its Strategic Business Plan, and should be reflective of its costs to update its IWCM over the 2019 period.

5.4.4 Broadly accept Essential Water's electricity costs

Essential Water requires significant volumes of electricity to operate its network, including pump stations and treatment plants. Essential Water's electricity needs will be different in

the 2019 determination period compared to the 2014 determination period - for example, it will no longer need to operate pump stations along the Menindee pipeline but will instead need to pump water along the last 21 km section of the Pipeline.

Essential Water proposed to spend $4.3 million on electricity over the 2019-22 period, or $1.4 million per year on average. This is $1.3 million (or 47%) per year less than the average over the 2014 determination period. Specifically, Essential Water proposed relatively constant electricity costs for 2019-20 and 2020-21, and then an 11% increase for 2021-22.

Whilst Essential Water has forecast its energy demand to remain relatively constant over the 2019 determination period, it submitted that it will have a contract renewal in 2020 and is expecting increases in electricity prices of around 7% per year based on Australian Energy Market Operator (AEMO) forecasts.

Aither's Recommendation

Overall, Aither recommended a small increase of $0.1 million to Essential Water's proposed costs over the 2019 determination period.

Essential Water forecast that electricity volumes would be relatively constant over the 2019 determination period. Aither accepted Essential Water's forecast electricity volumes as being reasonable but did not accept Essential water's forecast increase in electricity prices for 2021-22. As such, Aither has recommended an alternative forecast for declining electricity costs in real terms, based on Australian Energy Market Commission (AEMC) forecast prices for wholesale and regulated networks over the determination period. Aither also included an additional allowance for small sites,[66] which were not included in Essential Water's pricing proposal.

IPART's decision

We have accepted Aither's recommendations. We also consider that electricity costs for the new bulk water pump station will offset many of the efficiencies gained from decommissioning the Menindee pipeline and therefore Aither's electricity cost forecast is appropriate.

5.4.5 Include efficiency improvements of $0.3 million

Aither's recommendation

Aither recommended a 1% efficiency adjustment to non-labour direct expenditure in each year of the determination. This is because its recommended reductions to specific operating expenditure items are designed to establish baseline for operating expenditure, and do not include productivity improvements. The 1% efficiency adjustment is intended to explicitly capture future efficiencies, including expected efficiencies from moving to the Pipeline. Aither did not apply an efficiency adjustment to labour expenditure, as Essential Water forecast that wages would increase in nominal terms by 1.5% per year, and thus incorporated a real reduction in per unit labour costs.

66 Small sites other than the large pumping stations, booster stations and treatment plants that Essential Water operates.

IPART's decision

We support Aither's recommendation of a 1% annual efficiency adjustment to reflect productivity improvements over time.

5.4.6 Reduce corporate operating costs by $1.2 million

Essential Water proposed $6.5 million of corporate operating costs over the 3-year period to 2021-22. Chapter 4 discussed Essential Water's approach to calculating corporate operating costs, Aither's recommendation and our overall decision on corporate overheads.

As discussed in Chapter 4, we have applied corporate overhead loadings of 17.5% for 2019-20, 17% for 2020-21 and 16.5% for 2021-22 to all direct operating expenditure. This results in an overhead allowance of $5.3 million over the 2019 determination period, and reflects our decisions to:

- Reduce direct operating expenditure, and
- Reduce the percentage loading applied to direct operating expenditure.

5.4.7 Include $73.1m for bulk water transportation services

From mid-2019, Essential Water will source the majority of its bulk water from the Pipeline. We have determined the total NRR based on full efficient costs, including the Pipeline transportation costs and consequential works, consistent with our approach to setting prices as outlined in Section 1.1.5.

IPART has set the maximum prices WaterNSW can charge Essential Water for bulk water transportation services in our concurrent review.[67] These prices will recover WaterNSW's efficient operational costs as well as a return on (and of) capital.

The Pipeline transportation services make up about three quarters of Essential Water's annual operating costs and would have major impacts on customers if passed on in full. However, we have considered the Government's commitment to fund the efficient costs of the Pipeline such that end prices do not increase in real terms. Therefore, we have recommended the difference between the amount that is recovered from prices (ie, from our decision to not increase prices in real terms as a result of the Pipeline) and Essential Water's total NRR as a Government contribution (discussed in Chapter 4).

67 IPART, Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019 – Final Report, May 2019.

6 Prudent historical and efficient forecast capital expenditure

This chapter outlines our assessment of Essential Water's prudent historical and efficient forecast capital expenditure. It discusses:

- Essential Water's actual capital expenditure during the 2014 determination period.
- Essential Water's proposed capital expenditure for the 2019 determination period including:
  - Its major proposed capital works projects
  - Its proposed approach to the Pipeline and consequential works, and
  - Changes to its long term water operations.
- Our decisions on Essential Water's proposal.

Under the building block method, capital costs are not recovered as they are expended. Instead, the prudent historical and efficient forecast capital expenditure is added to the Regulatory Asset Base (RAB) and recovered over time through allowances for a return on assets and regulatory depreciation (see Chapter 4).

As with operating expenditure, we engaged consultants Aither to review Essential Water's historical and proposed capital expenditure and recommend the prudent historical and efficient forecast amount to include in the Regulatory Asset Base (RAB). Aither also reviewed Essential Water's performance against output measures over the 2014 determination period.

We also considered submissions from stakeholders in making our decisions.

6.1 Summary of our decisions

We decided to:

- Largely accept Essential Water's historical capital expenditure over the 2014 determination period as prudent, with small reductions to capital expenditure in 2017-18 and 2018-19 only.
- Include an allowance of $53.0 million for capital expenditure over the 2019 determination period. This reflects our decisions to allow:
  - $33.0 million for capital expenditure to maintain Essential Water's existing network over the next three years, including corporate overheads and non-system assets (a 39% reduction from Essential Water's proposal).
  - $19.9 million for capital expenditure for consequential works, over the 3-year period. Essential Water proposed $46.8 million for these projects over the same period, but did not include these in its proposed prices.
- Accept Essential Water's proposal to create a new RAB category for corporate capital costs.

- Accept Essential Water's proposed asset lives for water and sewerage assets, and to adopt slightly longer asset lives for corporate assets.
- Retain the current output measures of Essential Water's performance. However, we recommend that Essential Water's output measures provide a quantitative assessment of its performance in future reviews.

To make our capital expenditure decisions, we first considered Essential Water's historical capital expenditure over the 2014 determination period, and then considered the capital programs it has proposed for the 2019 determination period.

To aid us in this assessment, we engaged Aither to undertake a review of Essential Water's historical and proposed capital expenditure, including a strategic review of the Essential Water's long-term investment plans, asset management systems and practices. In undertaking their review, Aither applied our prudency and efficiency tests to Essential Water's capital expenditure. See Box 6.1 for a summary of these tests.

Box 6.1 Prudence and efficiency tests

In reviewing expenditure, Aither applied prudence and efficiency tests to historical and proposed expenditure.

Both the prudence and efficiency tests look at, at a given point in time, whether the expenditure is economically efficient.

Prudence test

This test assesses whether the decision to invest in an asset was one that Essential Water, acting prudently, would have been expected to make in the circumstances existing at the time. Having regard to information available at the time, the test assesses both:

- The prudence of how the decision was made to invest, and
- The prudence of how the investment was executed (ie, whether the construction or delivery of the asset was cost effective).

In examining forecast expenditure, the prudence test examines the consistency of this expenditure with the utility's longer-term capital expenditure program.

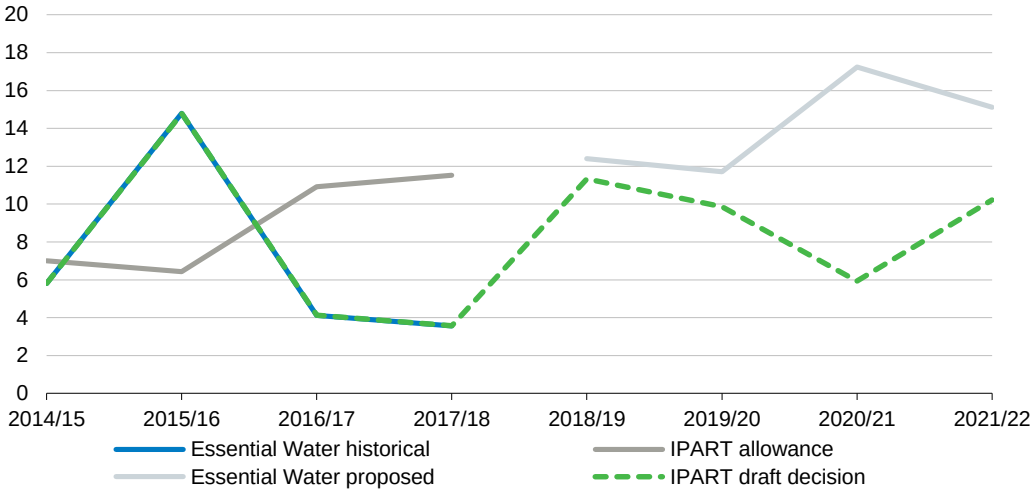
Efficiency test

This test examines whether Essential Water's actual and proposed expenditure represents the best and most cost effective way of delivering the monopoly services.

The efficiency test examines whether the proposed capital expenditure represents the best way of meeting customers' needs (over the life of the asset), subject to the utility's regulatory requirements.

We have considered Aither's review and recommendations in forming our decisions on prudent historical and efficient forecast capital expenditure. Our decisions are summarised in Figure 6.1.

Figure 6.1 Essential Water's past and forecast total capital expenditure excluding consequential works ($ millions, $2018-19)



Our final decisions are unchanged from our draft decisions. In maintaining our draft decisions, we considered Essential Water's comments on our draft decisions regarding corrosion works, brine pond works and asset lives for ICT assets.

6.2 Capital expenditure over the 2014 determination period

We made a decision

15 To set Essential Water's prudent level of past capital expenditure to be included in the Regulatory Asset Base (RAB) as set out in Table 6.1.

Table 6.1 IPART's decision and Essential Water's proposed prudent capital expenditure for the 2014 determination period ($millions, $nominal)

	2014-15 Actual	2015-16 Actual	2016-17 Actual	2017-18 Actual	Total 2014-18	2018-19 Forecast
Essential Water's proposal						
Water	3.2	12.5	1.7	2.4	19.8	9.1
Sewerage	2.2	1.4	2.2	1.0	6.9	3.3
Corporate overheads[a]	0.9	0.6	1.7	0.4	3.6	2.2
Non-system assets	0.0	0.0	0.0	1.9	1.9	1.6
Total	6.3	14.4	5.7	5.8	32.2	16.2
IPART's decision						
Water	3.2	12.5	1.7	2.4	19.8	8.1
Sewerage	2.2	1.4	2.2	1.0	6.9	3.3
Corporate overheads[a]	0.9	0.6	1.7	0.4	3.6	2.0
Non-system assets	0.0	0.0	0.0	0.0	0.0	1.6
Total	**6.3**	**14.4**	**5.7**	**3.8**	**30.3**	**15.0**

a Essential Water's prudent capital expenditure on non-system assets has been proportionally allocated to the water and sewerage RABs for 2018-19.

Note: Columns may not sum due to rounding.

Source: Essential Water AIR, September 2018; Essential Water Expenditure Review Draft Report, Aither, January 2019, p32.

Under the building block framework, prudent historical and efficient forecast capital expenditure will be rolled into Essential Water's RAB to be recovered from customers over time.

We reviewed the prudency of Essential Water's capital expenditure over the 2014 determination period, as well as the efficiency of forecast expenditure for 2018-19.[68]

During the 2014 determination period, Essential Water delayed several significant capital projects, which lead to a significant capital underspend compared to IPART's allowance (see Table 6.2). Essential Water stated these delays were due to reallocation of expenditure to the emergency drought works.

During 2015, worsening drought conditions lead to increased salinity in the Darling River and Menindee Lakes. On 19 June 2015, the Minister for Industry, Resources and Energy directed Essential Water to construct, operate and maintain the necessary infrastructure to maintain drinking water quality.

The NSW Government provided $13.8 million directly to Essential Water for the emergency drought works. These works included constructing a reverse osmosis desalination plant at the Mica Street Water Treatment Plant, as well as a pipeline and evaporating pond for the brine produced.

In determining Essential Water's prudent capital expenditure for the 2014 determination period, we have netted off cash capital contributions for emergency drought works (exclusive

68 Because 2018-19 expenditure is forecast, we consider the efficiency of this expenditure at this review. At the next review in 2022, we will consider the prudency of 2018-19 expenditure.

of the tax payable on these grants) from the total prudent expenditure incurred. Including the amount provided by the Government for emergency drought works, Essential Water underspent its capital allowance by $7.5 million (or 22%). Excluding the drought works, Essential Water's actual capital expenditure for the 2014 determination period was $16.1 million (or 47%) less than IPART's allowance.

Table 6.2 Essential Water's historical capital expenditure (excluding corporate overheads, $millions, $nominal)

	2014-15	2015-16	2016-17	2017-18	Total 2014-18	2018-19
Actual/ Forecast including emergency drought works	5.4	13.8	3.9	3.5	26.6	12.4
Emergency drought works	0.0	7.9	0.6	0.0	8.6	0.0
Actual/Forecast excluding emergency drought works	5.4	5.9	3.3	3.5	18.1	12.4
IPART's 2014 Determination	**6.5**	**6.0**	**10.4**	**11.2**	**34.1**	N/A
Difference including emergency works	-1.1	7.8	-6.5	-7.8	-7.5	N/A
Difference excluding emergency works	-1.1	-0.1	-7.1	-7.7	-16.1	N/A

Note: The actual capital expenditure in this table is exclusive of corporate overheads and so differs from Table 6.1. Columns may not sum due to rounding.

Source: Essential Water AIR, September 2018.

Aither assessed Essential Water's actual capital expenditure over the 2014-19 period as prudent, with two exceptions:

1. It did not consider that Essential Water's expenditure on non-system assets (NSAs) in 2017-18 was prudent, and that $1.9 million should be excluded from the RAB (see Section 6.6).
2. Essential Water's expenditure in 2018-19 includes $1.1 million for corrosion works at the Mica Street water treatment plant, which Aither did not consider efficient. In Aither's view, while repairs are required, they should have been avoided in the first place, as it would reasonably be expected that corrosion protection would be specified at the time of construction. Therefore, it is not efficient for customers to bear the costs of these corrosion works.

In response to Aither's draft report, Essential Water considered that it should not absorb the costs of corrosion repair, because it did all that was reasonably possible to specify the need for corrosion protection in the original project scope.[69] However, our view is that these repair costs should not be borne by customers, and that they should be borne by Essential Water or the original contractors. We also note that Essential Water are attempting to recover the costs of corrosion repairs from the original contractors.

69 Essential Water, Response to Aither's draft report, December 2018 – confidential document.

In response to our Draft Report, Essential Water submitted that it is pursuing the original contractors to address the corrosion.[70] However, it proposed initially including the costs of the repairs in its RAB, with the caveat that if any funds are obtained from the original contractors, then a corresponding adjustment is made to the RAB to remove the received amounts as a disposal, to offset expenditures going forward. In response, our decision is to maintain our approach in the Draft Report, and not include the cost of the corrosion repairs in Essential Water's RAB. Our final decision provides a financial incentive for Essential Water to pursue the original contractors to address the corrosion, whereas Essential Water's proposal does not.

We agree with Aither's recommended adjustments to Essential Water's historical capital expenditure over the 2014-19 period.

6.3 Proposed capital expenditure for the 2019 determination period

We made a decision

16 To set Essential Water's efficient level of capital expenditure to be included in the Regulatory Asset Base (RAB) for the 2019 determination period as shown in Table 6.3.

Table 6.3 IPART's decision on Essential Water's efficient capital expenditure for the 2019 determination period ($millions, $2018-19)

	2019-20	2020-21	2021-22	Total 2019-22
Water	21.1	8.1	3.7	32.9
Of which:				
Existing network	7.7	3.9	1.5	13.0
Consequential works	*13.4*	*4.3*	*2.3*	*19.9*
Sewerage	2.2	2.1	8.1	12.4
Corporate overheads	1.7	1.0	1.6	4.3
Non-system assets	1.6	1.0	0.8	3.3
Total	**26.6**	**12.2**	**14.2**	**53.0**

Note: Columns may not sum due to rounding.

The three components of our capital expenditure allowance are discussed in turn:

- Direct capital expenditure on water and sewerage assets to maintain the existing network.
- Consequential works expenditure on water assets, as a result of the Pipeline.
- Allowances for corporate costs – the allocation of corporate overheads to capital expenditure, and the efficient level of expenditure on corporate capital expenditure (non-system assets).

70 Essential Water, submission to the Draft Report – Review Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, April 2019, p 5.

6.4 Direct capital expenditure to maintain the existing network

Table 6.4 summarises Essential Water's proposal for direct capital expenditure, Aither's recommended expenditure allowance, and our decision.

Table 6.4 IPART's decision on efficient capital expenditure for the 2019 determination period, excluding consequential works ($millions, $2018-19)

	2019-20	2020-21	2021-22	Total 2019-22
Essential Water proposed				
Water	9.5	3.9	1.8	15.2
Sewerage	2.2	13.4	13.4	28.9
Corporate overheads	2.1	3.1	2.7	7.9
Non-system assets	1.6	1.0	0.8	3.3
Total	15.4	21.3	18.6	55.3
Aither recommended				
Water	7.7	3.9	1.8	13.3
Sewerage	2.2	2.1	2.7	6.9
Corporate overheads	1.7	1.0	0.7	3.5
Non-system assets	1.6	1.0	0.8	3.3
Total	13.2	7.9	6.0	27.1
IPART's decision				
Water	7.7	3.9	1.5	13.0
Sewerage	2.2	2.1	8.1	12.4
Corporate overheads	1.7	1.0	1.6	4.3
Non-system assets	1.6	1.0	0.8	3.3
Total	13.2	7.9	11.9	33.0

Notes: Columns may not sum due to rounding.

Source: Essential Water AIR, September 2018; Essential Water Expenditure Review Final Report, Aither, January 2019, IPART analysis.

Essential Water's proposed $55.3 million of capital expenditure for the 2019-22 period (excluding consequential works related to the Pipeline).

Our decision on Essential Water's efficient capital expenditure for the 2019 determination period is $33.0 million, excluding consequential works. This is $22.3 million (or 40%) less than Essential Water's proposal. This reduction mainly reflects our decisions to:

- Delay the replacement of the Wills Street sewerage treatment plant until the third year of the determination (-$16.5 million)
- Exclude corrosion works expenditure (as it is not efficient for customers to pay for these costs) and expenditure on the Stephens Creek Dam Wall rehabilitation (-$2.1 million), and
- Exclude corporate overhead costs relating to our draft reductions (-$3.6 million).

The reasons for our decisions on major proposed capital projects are discussed below.

6.4.1 Reduce Wills Street sewerage treatment plant expenditure by $16.5 million

Essential Water's largest proposed capital project was to replace the Wills Street sewerage treatment plant at a cost of $25.8 million over four years. The plant was constructed in the 1930s and Essential Water considers that the plant is nearing the end of its useful life and requires significant upgrades to comply with its environmental protection licence. Essential Water argues that constructing a new plant would avoid $20 million in remediation costs to bring the existing plant up to environmental standards.

Aither's recommendation

Aither recommended deferring the Wills Street sewerage treatment plant replacement to start in 2022-23 instead of 2019-20.[71] It had concerns about Essential Water's capacity to deliver its proposed capital expenditure program over the next three years. Aither noted that Essential Water's proposed expenditure for the 2019 determination period is 190% of the 2014 determination, and over 300% of the previous determination period if consequential works are included.

Essential Water's initial pricing proposal argued that works are needed to comply with NSW Environment Protection Agency (EPA) environmental requirements. However, Aither's analysis found that Essential Water has already addressed one of the two EPA requirements (regarding groundwater contamination) through existing remedial works, and has agreed with EPA on works to address the other requirement regarding stormwater control by 30 June 2019. Therefore, Aither considers that Essential Water should assess the success of the recently completed works in reducing environmental contamination, and review the scope and timing of future works.

IPART's decision

We largely accept Aither's recommendation, but with a timing adjustment to include Aither's total recommended $9.3 million expenditure allowance over the 3-year determination period, rather than over four years (see Table 6.5). In making our decision, we noted Aither's view that Essential Water's recent expenditure on the Wills Street sewerage treatment plant has largely addressed current EPA requirements.

Table 6.5 Capital expenditure for the replacement of Wills St sewerage treatment plant ($millions, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total 2019-22
Essential Water proposed	1.2	12.2	12.4	3.5	25.8
Aither recommended	1.3	1.0	2.0	5.0	4.3
IPART's decision	1.3	1.0	7.0	-	9.3
Difference	0.1	-11.2	-5.4	-	-16.5

Note: Columns may not sum due to rounding. Figures for 2022-23 are shown as they were proposed by Essential Water, but are outside our draft determination period of 2019-22.

Source: Essential Water AIR, September 2018; Essential Water Expenditure Review Final Report, Aither, January 2019, p 99.

71 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 27.

In effect, this will provide an allowance for Essential Water to begin construction in the final year of the determination period (2021-22). We strongly encourage Essential Water to complete a comprehensive business case in the first two years and commence works in the third year. This adjusted profile gives Essential Water an opportunity to demonstrate its capacity to deliver.

In its response to Aither's draft report, Essential Water suggested that Wills St could be considered a 'contingent' project (a concept used by the Australian Energy Regulator). The cost of a 'contingent' project is recovered from customers only if pre-defined conditions are met. We identified advantages and disadvantages of this approach:

- Essential Water has not yet completed a business case and the project costs are uncertain. Therefore, there is a risk that customers may pay too much if the allowance we set is inefficient.
- A 'contingent' project mechanism would provide a true-up at the next determination to include the efficient cost of the project. That is, we could set a small or zero allowance for Wills St in this determination, and make an adjustment at the next determination.
- This option could minimise risks of overpayment by customers, but would be administratively more complex for both Essential Water and IPART. In addition, it might also reduce the incentives for Essential Water to find efficiencies in delivering the project.

On balance, our view is that a $9.3 million allowance over the 2019 determination period will allow Essential Water to proceed with replacing the treatment plant starting 2021-22, and potentially give the 2022 expenditure review sufficient information to assess the prudency and efficiency of the project.

Our final allowance is unchanged from our draft allowance and we received no feedback from stakeholders on this draft allowance.

6.4.2 Not recover Mica St water treatment plant corrosion works from customers

As discussed in Section 6.2, Essential Water has identified the need for remediation works at the Mica Street water treatment plant to address concrete corrosion. Essential Water proposed to include $1.8 million in repairs in its RAB in the 2019 determination period in addition to the $1.1 million spent during 2018-19 (excluding corporate overheads).

Aither's recommendation

Consistent with its assessment of Essential Water's corrosion repairs in 2018-19, Aither considered the proposed project was not efficient because works would not have been needed if corrosion protection was installed at the time of construction. Therefore, it considered that Essential Water should not recover these costs from customers, but should absorb these costs or recover them from contractors.[72]

72 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 23.

IPART's decision

We accept Aither's recommendation. Our view is that these repair costs are not efficient and so should not be borne by customers. Rather, they should be borne by Essential Water or the original contractors.

6.4.3 Not include Stephens Creek dam wall rehabilitation costs

Essential Water proposed $0.3 million for 2021-22 and $0.8 million for 2022-23 (excluding corporate overheads) on Stephens Creek dam wall rehabilitation works. In its view, these works are needed to reduce the risk of dam failure, with potential risk of loss of life and assets.

Aither's recommendation

Aither's view was that these works are necessary and efficient.

IPART's decision

Following consultation with the Dam Safety Committee, we have decided to exclude the proposed Stephens Creek dam wall rehabilitation costs until new dam safety legislation is in place, and encourage Essential Water to review the need for the works at the next determination period.

This reflects our view that these works are not required by current dam safety requirements, and that Essential Water should wait for the new safety requirements to be implemented before proposing expenditure to address dam safety requirements.

The Dam Safety Committee has identified 15 dams in NSW that are significant risk dams under current legislation, which would require dam owners to rectify any identified deficiencies in order to address flooding risk. These 15 dams have been assessed as being in the 'intolerable zone' on the risk matrix (which plots the probability of flooding and expected lives lost).[73] Stephens Creek is not one of these dams, and there is no current mandatory requirement for additional works to address dam safety issues.

Looking forward, we understand that a new Dam Safety Act could be in place by 2019, which will be supported by associated regulations on dam safety requirements. We understand that the new regulations will focus on management systems and processes, and refer to ISO standards and ANCOLD guidelines,[74] but will not prescribe technical standards. Therefore, we consider it is unlikely that the new safety regulatory regime would represent a tightening of requirements to address dam safety issues.

6.5 Proposed consequential works capital expenditure

Essential Water has proposed consequential works projects to adapt its water supply network to integrate with the Pipeline, see Box 6.2. Table 6.6 summarises Essential Water's estimated

73 Dam Safety Committee secretariat, email to IPART, 17 December 2018.

74 ANCOLD is the Australian National Committee on Large Dams, which provide technical guidelines on management of large dams.

capital costs for these projects, Aither's recommended expenditure allowance, and our view of the efficient cost of consequential works.

Table 6.6 IPART's decision on consequential works capital expenditure for the 2019 determination period ($millions, $2018-19)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total 2019-22
Essential Water proposed	10.0	39.2	5.3	2.3	2.3	46.8
Aither recommended	0.7	6.6	4.4	4.3	5.3	15.2
IPART's decision	6.4	13.4	4.3	2.3	N/A	19.9

Note: Columns may not sum due to rounding. Figures for 2018-19 and 2022-23 are shown as they were proposed by Essential Water, despite being outside our draft determination period of 2019-22.

Source: Essential Water pricing submission to IPART, June 2018; Essential Water Expenditure Review Final Report, Aither, January 2019, IPART analysis.

Essential Water estimated the total capital cost for the works at $59.1 million (including overheads and contingencies) over the 2018-23 period, with an ongoing operating cost of $0.4 million per year. Over the 3-year determination period, it is $46.8 million.

Essential Water excluded consequential works from its proposed NRR, because it is seeking separate Government funding for the full cost of the works. In the event that the Government does not fund the cost of the consequential works, Essential Water has proposed a cost pass-through mechanism to recover some, or all, of these costs from customers (including operational costs). We did not accept Essential Water's proposed cost pass-through for consequential works (see Section 3.3 for further discussion).

We have not received confirmation from NSW Government regarding funding for consequential works. Therefore, we have made our own assessment of the prudency and efficiency of the proposed consequential works, taking into account Aither's assessment.

We will set prices to reflect Essential Water's costs for providing water services, including efficient capital expenditure on the consequential works, less any confirmed Government subsidies or grants.

Overall, our decision is to allow $19.9 million for the 2019 determination period, and include $6.4 million in Essential Water's RAB for 2018-19.

Box 6.2 Essential Water's proposed consequential works

Essential Water has proposed consequential works projects to integrate its water supply network to the Pipeline.

Stephens Creek pump station and Rocla pipeline refurbishments ($31.5 million)

Essential Water plans to transition Stephens Creek reservoir from Broken Hill's main water source to a back-up, which will supply the city when the Pipeline is shut down. To improve the reliability of the Stephens Creek supply system, Essential Water proposes to replace the Stephens Creek pump station and sections of the Rocla pipeline connecting the reservoir to Broken Hill.

Replacement supply for Menindee pipeline customers ($12.3 million)

Currently, Essential Water provides water to the Menindee Lakes caravan park, the community of Sunset Strip, and 11 graziers from off-takes along the Menindee pipeline. When the Menindee pipeline is decommissioned Essential Water proposes to supply the caravan park and Sunset Strip with treated water from a new pipeline from the Menindee water treatment plant (at a cost of $1.5m) and the graziers from a new gravity fed pipeline from Stephens Creek reservoir (at a cost of $10.8m).

Mica Street water treatment plant upgrades ($2.2 million)

Essential Water identified two major water quality risks from water pumped from the Murray River for its chlorinated and untreated water customers. Firstly, water from the Murray River is likely to be more corrosive than water from the Darling River and could cause accelerated degradation of pipes in the Essential Water network. Secondly, WaterNSW identified a risk of cyanobacteria (blue-green algae) blooms in its bulk water storage. WaterNSW proposes to use Powdered Activated Carbon (PAC) to control algae. However, residual PAC will remain in Essential Water's untreated water stream which could create additional health risks and potentially clog Essential Water's infrastructure over time.

Essential Water proposes to construct new infrastructure at Mica Street water treatment plant including:

- CO_2 and Lime dossing to reduce water corrosiveness, and
- Dissolved Air Flotation (DAF) filters to remove residual powdered activated carbon (PAC).

Decommissioning the desalination plant brine pond ($10.0 million)

Essential Water proposes decommissioning the brine evaporation pond and pipeline for the city's desalination plant, which will no longer be required once the Pipeline is operational. Essential Water is leasing the land the brine pond is built on from Perilya. Once the site is remediated, the land will returned to Perilya who plan to retain the earthworks for use as a future tailings dam.

Note: Costs exclude corporate overheads

6.5.1 Stephens Creek upgrades are not consequential works

Once the Pipeline becomes available Essential Water proposes to transition the Stephens Creek supply system to become a backup source. It proposes $31.5 million in capital works between 2018-19 and 2020-21, to improve the reliability of this system. This involves replacing the Stephens Creek pump station and some sections of the Rocla pipeline connecting Stephens Creek to Broken Hill.

Aither's recommendation

Aither has recommended deferring Stephens Creek reservoir refurbishments, which were proposed by Essential Water to ensure the reliability of Stephens Creek as Broken Hill's main back-up supply.[75]

In Aither's view, this expenditure should be deferred until a more rigorous assessment defines the optimum solution for meeting reliability objectives. Aither noted that the need for these works appear to be based on worst case scenarios, rather than based on the most efficient option.

In particular, once the Pipeline is operational, there will be less need to rely on Stephens Creek assets. This is because water will be supplied from the Pipeline going forward, rather than through the Menindee pipeline via the Stephens Creek reservoir. Instead, Aither recommends the investment should be delayed until a probabilistic review of reliability is undertaken.

Aither also noted as these works are for existing assets which service existing customers, it is arguable whether they are truly consequential works, rather than business-as-usual works.

IPART's decision

We agree with Aither's recommendation to defer works, at least until the reliability of the new Pipeline is understood.

Stephens Creek is currently used as the primary water source for Broken Hill residents under water supply arrangements, and these assets in their current condition have provided a level of service to customers that (according to Essential Water's pricing proposal) has "met or exceeded its customer service standard obligations".[76] With Stephens Creek only required as a back-up water source, the need for expenditure to upgrade these assets, at least in the short term, does not appear efficient.

6.5.2 Accept Essential Water's proposed pipelines to supply Sunset Strip and the graziers

Essential Water proposes to construct two new pipelines so it can continue to supply customers currently receiving water from offtakes to the Menindee pipeline:

1. A 21 km rising main to transport water from the Menindee water treatment plant to the community of Sunset Strip via the Menindee Lakes caravan park at a capital cost of $1.5 million.
2. An 80 km gravity main from Stephens Creek reservoir to supply graziers north of Sunset Strip along the Menindee pipeline route, at a capital cost of $10.8 million.

Essential Water considered it is not safe to supply customers via the existing Menindee pipeline (either pumping from Menindee or gravity feeding from Stephens Creek) because of the increased risk of protozoa and bacterial contamination if water is not constantly flowing.

75 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 28.
76 Essential Water pricing proposal to IPART, July 2018, p 79.

Aither's recommendation

Aither recommended accepting the proposed Menindee to Sunset Strip pipeline expenditure.[77] It considered Essential Water's proposal was the most efficient method for continuing to provide services to a vulnerable residential customer group. It also allowed Essential Water to transition Sunset Strip from chlorinated water to higher value treated water, while decommissioning the expensive and unreliable Sunset Strip treatment plant.

Aither recommended not accepting Essential Water's proposed graziers pipeline. Given the high cost to supply only 11 customers, Aither recommended further work to look for cheaper and more innovative solutions.[78] Aither's recommended expenditure of $5.3 million, which comprised:

- $0.3 million over 2018-21 to allow the existing Menindee pipeline to be gravity fed, and for ongoing monitoring and planning, and
- $5.0 million over 2021-23 to commence (but not necessarily complete) works.

In its response to Aither's draft report, Essential Water submitted that the project needs to be completed by the end of 2019 to maintain service to the graziers. It also stated that the Public Works Authority (PWA) has already undertaken extensive options analysis.[79]

However, Aither has recommended that it would be more efficient to install connection works to gravity feed water from Stephens Creek (following decommissioning of the Menindee pipeline), and monitor the quality of water initially. This would allow Essential Water to then identify the most cost effective option, which could include a hybrid 'bores and pipeline' option where:

- A shorter pipeline is built to service graziers near Stephens Creek, and
- Bores are drilled for customers closer to Menindee, if it is more cost effective to do so.

While PWA investigated the option of a bore field, their scenario was to drill a bore field near the Darling River and pump this water uphill to service all 11 graziers.

Once the most cost effective option has been identified by Essential Water, Aither recommended $5.0 million to commence works over 2021-23. Should the efficient scope of the project be larger than this amount, a further allowance could be considered at the next price review.

Other stakeholder submissions

At the public hearing, some graziers noted that although they would receive a significant subsidy from other customers (and/or NSW Government) under Essential Water's proposal, they bring significant financial benefits to the community of Broken Hill which could offset these costs.

77 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 29.
78 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 29.
79 Essential Water, Response to Aither's draft report, December 2018 – confidential document.

IPART's decision

We have accepted Aither's recommendation that an allowance should be included for a new pipeline to supply treated water from Menindee to Sunset Strip.

We have also decided to accept Essential Water's full proposed expenditure for a new pipeline from Stephens Creek reservoir to supply graziers along the Menindee pipeline route.

We consider it is likely these graziers will continue to require services in the long-term and a permanent solution is appropriate. Analysis by PWA indicates the pipeline option was the most viable option, and we believe the added health risks of using the existing Menindee pipeline in the short-term outweighs the possibility of finding a more efficient solution with additional planning.

We acknowledge Aither's argument that $11.4 million is a large expenditure for just 11 customers, given these costs will be borne across Essential Water's entire customer base. However:

- Our decision to harmonise usage prices for pipeline untreated water users with other untreated water users will improve cost-reflectivity for pipeline customers (see Chapter 8), and
- Essential Water will still have a financial incentive to identify a cheaper solution if it is feasible. Under our incentive-based regulatory framework, any cost savings that Essential Water can identify will be shared with customers over time.

6.5.3 Accept proposed upgrades to Mica Street water treatment plant to protect against blue green algae and corrosion

Essential Water proposed $2.2 million over 2018-20 to reduce the corrosiveness of untreated and chlorinated water and remove residual powdered activated carbon used to control algae.

PWA's report considered three options and Essential Water decided to recommend the highest cost option on the basis that it provided the lowest risk to Essential Water and its customers. Under this option Essential Water would convert disused sand filters at the Mica Street water treatment plant into DAF filters to remove PAC and construct new CO_2 and lime dossing equipment to control corrosiveness.

Aither's recommendation

Aither considered the proposed option is not efficient without better quantifying the relative risks of the options. Aither recommended proceeding with an interim solution (the second highest cost option identified in PWA's analysis) to better understand the long-term risks. Under this option, corrosive water conditioning was included but PAC filtering was not.[80]

IPART's decision

We have accepted Essential Water's proposal to construct DAF filters and lime and CO_2 dossers to manage water quality risks for chlorinated and untreated water.

80 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 30.

We acknowledge that the need for pre-treatment will be intermittent (as raw water quality will vary). However, we consider it is reasonable in this case to take a conservative approach.

6.5.4 Reduce proposed expenditure on decommissioning the brine pond by $2.0m over 2019-21

PWA considered a number of possible options for decommissioning the brine pond built in 2015 to evaporate waste brine from Broken Hill's reverse osmosis desalination plant. Essential Water states that is contractually obliged to return the land in a remediated state during 2020. Essential Water provided business case documents showing that cost estimates for this project varied widely, ranging from $4.5 million to $17 million. Essential Water's forecasts assumed $10.0 million for the project, over 2019-21.

Aither recommended adopting the lowest cost option ($4.5 million), with a large allowance for contingency ($4.0 million) to account for uncertainty in project costs.

IPART's decision

We have accepted Aither's recommendation and reduced Essential Water's proposed expenditure by $1.5 million over 2019-21.

In response to our Draft Report, Essential Water submitted that rather than including the expenditure as capital expenditure, it should be included as operating expenditure.[81] This is because it has been advised that under accounting standards, this work must be expensed rather than capitalised.

We note that there may be differences between our regulatory approach and accounting standards, and that this may result in a different classification of expenditure. However, under our regulatory framework, irrespective of how expenditure is classified under different standards, Essential Water is able to eventually recover its efficient costs.

The costs of decommissioning the brine pond are a consequence of the Pipeline. We recognise that there are two options to recover this cost:

- Up front as an operating expense, or
- Gradually over time as a capital expense.

In this case, we consider it appropriate to gradually recover the costs over time as a capital expense. In effect, to add the decommissioning costs to the original capital costs for the Pipeline and gradually recoup these costs over time, as would typically happen for large capital projects. Given the uncertainty around costs for this project, treating these costs as a capital expense would allow IPART to update the forecast costs for actual efficient expenditure at the next determination period.

81 Essential Water, submission to the Draft Report – Review Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, April 2019, p 4.

6.6 Corporate capital expenditure (non-system assets)

We made decisions

17 To include Essential Water's efficient non-system capital expenditure for 2018-19 in the Regulatory Asset Base (RAB), by dividing this expenditure between the water and sewerage RABs based on direct capital expenditure.

18 To create a new corporate Regulatory Asset Base (RAB) from 1 July 2019, with four sub categories: ICT, FFP&E (Furniture, Fittings, Plant & Equipment), vehicles and buildings.

Table 6.7 IPART's decision on corporate capital expenditure ($millions, $2018-19)

	2018-19	2019-20	2020-21	2021-22	Total 2019-22
Non-system assets RAB					
ICT	n/a	1.3	0.7	0.5	2.5
FFP&E	n/a	0.1	0.1	0.1	0.2
Buildings	n/a	0.2	0.1	0.2	0.5
Vehicles	n/a	0.1	0.1	0.1	0.2
Total	**1.6**[a]	**1.6**	**1.0**	**0.8**	**3.3**

[a] Non-system assets for 2018-19 have been allocated to the water and sewerage RABs based on direct capital expenditure.

Note: FFP&E refers to Furniture, Fittings, Plant and Equipment.

Source: Essential Water's September AIR update.

Essential Water's corporate capital expenditure (also known as non-system assets) is the 'indirect' capital costs it occurs in providing its services, such as expenditure on computers, buildings and vehicles required for corporate administrative functions. Since Essential Water is an operating division of Essential Energy, corporate capital expenditure is essentially a contribution by Essential Water to Essential Energy for the provision of corporate capital assets. Our decision is to include efficient corporate capital expenditure in Essential Water's RAB, to be recovered from customers over time.

6.6.1 Incorporate $1.6 million of corporate capital expenditure (non-system assets) into Essential Water's water and sewerage RABs for 2018-19

Essential Water only began to identify non-system assets (corporate capital costs) from 2017-18 – this is in addition to its corporate operating costs. Essential Water proposed non-system assets of $1.9 million in 2017-18 and $1.6 million in 2018-19 respectively. We asked Aither to review the efficiency of Essential Water's non-system assets in 2017-18 and 2018-19.

Aither's recommendation

Aither recommended accepting Essential Water's proposed non-system capital expenditure for 2018-19.[82]

However, Aither recommended not accepting Essential Water's proposed non-system capital expenditure for 2017-18, because it considered that it did not have sufficient information to

82 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p xii.

determine if the expenditure was prudent and efficient. Aither recommended that Essential Water provide IPART with a more detailed breakdown of these costs.[83] Specifically, it noted that Essential Water did not provide any detail on these expenditures other than the ICT program. There was also some uncertainty in Essential Water's estimates for 2017-18, with a $0.8 million (or 40%) difference between its June 2018 forecast and September 2018 Annual Information Return.

IPART's decision

We accept Aither's recommendations regarding the efficiency of Essential Water's non-system assets for 2018-19.

We have incorporated $1.1 million into Essential Water's water RAB and $0.5 million into its sewerage RAB for 2018-19 to account for non-system assets. Consistent with our draft decision, we have not incorporated any non-system assets into Essential Water's RAB for 2017-18. Essential Water did not provide any additional information to IPART in response to our Draft Report.

Consistent with our decision to establish a new non-system assets RAB from 1 July 2019 (see below), historical non-system assets which we deem to be prudent will be incorporated into Essential Water's existing water and sewerage RABs in proportion to direct capital expenditure.

6.6.2 Establish a new non-system assets RAB from 1 July 2019

Essential Water proposed establishing a new RAB for non-system assets as a more transparent method for accounting for corporate capital expenditure. The new RAB would contain four new sub-categories: ICT, FFP&E, vehicles, and buildings. Essential Water proposed rolling prudent and efficient non-system capital expenditure into this new RAB from 2017-18 onwards.

Aither's recommendation

Aither considered Essential Water's proposed non-system capital expenditure for the 2019 determination period to be necessary and efficient.[84] This was based on its review of Essential Energy's bottom-up assessment of actual corporate assets that were relevant and used by the water business.

Aither also noted that, based on the information provided and its examination of Essential Energy's process of allocating corporate costs in its AER approved Cost Allocation Methodology (CAM), it was confident that Essential Energy was not double counting in its proposal of corporate capital costs and corporate operating costs.[85]

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83 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 25.

84 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 101.

85 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 69.

IPART's decision

We support Essential Water's proposal to create a new RAB for non-system assets. This is a positive step towards Essential Water better establishing its overall efficient corporate costs for Essential Water, and promotes cost-reflective charges.

We accept Aither's recommendation that Essential Water's proposed corporate capital expenditure from 1 July 2019 is efficient. We consider that it is important for Essential Energy to establish its proposed costs for Essential Water by undertaking a bottom up assessment of Essential Water's actual use of Essential Energy's corporate assets.

Our decision is to create a new RAB for non-system assets from 1 July 2019 to reflect Essential Water's forecast efficient capital expenditure over the 2019 determination period. We have incorporated historical efficient corporate capital expenditure from 2018-19 into the water and sewerage RABs in proportion to direct water and sewerage capital expenditure in 2018-19, rather than creating the non-system assets RAB retrospectively.

6.7 Asset lives

Water utilities typically construct and operate assets which are long-lived. The building block method provides an allowance for regulatory depreciation so that the capital a utility invests in its regulated assets is recovered from customers over the useful life of each asset. To calculate this allowance, we need to decide on the appropriate useful lives for the assets in Essential Water's RAB. As with capital expenditure, we sought advice from Aither on Essential Water's asset lives.

We made decisions

19 To adopt new and existing water and sewerage asset lives as set out in Table 6.8.

20 To adopt new corporate asset lives as set out in Table 6.9.

Essential Water proposed to maintain its asset lives for new water and new sewerage assets from its 2014 Determination (Table 6.8). It also proposed to update its asset lives for existing water and sewerage assets to reflect the capital expenditure it undertook over its 2014 determination period.

As mentioned in Section 6.6 above, Essential Water proposed a new RAB category for corporate assets – which are non-system assets such as ICT, buildings, plant and equipment and motor vehicles. Its proposed lives for these assets are shown in Table 6.9.

Table 6.8 IPART's decision and Essential Water's proposed asset lives for water and sewerage

Regulatory life of assets (years)	Essential Water's proposed		IPART's decision	
	Water	Sewerage	Water	Sewerage
New assets	98	89	**98**	**89**
New assets (2014 Determination)	*98*	*89*	-	-
Remaining life of existing assets	50	49	**53**	**50**
Remaining life of existing assets (2014 Determination)	*46*	*47*	-	-

Note: Columns may not sum due to rounding.

Source: Essential Water pricing proposal to IPART, July 2018, Table 8-5, p 162; IPART, *Essential Energy's water and sewerage services in Broken Hill, Review of prices from 1 July 2014 to 30 June 2018 - Final Report*, June 2014, p 99.

Table 6.9 IPART's decision and Essential Water's proposed asset lives for corporate assets

Regulatory life of assets (years)	Essential Water's proposed	IPART's decision
IT	4	10
Furniture, fittings, plant and equipment	6.7	7
Motor vehicles	15	15
Buildings	50	50

Source: Aither draft report, *Essential Water capital and operating expenditure review*, November 2018, p35.

Aither's recommendation

As part of the review of Essential Water's proposed costs, we asked Aither to examine Essential Water's proposed asset lives for water, sewerage and corporate assets. It found Essential Water's proposal to be reasonable, with the exception of ICT assets. It considered that four years was unreasonable as it appeared too short compared with what is typically applied for corporate ICT assets. Aither recommended that we instead adopt a 10 year asset life for new assets, consistent with IPART's 2016 Determination for Sydney Water. The 10 year asset life we adopted in that review, was an average of 15 years for new systems and Enterprise Resource Planning assets, and five years for other computer systems.

IPART's decision

Our decision is to accept Aither's recommendations as being reasonable. We also decided to round up Essential Water's proposed asset lives for 'furniture, fittings, plant and equipment' to seven years for simplicity.

In response to our Draft Report, Essential Water submitted that we should adopt an asset life of five years for ICT assets, consistent with the five year asset life applied by the Australian Energy Regulator for Essential Energy and other Distribution Network System Providers for all ICT systems.

However, while it may be reasonable to adopt a five year asset life for smaller computer systems, we consider a longer asset life is appropriate for other IT systems such as new systems (eg, billing systems) and ERP assets, as it would be unreasonable to replace such systems as frequently as smaller computer assets. Therefore, an average of 10 years is a reasonable recovery period and we have maintained our draft decision, given that Essential Water's proposal includes a contribution towards Essential Energy for larger IT systems such as billing and enterprise systems, which have longer lives than smaller computer systems.[86]

6.8 Output measures

Essential Water has adopted output measures to inform stakeholders on whether they are delivering on their customer service levels targets (see Appendix H). Its current customer service level targets cover:

- The availability of water supply
- Water quality
- Response times
- Sewerage performance
- Customer complaints
- Notice periods, and
- Duration of planned interruptions.

Essential Water has proposed to maintain its existing service level targets in the 2019 determination period.

We made a decision

21 To retain the current output measures of Essential Water's performance.

Output measures are important because we set prices to enable the utility to recover the forecast costs of meeting these targets. If output measure targets are not met, it could indicate that the levels of service, to which we have linked our prices, are not being met and there is a deficiency in the planning and delivery of capital projects. However, strict conclusions about Essential Water's performance should not be drawn on the basis of whether or not it has met these targets. There may be reasonable explanations why it does not meet certain targets. For example, as circumstances evolve over a determination period, changing a target may result in a better outcome for customers. In such cases, the output measures can provide a reference point for articulating changes in priorities.

Aither's recommendation

As part of the review of Essential Water's proposed costs, we asked Aither to review Essential Water's performance against its current output measures. Aither found that some quantitative targets were not appropriately measured against, including response times for

86 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, pp 36, 100.

water and sewerage system failures.[87] Aither noted that while Essential Water has outlined quantitative response time targets, actual performance against the targets is not measured on a job-by-job basis.

Aither further noted that Essential Water has identified its inability to measure itself against its response time targets as an issue and that Essential Water has committed to implement appropriate procedures to capture performance prior to July 2019. In addition to these procedures, Aither recommended that further improvements be made with regard to collecting data to measure Essential Water's performance against output targets.

IPART's decision

We have decided to accept Essential Water's proposal to maintain current existing service level targets in the 2019 determination period. We agree with Aither that Essential Water's output measures should provide a quantitative assessment of its performance in future reviews, and that Essential Water should implement procedures to adequately measure performance against its quantitative targets. This will help with communicating with customers regarding the level of service they are receiving.

Going forward, Essential Water should continue to monitor performance against its customer service level targets and review them at the next price review.

87 Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 37.

7 Forecast water sales and customer numbers

Once we have determined the revenue requirement for the 2019 determination period, the next step in our approach is to decide on Essential Water's forecast water demand, chargeable sewerage volumes and customer numbers. These forecasts are used in calculating the water and sewerage price levels required to recover the notional revenue requirement, less the NSW Government contribution.

It is important that the forecasts are reasonable. If they differ significantly from Essential Water's actual water sales, customers numbers and chargeable wastewater volumes over the determination period, the determined prices will result in the utility significantly over- or under-recovering its required revenue. If the forecasts are lower than actual sales, customers will pay too much. If they are higher than actual sales, Essential Water may not earn sufficient revenue to recover its efficient costs.

This chapter discusses our decisions on Essential Water's forecast water sales, customer numbers and chargeable wastewater volumes over the 2019 determination period. To assist us in making our decisions, we engaged consultants Frontier Economics to review Essential Water's estimates for demand and customer numbers. We also considered stakeholder submissions and undertook our own analysis.

7.1 Summary of our decisions

We decided:

- To adopt forecast metered water sales that are about 16% higher than Essential Water's forecasts. This mainly reflects our decision to incorporate a 10% "bounce-back" in demand from residential, business and exempt properties customers.
- To accept Essential Water's forecast that non-residential sewerage volumes will remain constant.
- To adopt slightly higher forecasts of customer numbers than proposed by Essential Water. We expect that customer numbers will decline by between 0.4% and 0.5% per year, in comparison with Essential Water's forecast of a 1% reduction per year.

Our final decisions are broadly unchanged from our draft decisions, except we have revised down the starting point for our forecast residential water and sewerage customer numbers by 3% and 4% respectively, and made minor adjustments to the distribution of water sales between treated and chlorinated water. These minor changes were based on detailed customer-level data provided by Essential Water since the Draft Report.

This chapter also discusses our decision, in the WaterNSW review, on Essential Water's forecast demand from the Pipeline.[88] We expect that Essential Water's bulk water purchases

88 Essential Water will be the main customer for the Pipeline. Our decision on Essential Water's forecast demand from the Pipeline is contained within that review. Essential Water's demand forecast from the Pipeline does not *directly* impact how we calculate Essential Water's water prices.

from WaterNSW will be lower, on average, than the total water Essential Water supplies to its customers, as existing storage reservoirs can be used to supply some water to Broken Hill.

7.2 Metered water sales

We made a decision

22 To adopt forecast metered water sales as shown in Table 7.1.

Our forecast metered water sales are about 16% higher than forecast by Essential Water. This reflects:

- Our decision to incorporate a factor to account for a "bounce back" in demand due to expected changes in customer behaviour resulting from increased water security.
- The analysis of Frontier Economics which suggests that basing water forecasts on 2016-17 consumption is not appropriate because that year is, in fact, a lower residential demand year.

Other than these two differences, we have broadly accepted Essential Water's demand forecasts, including:

- A gradual decrease in water demand over the 2019 determination period due to Broken Hill's declining residential population in line with Essential Water's proposal, but at a slightly lower rate.
- Accepting Essential Water's proposal that non-residential demand will remain relatively constant.

We have not applied any price elasticity adjustments to our water demand forecasts as our decision is to maintain most prices in real terms (see Chapter 9).

In its submission to our Draft Report, Essential Water opposed IPART's draft water sales forecast and considered we should use the approach in its original proposal.[89] However, after considering the points raised by Essential Water (discussed below), we have decided to maintain our draft decisions.

We note that since our Draft Report, we have been able to separate Sunset Strip customers (who will receive treated water during the 2019 determination period) from other chlorinated water customers. Because of this, we have increased treated water demand by 30 ML per year and decreased chlorinated water demand by 30 ML per year.

89 Essential Water, submission to the Draft Report – Review Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, April 2019, p 6.

Table 7.1 IPART's decision and Essential Water's proposed forecast metered water sales (ML)

	2019-20	2020-21	2021-22
Essential Water's proposed			
Treated water	4,129	4,111	4,093
Chlorinated water	42	42	42
Untreated water	976	976	976
Total	5,147	5,129	5,111
IPART's decision			
Treated water	4,840	4,827	4,811
Chlorinated water	19	19	19
Untreated water	1,109	1,109	1,109
Total	5,968	5,955	5,939
Difference	820	826	827

Note: Totals may not add due to rounding.

Source: Essential Water pricing proposal to IPART, July 2018, p 101; IPART analysis.

7.2.1 Actual water sales over the 2014 determination period were lower than forecast

Broken Hill experienced drought conditions throughout most of the 2014 determination period which resulted in water restrictions over 2015 and 2016.[90] This led to lower than forecast water demand between 2014-15 and 2016-17 (see Table 7.2). Although this impacted Essential Water's revenue, the shortfall was largely offset through reduced capital spending.[91] More recently, customer demand was higher in 2017-18 following the announcement of the Pipeline and easing of water restrictions.[92]

Table 7.2 Forecast and actual water sales (ML per year)

	2014-15	2015-16	2016-17	2017-18	Total
IPART 2014 Determination	5,526	5,482	5,440	5,401	21,850
Actual water sales	5,007	4,612	4,864	5,871	20,354
Difference %	-9%	-16%	-11%	9%	-7%

Note: The above table includes total water sales to all customers (including the mines): treated, chlorinated and untreated.

Source: IPART, Essential Energy's water and sewerage services in Broken Hill, Final Report 2014, Table 8.1; Essential Water Pricing Proposal to IPART, September 2018.

7.2.2 Essential Water's forecast water sales volumes for the 2019 determination period were too low

For the 2019 determination period, Essential Water forecast a decrease in total water demand from 5,167 ML in 2018-19 to 5,111 ML by 2021-22 (see Table 7.3). This represents a total decrease of 1.1% (or -0.4% per year) over the forecast period.

90 Essential Water pricing proposal to IPART, July 2018, p 80.

91 See Chapter 6.

92 https://www.waternsw.com.au/projects/wentworth-to-broken-hill-pipeline (accessed 15 January 2019); Essential Water pricing proposal to IPART, July 2018, p 80.

To assist us in reviewing Essential Water's proposal, we engaged Frontier Economics to review Essential Water's forecast metered water sales, and recommend its own forecasts (Table 7.3).

Our final decision on water sales volumes is based on Frontier Economics' forecast for treated water volumes and Essential Water's forecasts for untreated water, but with an additional "bounce back" factor applied to treated water sales, as discussed below.

Table 7.3 Essential Water's and Frontier Economics' forecast metered water sales (ML)

	2018-19	2019-20	2020-21	2021-22
Essential Water	5,167	5,147	5,129	5,111
Frontier Economics	n/a	5,435	5,422	5,407
IPART's decision	n/a	5,968	5,955	5,939

Source: Frontier Economics, Review of WaterNSW and Essential Energy's Water Forecasts, Final Report, January 2019.

Essential Water based its forecasts on 2016-17 demand

Essential Water established its baseline demand forecast based on 2016-17 usage.[93] It argued 2016-17 was the most recent year with 'normal' water consumption, ie, with fairly typical rainfall and no water restrictions. Essential Water then forecast treated water sales to decline by 0.4% per year over the and chlorinated water sales to decline by 0.6% per year over the 2019 determination period,[94] by assuming that:

- Residential water consumption would decline by around 0.8% per year, reflecting its forecast that the population of Broken Hill will decline by 1% per year over the regulatory period, which is partially offset by a slight increase in per capita consumption.
- Treated, untreated and chlorinated water sales to non-residential customers would remain constant.
- Demand for treated and untreated water from the existing mining companies would also remain constant.
- No new mining customers would begin operating.[95]

Frontier Economics used a different method to forecast water sales volumes

Frontier Economics considered that basing demand forecasts on a single year of consumption data (2016-17) was potentially unreliable, given the high variability in Essential Water's historical demand. Indeed, based on historical trends, Frontier considered 2016-17 was a low residential demand year.[96]

Frontier Economics argued volatility in Essential Water's historical customer demand was largely due to lower per capita demand during high rainfall years and water restrictions

93 Essential Water pricing proposal to IPART, July 2018, p 103.
94 Ibid, p 101.
95 Ibid, p 109.
96 Frontier Economics, Review of WaterNSW and Essential Energy's water forecasts – Final Report, January 2019, p 14.

during drought years.[97] Frontier Economics excluded high and low rainfall years from its analysis, using an average of seven of the last 12 annual data points to establish a baseline level of demand.[98]

Frontier Economics projected changes in residential customer numbers using publicly available forecasts from the NSW Department of Planning and Environment (DPE). DPE projected residential customers would fall by 0.4% to 0.5% per year in Broken Hill.[99]

We have included an estimate of demand "bounce back" in our forecast

The construction of the Pipeline is expected to deliver a more reliable water source and hence reduce the likelihood of water restrictions. Therefore, we consider it reasonable for there to be a bounce back in water demand because Broken Hill has:

- A very high proportion of detached houses with gardens and relatively few apartments
- Historically high discretionary water use, and
- An ongoing lead dust management problem, requiring garden and municipal watering to protect human health.

We asked Frontier Economics to investigate the potential bounce back in demand that could be expected from the Pipeline. Frontier Economics analysed changes in water consumption from other communities which have come out of drought conditions. It looked at four regional Victorian water corporations which experienced bounce backs of between -3% and 25% in the four years that followed the easing of drought conditions.[100]

Frontier Economics did not incorporate an estimate of the bounce back into their forecasts because they considered the increase in demand from 2016-17 to 2017-18 was evidence that a bounce back had already occurred and was therefore accounted for in its baseline forecast.[101] However, we consider that the additional water security created by the Pipeline will provoke behavioural changes, such as planting gardens and lawns and expanding water intensive businesses, which were discouraged by the uncertainty of future water restrictions. This would increase water demand above recent unrestricted levels.[102] We also note that our demand forecasts are similar to 2017-18 consumption, which is consistent with Frontier's argument.

To supplement Frontier Economics' bounce-back analysis, we looked at other communities which received major supply augmentations in response to the Millennium Drought.[103] We calculated the bounce back by comparing 2016-17 water usage to minimum water usage during the Millennium Drought period (Table 7.4). Of these utilities, larger bounce backs were observed in regional cities such as Ballarat and Goulburn than in metropolitan areas.

97 Frontier Economics, Review of WaterNSW and Essential Energy's water forecasts – Final Report, January 2019, p 16.
98 Ibid, pp. 11-13.
99 Ibid, p 14.
100 Ibid, p 17.
101 Ibid, pp. 16-17.
102 Although, we note that level 1 water restrictions were recently introduced in December 2018. http://www.essentialwater.com.au/asset/cms/pdf/media/ES-MR-01122018.pdf (accessed 16 January 2019).
103 Millennium Drought - period from late 1996 to mid-2010 where South Australia, including the Murray-Darling Basin and most of the southern states were affected by severe drought conditions.

Table 7.4 Estimated bounce-back in demand from water supply augmentations

Utility	Augmentation	Bounce back
Central Highlands Water (Ballarat region)	Pipeline	20%
Goulburn Mulwaree Council	Pipeline	17%
Icon Water (Canberra)	Dam	7%
Sydney Water	Desalination Plant	13%
City West Water (Melbourne)	Desalination Plant	6%

Source: Bureau of Meteorology, National Performance Report: Urban Utilities 2016-17.

We have adopted a 10% bounce back to our demand forecast for Essential Water's residential, business and exempt properties customers. We have not applied a bounce back to mining customers, given their water demand is more closely related to production levels, which are instead influenced by external factors such as commodity prices.

We consider the 10% adjustment to be reasonable because:

- There is considerable scope for increased discretionary water use in Broken Hill, particularly due to health concerns such as lead dust suppression
- Frontier Economics' analysis of water consumption in other communities which have come out of drought conditions also suggests an average bounce back of about 10%, and
- Our analysis of water consumption following recent water supply augmentations in other water utilities also suggests an average bounce-back of about 10%.

Essential Water opposed our draft treated water volumes

In its submission to our Draft Report, Essential Water raised concerns about our forecast treated water volumes. It argued that using historical population data – which shows an annual population decline of between 1.1% and 1.2% per year – is a more appropriate basis for forecasting population than the forecast prepared by DPE. Furthermore, Essential Water considered our treated water demand forecast appeared to be based on 2017-18 levels, which it reiterated was an unusually high usage year due to drought conditions. In comparison, its demand forecast was based on an average historical consumption level which shows a slight downwards trend.[104]

We considered the points raised by Essential Water and have decided to maintain our draft decisions. Firstly, our forecast is not based on 2017/18 usage but instead a regression of historical usage during 'normal' usage years, consistent with the approach taken by Frontier Economics. We agree with Frontier Economics that it is not possible to accurately predict future residential demand based on a simple regression of recent historical data, given the impact of water restrictions. In addition, we believe it is reasonable to predict residential water demand will increase because of improved water security from the Pipeline.

Secondly, we consider that the approach taken by Frontier to use DPE's projections to forecast consumption is appropriate. DPE's projections are readily available, account for the impact

104 Essential Water, submission to the Draft Report – Review Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, April 2019, p 6.

of births and deaths, and are used by the Government to help plan for service and infrastructure delivery for the community.[105]

7.3 Forecast sewerage volumes

Our decision on forecast billable sewerage volumes only relate to non-residential customers. This is because residential customers do not face an explicit sewerage usage charge as we have deemed that each customer discharges 90 kL of sewerage per year and have included this as part of their sewerage service charge (see Chapter 9).

We made a decision

23 To adopt forecast billable sewerage volumes as shown in Table 7.5.

Table 7.5 IPART's decision on billable sewerage volumes (ML)

	2019-20	2020-21	2021-22
Non-residential customers (excluding exempt properties and mines)	259	259	259
Exempt properties	267	267	267
Mines	29	29	29
Total billable sewerage volumes	555	555	555

Note: Residential customers are deemed to discharge 90 kL of sewerage in their service charges and not charged an explicit usage charge. The billable sewerage volumes only relate to non-residential sewerage usage, including exempt properties.

Exempt properties are customers that are exempt from paying service charges, but are still required to pay relevant water and sewerage usage charges.

Source: Essential Water pricing proposal to IPART, July 2018, p 111.

Essential Water proposed forecast billable sewerage volumes of 555 ML per year over the 2019 determination period.[106] This amount is consistent with its latest forecast of 555 ML for 2018-19.

As Essential Water's proposal is in line with recent historical averages of 558 ML per year[107], we have accepted this proposal. We also considered whether it would be appropriate to incorporate a bounce-back in billable volumes, consistent with our decision for water usage, but did not do so because:

- We expect that a large proportion of an increase in demand would relate to 'discretionary' use, which we consider has minimal impact on the sewerage system.
- As discussed in Chapter 8, we have based sewerage prices on 2018-19 revenues. As a result, the forecast billable sewerage volumes we set do not impact the price that customers would pay.[108]

Therefore, our decision is to accept Essential Water's proposed billable sewerage volumes. We did not receive any submissions from stakeholders about forecast sewerage volumes.

105 DPE's household projections and a user guide for the data are available at https://www.planning.nsw.gov.au/Research-and-Demography/Demography/Population-projections

106 Essential Water pricing proposal to IPART, July 2018, Table 5-7, p 111.

107 Averaged over 2014-15 to 2018-19.

108 It does, however, have a small impact on our recommended Government funding contribution.

7.4 Forecast water and sewerage customer numbers

We made a decision

24 To adopt forecast water and sewerage customer numbers as shown in Table 7.6.

Since the Draft Report we have analysed more detailed data from Essential Water and have revised down the starting point for our forecast residential water and sewerage customer numbers by 3% and 4%, respectively.[109] We continue to agree with Frontier Economics that residential customers will decline in line with DPE's projections of household numbers for Broken Hill. [110]

We have accepted Frontier's forecast that non-residential water customers will remain constant at current (2018-19) levels.[111] We have also accepted Essential Water's forecasts for pipeline (Menindee, Stephens Creek and Umberumberka) and exempt customer numbers.

For sewerage customers, we have applied a 0.5% per year reduction for residential sewerage customers, consistent with our decision on residential water customers. For non-residential customers, we have accepted Essential Water's proposal to maintain forecast customer numbers at current (2018-19) levels in line with our decision to accept its billable sewerage volume forecasts for the same customers.[112]

109 We received meter-level data from Essential Water, which showed 3%-4% fewer residential meters with at least one quarterly meter reading across a year.

110 However, for consistency with our pricing model – which is based on the number of residential customers – we have adjusted Frontier Economics' meter forecasts to account for apartments with shared meters.

111 Frontier Economics, Review of WaterNSW and Essential Energy's water forecasts – Final Report, January 2019, pp. 20-22.

112 Essential Water pricing proposal to IPART, July 2018, p 112.

Table 7.6 IPART's decision on forecast water and sewerage customers

No. of connections	2019-20	2020-21	2021-22
Water			
Residential[a]	9,661	9,627	9,580
Non-residential (excluding exempt properties)	588	588	588
Exempt properties	249	249	249
Pipeline (Menindee, Stephens Creek and Umberumberka)	46	46	46
Sewerage			
Residential[b]	9,110	9,076	9,029
Non-Residential (excluding exempt properties and mines)	548	548	548
Exempt properties	140	140	140
Mines	2	2	2

a Includes 339 units which have a common meter for water services.

b Includes 328 units which have a common meter for sewerage services

Note: Mines are not included in the count of water meters as their water service charges are not set on a per meter basis (see section 8.7). However, mines do pay sewerage service charges on a per meter basis.

Note: Our customer numbers in the above table incorporate our decision to not charge unconnected properties water and sewerage service charges, as these properties are no longer included in the customer count.

For modelling actual prices, we have also converted the non-residential water and sewerage customers into 20mm meter equivalents and applied relevant discharge factors.

7.5 Essential Water's bulk water purchases from WaterNSW

In the WaterNSW Pipeline Final Report,[113] we made a decision on Essential Water's forecast water purchases from WaterNSW. In this section, we summarise how we derived this forecast, and why it differs from Essential Water's forecast water sales to customers.

Table 7.7 shows that the two key differences between these forecasts are:

- Our estimate of Essential Water's 'real' water losses, and
- That existing storage reservoirs at Stephens Creek and Umberumberka could be used to supply customers, if there is sufficient rainfall.

Table 7.7 Comparison of IPART's estimates for Essential Water's forecast demand from customers and its purchases from WaterNSW (ML)

Forecast	2019-20	2020-21	2021-22
IPART's estimate of Essential Water's forecast water sales	**5,968**	**5,955**	**5,939**
Plus: Real water losses in Essential Water's existing network	+343	+342	+341
Less: Supply from existing storages	-1,910	-1,910	-1,910
Essential Water's purchases from WaterNSW	**4,401**	**4,387**	**4,370**

113 IPART, Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019 – Final Report, May 2019.

We considered the impact of water losses in the Essential Water network in our forecasts

In any water supply system, there are system losses as a result of leaking pipes, main breaks, system flushing etc. We treat these 'real' water losses as non-revenue water for modelling purposes. However, Essential Water will need to purchase water from WaterNSW to cover these losses. Essential Water calculates its real losses by subtracting metered water sales from the total volume it extracts.

To account for real losses for its water demand from the Pipeline, we added a factor of 5.4% to Essential Water's total water demand (including the 10% bounce back). This is the 10 year average of real losses reported by Essential Water. Essential water's real losses are quite low compared to similar utilities, at roughly half of the national average.[114]

We considered the impact of rainfall in our forecasts

Given the cost of pumping water from the Murray River to Broken Hill, we consider it is more cost effective for Essential Water to access water from its storages in preference to the Pipeline, if there is sufficient rainfall to do so.

Essential Water currently operates two water storages: Stephens Creek reservoir and Umberumberka reservoir.[115] Umberumberka receives water from rainfall only. Stephens Creek receives water from rainfall in its catchment. Additionally, water that is pumped from the Menindee pipeline is also transported to, and stored at, Stephens Creek reservoir.

To forecast the water demand from Essential Water's storages, we obtained 20 years of daily data on the volume of water pumped:

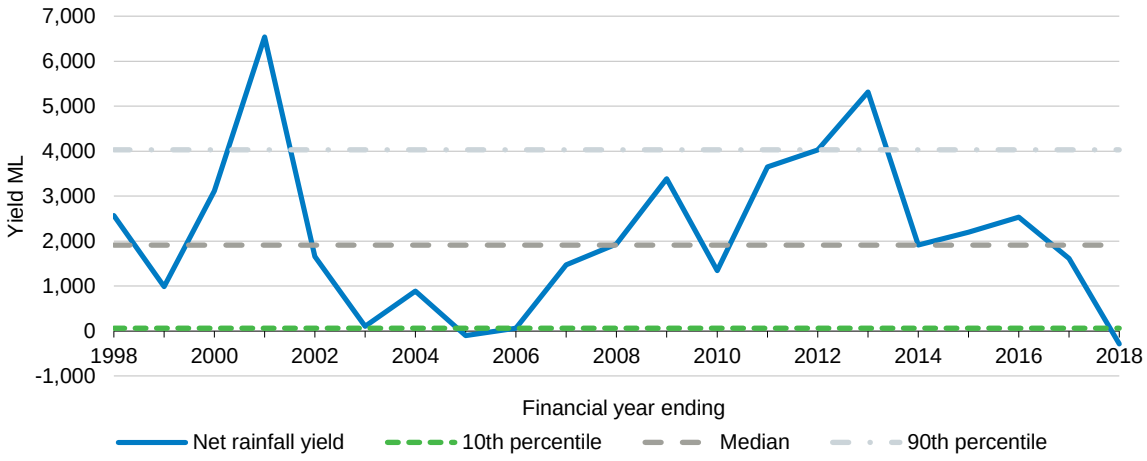
- From the Umberumberka pump station
- From the Stephens Creek pump station, and
- From the Menindee Lakes pump station to Stephens Creek along the Menindee pipeline.

We estimated that the volume of water supplied using rainfall from the two reservoirs is the difference between the volume pumped from Stephens Creek and the volume pumped into Stephens Creek from the Menindee Pump Station,[116] plus the volume from the Umberumberka pump station.

We estimated the calculated rainfall yield from Essential Water's storages over the last 20 years (see Figure 7.1). Our analysis shows that in particularly dry years, the net rainfall yield was close to zero, requiring heavy reliance on the Menindee pipeline to meet Broken Hill's raw water needs. Equally, in wet years, most of Broken Hill's water demand (which is 5,000 ML to 6,000 ML per year) can be supplied from rainfall. The historical median yield has been about 1,910 ML per year.

114 Bureau of Meteorology, National Performance Report: Urban Utilities 2016-17.
115 See Chapter 2.
116 We also made a small adjustment for evaporation at Stephens Creek dam, based on Essential Water's seasonal estimates of evaporation.

Figure 7.1 Net rainfall yield from Essential Water's storages



Source: Essential Water and IPART analysis.

We estimate that about 30% of Broken Hill's water needs could be supplied from storage reservoirs, on average. Although the volume of water supplied from rainfall is volatile, we consider it appropriate to subtract the median amount of water supplied from rainfall from the amount of water that Essential Water purchases from WaterNSW.

We also note that our estimates of the water supplied from rainfall are more conservative than Essential Water's submission to the 2012 *Inquiry into Adequacy of Water Storage in NSW*. In that submission, Essential Water estimated that the reservoirs at Stephens Creek, Umberumberka and Imperial Lake supply between 30 per cent and 90 per cent of local annual water needs, depending on rainfall.[117]

117 Essential Water 2012, Submission to Inquiry into Adequacy of Water Storage in NSW, Submission No. 51. Available at: www.parliament.nsw.gov.au/lcdocs/submissions/41996/0051%20Essential%20Water.pdf

8 Water prices

Essential Water's prices for water services comprise two components:

- A fixed service price (expressed as $ per year), and
- A variable usage price (expressed as $ per kilolitre (kL) of metered water supplied).

Currently, all residential customers pay a standard service price, regardless of whether their property is a house or a unit in a multi-premises property. For larger non-residential customers, the service price depends on their meter size, and is set with reference to a 20mm meter. Customers pay a different water usage price if they receive treated water (of $1.80 per kL), chlorinated water (of $1.16 per kL) or untreated water (from $0.78 to $1.58 per kL).

For this review, Essential Water proposed to:

- Retain the current structure of prices, whereby all customers pay a fixed price and a usage price, and
- Increase service and usage prices for all customers by 4.2% per year, in real terms.

The sections below summarise our decisions on water prices, and then discuss those decisions and our consideration of Essential Water's proposal and stakeholders' comments in more detail.

8.1 Summary of our decision on water prices

Table 8.1 sets out our decision on Essential Water's water prices, and shows that most of those prices remain the same as the current prices for the 3-year determination period. In comparison, under Essential Water's proposal, all prices would increase by 13.3% over the three years (Table 8.2).

Water prices reflect our decisions to:

- Accept Essential Water's proposal to maintain current price structures
- Maintain service prices for residential and non-residential customers in real terms
- Maintain the usage price for treated water in real terms
- Maintain the usage price for untreated water for most customers in real terms
- Promote consistency in other usage prices by:
  - Gradually increasing the untreated water usage price for customers who currently receive water directly from the Menindee, Stephens Creek and Umberumberka pipelines (pipeline customers) over the determination period, so that it gradually transitions towards the price for other untreated water customers
  - Gradually increasing the chlorinated usage price over the determination period so that it transitions towards the untreated usage price, and

- Maintain water services changes for mining customers in real terms.

We made changes to our draft decisions to take into account stakeholder submissions and updated information provided by Essential Water. Specifically, we decided to:

- Gradually transition the price for untreated water customers on the Menindee, Stephens Creek and Umberumberka pipelines to the price for other untreated water customers, to reduce bill shock, and
- Maintain water services changes for mining customers in real terms.

Our final decisions are discussed in the sections below. They were informed by our analysis of the costs of supplying water to Essential Water's customers. We also considered the NSW Government's commitment to maintain price stability, for four years, as a result of the Pipeline (see Box 1.1).

Table 8.1 IPART's decision on Essential Water's water prices ($2018-19 – ie, without inflation)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2021-22
Service Charges ($/year)					
Residential	327.68	327.68	327.68	327.68	0.0%
Non-residential[a]					
– 20mm connection	327.68	327.68	327.68	327.68	0.0%
– 25mm connection	512.00	512.00	512.00	512.00	0.0%
– 40mm connection	1,310.72	1,310.72	1,310.72	1,310.72	0.0%
– 100mm connection	8,192.01	8192.00	8,192.00	8,192.00	0.0%
Mines ($ 000s)					
– Perilya	2,301.55	2,301.55	2,301.55	2,301.55	0.0%
– CBH	555.17	555.17	555.17	555.17	0.0%
Usage Charges ($/kL)					
Treated	1.80	1.80	1.80	1.80	0%
Chlorinated[b]	1.16	1.22	1.28	1.34	15.5%
Untreated – pipeline[c]	0.78	0.86	0.94	1.02	30.8%
Untreated – Non-pipeline[d]	1.58	1.58	1.58	1.58	0%

a The meter based charges are set with reference to the 20mm meter charge based on the following formula: (meter size)^2 x 20mm meter charge / 400.

b Chlorinated water is supplied to residential and non-residential customers in Silverton.

c Pipeline customers with offtakes from the Menindee, Stephens Creek and Umberumberka pipelines currently receive untreated water for stock and domestic purposes.

d Untreated water is supplied to customers in Broken Hill, including Broken Hill Council and the mines.

Table 8.2 Essential Water's proposed water prices ($2018-19 – ie, without inflation)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2021-22
Service Charges ($/year)					
Residential	327.68	341.58	356.08	371.19	13.3%
Non-residential[a]					
– 20mm connection	327.68	341.58	356.08	371.19	13.3%
– 25mm connection	512.00	533.72	556.37	579.98	13.3%
– 40mm connection	1,310.72	1,366.34	1,424.31	1,484.75	13.3%
– 100mm connection	8,192.01	8,539.60	8,901.94	9,279.67	13.3%
Mines ($ 000s)					
– Perilya	2,301.55	2,399.20	2,501.00	2,607.13	13.3%
– CBH	555.17	578.72	603.28	628.88	13.3%
Usage Charges ($/kL)					
Treated	1.80	1.88	1.96	2.04	13.3%
Chlorinated	1.16	1.21	1.26	1.31	12.9%
Untreated – pipeline[b]	0.78	0.81	0.85	0.88	12.8%
Untreated – Non-pipeline	1.58	1.65	1.72	1.79	13.3%

a The meter based charges are set with reference to the 20mm meter charge based on the following formula: (meter size)^2 x 20mm meter charge / 400. We have calculated service charges for larger meter sizes using this formula, based on Essential Water's stated 20mm meter price.

b Pipeline customers with offtakes from the Menindee, Stephens Creek and Umberumberka pipelines currently receive untreated water for stock and domestic purposes.

Source: Essential Water pricing model – based in $2018-19. (Note that Essential Water's pricing proposal addendum, September 2018, is presented in nominal values.)

8.2 Stakeholders were concerned that price increases would not be affordable

Both Broken Hill City Council[118] and the Public Interest Advocacy Centre (PIAC)[119] raised concerns about the ability of the Broken Hill community to afford the price increases proposed by Essential Water. The Broken Hill City Council noted the city's persistently high unemployment rate, lower than average socio-economic profile and high pensioner population makes it more difficult for residents to afford price rises.

The Broken Hill Darling River Action Group submitted that Broken Hill's population was heavily dependent on welfare and had little capacity to afford price increases above inflation.[120] It believed higher prices would cause more people to leave, placing further cost pressures on the remaining residents.

118 Broken Hill City Council, submission to the Issues Paper – Review of prices for Essential Energy's water and sewerage services in Broken Hill from 1 July 2019, October 2018, p 4.

119 Public Interest Advocacy Centre, submission to the Issues Paper – Review of prices for Essential Energy's water and sewerage services in Broken Hill from 1 July 2019, November 2018, p 3.

120 Broken Hill Darling River Action Group, submission to the Issues Paper – Review of prices for Essential Energy's water and sewerage services in Broken Hill from 1 July 2019, October 2018, p 2.

Individual Broken Hill resident submissions argued that any price rises would unfairly affect low income earners and reduce their ability to manage lead dust pollution.

We consider that our decisions on prices address stakeholder concerns about affordability. In particular, the service and usage prices for almost all customers would remain constant in real terms. Our decision to increase usage prices for chlorinated and untreated pipeline customers would improve the cost reflectivity of these charges.

In addition, we have gradually implemented the increase for chlorinated water and untreated pipeline customers to recognise the potential for bill shock. We also note that bills for chlorinated water customers will be lower than proposed by Essential Water (see Chapter 11).

8.3 Maintain current price structures

We made a decision

25 To accept Essential Water's proposal to maintain the current 2-part tariffs for water and sewerage prices.

Essential Water proposed to maintain the current price structures for water and sewerage services, primarily because introducing alternative structures would be too costly to develop given the small size of its business. It also proposed to maintain the current balance between fixed service charges and variable usage charges (where each charge accounts for about half of residential water and sewerage bills, on average).

Essential Water's customer survey results suggest that about 70% of residential customers and 66% of business customers would like the current fixed/variable proportion of their water bills to be maintained. About 23% of residential customers and 30% of business customers said that if the proportion were to change, that they would prefer to increase the proportion of variable usage charges.

We consider that maintaining the current 2-part price structure for water and sewerage services is appropriate as it provides certainty and stability for both customers and Essential Water. We agree that developing alternative pricing structures would be too costly in this instance. We note that Essential Water's customer survey results suggest that most customers would prefer the current price structure and balance between fixed and usage charges to be maintained, and that no submissions from stakeholders suggested alternative price structures.

8.4 Maintain service prices in real terms

We made a decision

26 To maintain service prices to residential and non-residential customers in real terms.

Our decision is to maintain the current water service charge for residential customers (both houses and apartments) and non-residential customers with a 20mm meter at $327.68 per annum in real terms. Non-residential customers with multiple meters and/or meters greater than 20mm in size will have their charges scaled-up proportionally, as shown in Table 8.1.

We consider that our decision provides price stability for customers, and is consistent with the NSW Government funding commitment that prices do not rise in real terms as a result of the Pipeline (see Chapter 4).

Under our pricing decisions, average water bills for treated water customers will remain unchanged in real terms. However, bills for chlorinated, untreated pipeline customers and mines will increase in real terms, as discussed in Section 11.1. These increases are not due to the Pipeline, but rather our decisions to re-balance charges so that they better reflect the efficient costs required to serve each customer group.

We considered setting different service charges for houses and apartments

Currently, a standard residential service charge means that each flat or apartment is charged as if it were a single house. Residential apartment blocks are not charged according to the actual size of the water meter connecting them to the network.

Essential Water opposed different service charges for houses and apartments because the majority of customers in Essential Water's consultation opposed this. We did not receive comment from other stakeholders specifically on this issue.

We have decided to set a single standard residential service charge for houses and apartments. Our view is that introducing different service charges would increase complexity with little potential benefit.

We considered setting different water service and usage charges for customers in different locations

We considered setting different charges for different locations based on the underlying costs of servicing each group (eg, Broken Hill customers vs Sunset Strip customers vs graziers).

Essential Water noted that while geographical pricing could be economically efficient, there are practical impediments:

- A review of capital and operating costs, estimates of marginal costs and reallocating the RAB would be required for each section of the network, which could be time consuming.
- The billing system would need to be redesigned to accommodate the change.
- There could be very large bill impacts for individual customers, which IPART has not consulted on.
- Component costs for sunset strip and the graziers are highly dependent on the consequential works.

Our expenditure consultants, Aither, considered that because detailed costing information is not available from Essential Water, geographic prices would unlikely be cost-reflective and therefore unlikely to improve economic efficiency.[121] Due to practical limitations, our view is to accept Aither's recommendation and not set different prices for different customer groups, even though the underlying costs of servicing may differ.

[121] Aither, Essential Water expenditure review – a review of capital and operating expenditure, Final Report for IPART, 25 January 2019, p 15.

We did not receive comment from any other stakeholders specifically related to differential geographical pricing.

8.5 Maintain the usage price for treated water in real terms

We made a decision

27 To maintain the current treated water usage price of $1.80 per kL in real terms.

Our decision is to maintain the current treated water usage price of $1.80 per kL in real terms (ie, without inflation) over the determination period. This decision takes account of customers' preference to maintain the current proportion of fixed and variable charges for water services. It also reflects our preference for setting usage prices with reference to the marginal cost of supply.

Maintain the current proportion of fixed and variable charges for water services

Currently, service and usage charges each account for about half of residential water charges, on average. Essential Water's customer survey results suggest that 70% of residential customers would prefer the current fixed/variable proportion of their bills to be maintained.[122]

Our decision will maintain the current proportion of fixed and variable charges for treated water customers (which comprise the majority of customers).[123] We note that maintaining affordable usage prices is important for customers to manage lead dust pollution in Broken Hill.

Set water usage charges with reference to short run marginal cost

As discussed in our Issues Paper and Draft Report, water usage charges can be set with reference to either the long run marginal cost (LRMC) or the short run marginal cost (SRMC) of water supply.

LRMC sends an efficient price signal to customers about the cost of consuming an additional litre of water, as it prices the impact that water consumption today places on the need for future water augmentation. We typically set water usage prices with reference to LRMC in pricing reviews where future growth is expected.

We note that for the Broken Hill area, water consumption has been declining in recent years. In addition, given the Pipeline and proposed consequential works are expected to become operational in the 2019 determination period, no further large-scale augmentation of the water supply is foreseeable in the future. Therefore, we consider that in the context of Broken Hill, LRMC and SRMC estimates should converge. Given that the calculation of SRMC is more straightforward than LRMC, we consider its use more appropriate in the context of Broken Hill.

122 Essential Water pricing proposal to IPART, July 2018, p 187.

123 That is, holding all else constant. With the introduction of the Pipeline, we are expecting a 'bounce back' in water consumption as water security has increased. This would result in a higher proportion of a treated water customer's bill being variable.

Therefore, we estimated Essential Water's SRMC of supplying water based on a bottom-up assessment of operating costs based on information provided by Essential Water on its water operations (see Appendix G). This gave an estimate of $1.31 per kL, including the cost of transporting bulk water through the Pipeline. That is, the prices we set for WaterNSW to charge its customers (including Essential Water) are an input for our estimate of Essential Water's SRMC. Given our SRMC potentially underestimates the full marginal cost of supplying water because it excludes capital costs such as pumps, our view is that the current price is within a reasonable range of the true marginal cost of supplying water.

Essential Water submitted that water usage prices should be set with reference to LRMC, and estimated that a plausible range for the LRMC of treated water is $0.77 to $3.03 per kL, based on a range of LRMC estimates for regulated water utilities around Australia[124] and Essential Water's own estimates from the 2014 determination.[125] However, it did not recalculate its marginal costs from the 2014 determination because it considered that the LRMC of the water business would not have changed materially, and that its proposed treated water charge ($1.80 per kL in 2018-19) is within the plausible range.

However, we consider that the construction of the Pipeline (Murray River to Broken Hill) and the decommissioning of the Menindee pipeline, has significantly impacted the marginal cost of water supply. Therefore, we have recalculated Essential Water's SRMC of supplying water.

No other stakeholder submissions commented on this issue.

8.6 Promote consistency in other usage prices

We made decisions

28 To gradually transition the usage price for chlorinated water to $1.34 per kL ($2018-19) by 2021-22, as per Table 8.3.

29 To gradually transition the usage price for untreated water (pipeline customers) to $1.02 per kL ($2018-19) by 2021-22, as per Table 8.4.

We recommend

3 That the NSW Government fund the cost of transitioning the untreated water (pipeline customers) usage price over time.

Transition the usage price for chlorinated water

Going forward, Essential Water will continue to supply chlorinated water to customers in Silverton.

Currently, the usage price for chlorinated water is lower than the usage price for untreated water. However, our analysis of SRMC (see Appendix G) shows Essential Water's cost of supplying chlorinated water is higher than the cost of supplying untreated water. This suggests that the usage price should be at least equal to the untreated water usage prices. As customer affordability is likely to be issue for customers who receive chlorinated water, we

124 Sydney Water, Hunter Water, Icon Water and Water Corporation (Western Australia).
125 We note that Essential Water did not provide IPART with an estimate of LRMC in the 2014 review, although they did assist the Secretariat by providing inputs to estimate the SRMC of water.

decided to gradually transition the chlorinated water usage price towards $1.58 per kL in real terms (Table 8.3). This promotes more cost-reflective prices, while managing potential bill shocks for chlorinated water customers.

Given our decision to maintain current service charges for residential customers, the overall bill impacts for chlorinated water customers are likely to be small – including the impact of inflation, bills for these customers will increase by less than 5% a year over determination period (see section 11.1 for discussion on customer impacts). We did not receive any stakeholder submissions expressing concern with our decision on the usage price for chlorinated water.

Table 8.3 IPART's decision on price transition for chlorinated customers ($2018-19)

	2019-20	2020-21	2021-22
Chlorinated water usage price ($/kL)	1.22	1.28	1.34

Source: IPART analysis

Set a single untreated usage price

Untreated water is currently supplied to a small number of offtake customers from the Menindee, Stephens Creek and Umberumberka pipelines (pipeline customers), as well as to customers on Essential Water's existing network (non-pipeline customers). The current untreated water usage price is $1.58 per kL for non-pipeline customers and $0.78 per kL for pipeline customers. Our decision is to maintain the current price for untreated water at $1.58 per kL in real terms over the determination period for non-pipeline customers, and to gradually transition pipeline customers towards $1.58 per kL as per Table 8.4 below.

Table 8.4 IPART's decision on price transition for untreated pipeline customers ($2018-19)

	2019-20	2020-21	2021-22
Untreated (pipeline) water usage price ($/kL)	0.86	0.94	1.02

Source: IPART analysis

At the 2014 Determination, usage prices for pipeline customers were set lower than usage prices for non-pipeline customers. This was to reflect lower costs of supply to service pipeline customers, because they are not on the reticulation network (ie, they are supplied directly from the Menindee pipeline). However, the Menindee pipeline will be decommissioned. When the Pipeline (Murray River to Broken Hill) becomes operational, these offtake customers will receive untreated water from the new Pipeline instead, which means that this water will travel through Essential Water's reticulation network from Mica St to Stephens Creek and then to their offtakes.[126]

We consider that the price differential between non-pipeline and pipeline customers will not be justified once the Menindee pipeline is decommissioned, because their marginal cost of supply would be similar. Therefore, our decision is to set a single usage price for untreated water, in line with the current price for non-pipeline customers (ie, $1.58 per kL).

126 When there is sufficient rainfall in Broken Hill, these customers could also receive water from Stephens Creek reservoir.

Under our decision in the Draft Report, untreated water usage prices for pipeline customers would roughly double in the first year of the determination period then remain constant in real terms in the remaining two years. Our draft decision was not to set a transition path for pipeline customers, because setting a more cost-reflective charge would equalise the costs for all customers that receive untreated water.

Stakeholder submissions to our Draft Report raised concerns that this price increase would be unreasonable and unaffordable.[127] The Pastoralists' Association of West Darling submitted that current prices should be maintained because increasing the price would have a negative impact on property values and disposable income, with flow-on effects for the local economy. An individual submission from Mr Smith suggested that several pipeline customers thought that an incremental price increase of $0.05 per annum from $0.78 per kL to 0.98 per kL (from 2018-19 to 2021-22) would be "an acceptable and affordable compromise". The Public Interest Advocate Centre supported a single usage price for untreated water for both pipeline and non-pipeline customers, without a transition price, because it is more cost-reflective and consistent across the customer base.[128]

Taking stakeholder concerns about affordability into account, we have decided to gradually transition usage prices for pipeline customers *towards* $1.58 per kL, to manage customer bill impacts (prices will still be well below $1.58 per kL by the end of the 2019 determination period). However, we consider that the rest of the Essential Water customer base should not have to fund the cost of the transition for pipeline customers. Therefore, we have recommended that the NSW Government subsidy should include the cost of the transition for the 2019 determination period. We have therefore included the cost of the transition in the 2019 determination period in our recommended Government funding contribution: $55,440 in 2019-20, $49,280 in 2020-21 and $43,120 in 2021-22 (see Section 4.5).

8.7 Maintain current water prices for the mines in real terms

We made a decision

30 To maintain the current water service prices for the mines in real terms.

In our Draft Report, we maintained our approach to determine prices for the mines from our 2014 Determination: we set water usage prices at the same price as for other customers; and we set water service prices based on the mines' share of total water revenue over the 2014 determination period (see Box 8.1 for further information).

Our draft decision would have resulted in an increase in the mines' service price of 20% for Perilya and 19% for CBH, excluding inflation, relative to current (2018-19) prices. Because the data provided by Essential Water at the time showed that mines' share of historical water usage has increased, the water service charges for the mines increased.

127 Pastoralists' Association of West Darling, submission to the Draft Report – Review Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, April 2019; F. Hughes, submission to the Draft Report – Review Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, April 2019; T. Smith, submission to the Draft Report – Review Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, April 2019.

128 Public Interest Advocate Centre (PIAC), submission to the Draft Report – Review Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, April 2019, p 1.

Our final decision is that water service prices for the mines will remain unchanged from current (2018-19) levels, in real terms, over the 2019 determination period. This decision reflects:

- Updated historical consumption, which shows that the mines share of historical water consumption has actually been broadly stable. Essential Water, after the Draft Report, provided IPART with meter-level consumption data. This updated data showed that the mines usage, as a share of total usage, has been largely stable over the past two determination periods.
- Uncertainty around future water consumption, particularly at this point in time. The Pipeline could result in a structural change in the respective shares of mining and non-mining water demand. Therefore, basing prices on historical revenue shares might not be appropriate for the 2019 determination period.

Essential Water also proposed to maintain the current pricing approach for a new mine, which we have accepted. That is:

- If a new mine commences operations in the 2019 determination period, it will pay the same water usage charges as the existing mines and other customers.
- As an interim measure until the next price determination, any new mining customers will pay the same meter-based water service charges as other non-residential customers.

The following sections discuss the reasons for our decision to maintain the mines service prices in real terms.

Box 8.1 IPART's draft decision for mines pricing

Our draft decision was to maintain our 2014 approach to setting water service prices for the mines:

1. We first calculated the mines' share of historical water revenue using 2015-16 to 2017-18 data. Using three years of historical data is consistent with our decision to set prices for three years.
2. We then calculated the revenue that would have been recovered from maintaining 2018-19 prices for **all customers** over the 2019 determination period (ie, 2018-19 prices multiplied by forecast customer numbers and usage volumes). We multiplied the mines' share of historical revenue (in step 1) to this revenue, to set the total water revenue recovered from the mines over the 2019 period.
3. We then set the mines' water usage prices at the same price as for other customers and calculated the expected revenue from usage charges using forecast water sales.
4. Lastly, we set services prices to recover the remainder of the mines' share of water revenue. We set service prices for each of the mines individually, using steps 1-4.

We set the mines' share of water revenue based on the revenue that would have been recovered from maintaining 2018-19 prices because we did not consider it appropriate to set mines' prices based on Essential Water's total water revenue requirement. Including the full costs of the Pipeline would result in significant price increases. We also considered the Government's commitment that prices would not rise, in real terms, as a result of the Pipeline. We consider that calculating the mines' prices based on their share of the revenue that would have been recovered by holding all current (2018-19) prices constant is consistent with this commitment.

Source: IPART, *Review of Essential Energy's prices for water and sewerage services in Broken Hill – Draft Report*, April 2019, pp 104-105.

Stakeholders did not support our draft decision

In response to our Draft Report, CBH Resources (one of the two mining customers) submitted that our proposed water service price increase was not appropriate because it would increase the split of fixed charges to variable charges and limit incentives to conserve water. CBH proposed that price increases should be limited to CPI only.[129]

Essential Water considered that water service prices for the mines should change in line with other customers (ie, be held constant in real terms over the determination period).[130] It disagreed with our pricing approach and considered it inappropriate to significantly increase service charges for the mines when their expected proportion of water usage out of total water consumption is forecast to be lower over the 2019 determination period than during the 2014 determination period.

We did not receive a submission from Perilya in response to our Draft Report, nor any other stakeholders on mines pricing.

We received meter-level consumption data from Essential Water

Following the Draft Report, we requested meter-level water usage data from Essential Water. This data has allowed for a better understanding of historical usage. This updated data suggests that the mines' share of historical consumption was in fact broadly stable over the past two determination periods. Therefore, we do not consider that our draft increase in service prices for the mines (of about 20%) would be appropriate given the Government's commitment of no real price increases due to the Pipeline.

The Pipeline could result in a change in the share of the mines' water consumption

As explained in Chapter 7, we expect the Pipeline could lead to a 'bounce-back' in water demand from residential and non-residential customers. In turn, this could lead to a change in the share of water consumed by mining customers.

Even though the mines' share of historical consumption (and revenue) may be broadly stable, under our approach in the Draft Report the mines would have still faced a small increase in their service charges in the 2019 period. This is because we would have applied their share of revenue to a larger notional revenue base, reflecting our forecast of a bounce-back in water consumption over this period (outlined in Box 8.1 above). However, this forecast bounce-back in water demand is due to non-mining customers.

Under our draft decision, if there is a change in the share of demand from mining and non-mining customers, this would be reflected in the following period. For example, a reduction in the mines' share of total demand would result in lower service prices in the following determination period.

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129 CBH Resources Limited, submission to the Draft Report – Review Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, April 2019.

130 Essential Water, submission to the Draft Report – Review Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, April 2019, p 7.

Given the Pipeline could lead to a shift in demand from mining and non-mining customers in the 2019 determination period, we agree with stakeholder feedback that basing prices on historical revenue shares might not be appropriate for this upcoming determination period.

Therefore, for simplicity and given the uncertainty associated with forecast water sales (and share of these sales) at this point in time, we have decided to maintain service prices for the mines at current (2018-19 levels), in real terms.

We will consider our method for setting mines prices at the next determination period

In setting prices for the 2019 Determination we considered the Government's commitment that prices should not rise in real-terms, for the next four years, as a result of the Pipeline.

At the next pricing review we will consider our approach for setting the mines' prices, and the share of Essential Water's costs that should be allocated to the mines. We will also examine the mines' share of water usage over the 2019 determination period compared to previous periods. As a longer time series of consumption data for the mines becomes available, long-term average usage could be used to establish the mines' share of fixed costs. Using a longer time period of historical water usage (eg, over 10 years) could improve cost-reflectivity, because it would smooth out temporary fluctuations in demand.

9 Sewerage prices

The current structure of sewerage service prices varies by customer category. **Residential customers** pay a fixed sewerage service charge ($522.08 per year), which is the same for houses and apartments. **Non-residential** customers pay a fixed sewerage service charge ($581.25 per year) based on their meter size, set with reference to the 20mm price. These customers also pay a sewerage usage price ($1.28 per kL) for actual sewerage discharge.[131]

For this review, Essential Water proposed to maintain current price structures, and increase all sewerage prices by an average of 4.2% per year, in real terms.

The sections below summarise our decisions on sewerage prices, and then discuss these decisions in more detail, including our consideration of Essential Water's proposal and stakeholders' comments.

9.1 Summary of our decisions on sewerage prices

Table 9.1 sets out our decisions on Essential Water's sewerage prices. By comparison, under Essential Water's proposal, all prices would increase by 13.3% over the three years (Table 9.2).

Sewerage prices reflect our decisions to:

- Maintain constant revenue generated from sewerage prices, on average, over the determination period.
- Maintain the current sewerage usage price of $1.28 per kL in real terms over the determination period.
- Introduce a deemed sewerage discharge allowance of 90 kL per annum for all residential customers, to improve the consistency in prices for residential and non-residential customers.
- Maintain the current approach for setting sewerage prices for mining customers.

Similar to Essential Water's proposed water price increases, stakeholders raised concerns about the ability of the Broken Hill community to afford sewerage price rises.[132]

Several submissions to our Issues Paper from individual residential customers also expressed concerns regarding the reliability of Broken Hill's sewerage network and believed that proposed price rises were not justified given poor service standards.

Our final decisions are unchanged from our draft decisions, as we did not receive stakeholder comments raising concerns with the draft decisions.

Our decisions are discussed in sections below. The combined effect of all price structure changes will result in residential customers paying $13.65 less per annum (for service and

131 Some customers also face trade waste charges, which we discuss in Chapter 12.
132 Including Broken Hill Council, Broken Hill Darling River Action Group and the Public Interest Advocacy Centre.

deemed usage) compared to current prices; and non-residential customers with a 20mm meter paying $183.75 per annum less for service charges compared to current prices, holding usage constant. We note that some non-residential customers will pay higher trade waste charges, which is discussed further in Chapters 10 and 11.

Table 9.1 IPART's decisions on Essential Water's sewerage prices ($2018-19– ie, without inflation)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2021-22
Service Charges ($/year)					
Residential[a]	535.73	522.08	522.08	522.08	-3%
Non-residential[b]					
– 20mm connection	765.00	581.25	581.25	581.25	-24%
– 25mm connection	1,195.22	908.21	908.21	908.21	-24%
– 40mm connection	3,060.01	2,325.01	2,325.01	2,325.01	-24%
– 100mm connection	19,125.08	14,531.32	14,531.32	14,531.32	-24%
Usage Charges ($/kL)					
Non-residential	1.28	1.28	1.28	1.28	0%

a We have made a decision to introduce a deemed sewerage discharge allowance of 90 kL per annum for residential customers (see section 9.4). This deemed sewerage usage charge has been included in the residential service charge, although it is up to Essential Water whether it bills customers the deemed sewerage discharge allowance as a separate usage charge, or includes the deemed usage as an item within the residential service charge.

b Non-residential prices assume a 100% discharge factor; bills will depend on discharge factors assigned by Essential Water for individual customers.

Note: Sewerage service charges for non-residential customers and mining customers are based on water meter size. The applicable meter charge is set using the formula: (meter size)^2 x 20mm meter charge / 400 x discharge factor.

Table 9.2 Essential Water's proposed sewerage prices ($2018-19 – ie, without inflation)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2021-22
Service Charges ($/year)					
Residential	535.73	558.42	582.11	606.81	13.3%
Non-residential[a]					
– 20mm connection	765.00	797.74	831.59	866.88	13.3%
– 25mm connection	1,195.22	1,246.47	1,299.36	1,354.50	13.3%
– 40mm connection	3,060.01	3,190.97	3,326.37	3,467.51	13.3%
– 100mm connection	19,125.08	19,943.59	20,789.81	21,671.93	13.3%
Usage Charges ($/kL)					
Non-residential	1.28	1.33	1.39	1.45	13.3%

a Non-residential prices assume a 100% discharge factor, bills will depend on discharge factors for individual customers.

Note: Sewerage service charges for non-residential customers and mining customers are based on water meter size. The applicable meter charge is set using the formula: (meter size)^2 x 20mm meter charge / 400 x discharge factor.

We have calculated service charges for larger meter sizes using this formula, based on Essential Water's stated 20mm price.

Source: Essential Water pricing model (based in $2018-19); IPART Analysis. (Note that Essential Water's pricing proposal addendum, September 2018, is presented in nominal values.)

9.2 Maintain total revenue from 2018-19 prices

We made a decision

31 To recover the same amount of revenue from sewerage charges, in total, that would have been recovered if 2018-19 prices were maintained.

We decided to set sewerage prices to recover the same amount of total revenue that would be recovered if 2018-19 prices were maintained, adjusted for our decisions to:

- Introduce a deemed discharge allowance for residential customers (as discussed in Section 9.4), and
- Exclude the costs of the trade waste services ($377,000 per year, see Chapter 10).

Because we have maintained sewerage usage and service prices in real terms, adjusted for price structure changes, sewerage prices recover more revenue than the sewerage NRR, and water prices recover less revenue than the water NRR (see Table 9.3).

Table 9.3 IPART's decision on revenue from water and sewerage tariffs ($millions, $2018-19)

	2019-20	2020-21	2021-22	Total
Water				
Water NRR	40.3	40.8	41.3	122.4
Water revenue	17.4	17.3	17.3	52.0
Difference	*-22.9*	*-23.5*	*-24.0*	*-70.4*
Sewerage				
Sewerage NRR	5.5	5.7	6.0	17.2
Sewerage revenue	6.6	6.6	6.6	19.9
Difference	*1.1*	*0.9*	*0.6*	*2.7*

We consider that it is more appropriate to maximise price stability for customers, as per customer preferences, rather than remove the cross-subsidy between water and sewerage services at this point in time. Given that significant capital expenditure is expected in the next determination period (ie, Wills St sewerage treatment plant renewal), an increase in the sewerage NRR is expected in the next determination period. That is, removing the cross-subsidy and decreasing the sewerage service price at this determination could mean a bigger price shock at the beginning of the next determination period.

We consider this decision maximises price stability for customers, and is consistent with the NSW Government funding commitment that prices do not rise in real terms as a result of the Pipeline (see Chapter 4).

Our price structure change to introduce a deemed sewerage discharge allowance for residential customers has changed the relative sewerage service charges for residential and non-residential customers. Along with the increase in trade waste revenue recovered, sewerage bills for both residential and non-residential customers will be significantly lower than proposed by Essential Water.

9.3 Maintain the sewerage usage price

We made a decision

32 To maintain the current sewerage usage price of $1.28 per kL in real terms.

Our decision is to maintain the current sewerage usage price of $1.28 per kL in real terms over the determination period, to maximise price stability and minimise customer impacts.

We considered setting this price with reference to the short run marginal cost (SRMC) of supplying sewerage services. We estimated the SRMC of supplying sewerage services at $0.22 per kL, based on information provided by Essential Water (see Appendix G). However, we consider that this underestimates the full marginal cost of sewerage services, as it excludes the cost of renewals for capital assets. We excluded these costs because we did not have sufficient information to determine what proportion of these costs vary per kL of sewerage collected, treated and disposed by Essential Water. If we assume 100% of maintenance renewals is marginal, then up to $0.73 per kL could be added to the SRMC estimate for sewerage.

We decided not to depart from the current usage price, because:

1. The information we used to estimate SRMC is indicative. The current price of $1.28 per kL is within a reasonable range, given that our estimate of SRMC could understate the full marginal cost of sewerage services as it excludes the cost of renewals for capital assets.
2. It maximises price stability for customers. Reducing the sewerage usage price closer to our estimate of SRMC would mean an increase in the service price, to recover the total sewerage revenue. Given our other changes to sewerage price structures, this would result in an increase in the share of revenue recovered from residential customers (and a decrease in the share of revenue from non-residential customers).

Looking forward, we see merit in setting the sewerage usage price with reference to the LRMC of supplying sewerage services. However, to date, sewerage usage prices have usually been set with reference to the SRMC of supplying sewerage services, and there is a lack of information on the LRMC. In future, we aim to obtain better information to enable us to estimate water utilities' LRMC's of supplying sewerage services.

9.4 Introduce a deemed sewerage discharge allowance for residential customers

We made a decision

33 To set a standard sewerage service charge for all residential customers, which includes a deemed sewerage discharge allowance of 90 kL per annum.

Currently, non-residential customers with equivalent use to a residential customer pay more for sewerage services than their residential counterparts.

Essential Water proposed to maintain the current price structure, under which:

- Residential customers pay only a sewerage service charge and no usage charge.

- Non-residential customers pay both service and usage charges, and the service charge does not include a discharge allowance (which would otherwise be the volume above which sewerage usage charges apply).

Under this structure, a residential customer who discharges 90 kL per year (the reported annual average discharge for residential customers as reported by Essential Water)[133] pays a sewerage service charge of $536 ($2018-19). However, a non-residential customer on a 20mm meter with a discharge factor of 70%[134] who also discharges 90 kL pays a service charge of $536, **plus** sewerage usage charges of $115, resulting in a total sewerage bill of $651 per year.[135]

In line with our pricing principles, we consider that customers who impose similar costs on the system should pay similar prices. To make residential and non-residential sewerage charges more comparable, we decided to restructure sewerage prices as outlined in Table 9.4. Under the new price structure:

- Residential customers will pay a fixed (or deemed) sewerage usage charge that reflects Essential Water's estimate of average residential sewerage discharges (90 kL per annum). That is, residential customers will pay a charge equal to 90 kL multiplied by the sewerage usage charge. This amount will be included in the residential fixed sewerage service charge.
- Non-residential customers will continue to pay a sewerage usage charge based on their water usage multiplied by their discharge factor and the sewerage usage price.
- The sewerage usage price (per kL) will be the same for both residential and non-residential customers.

Table 9.4 IPART's decision on sewerage price structures

	Residential customers	Non-residential customers
Usage charge	Deemed at 90 kL per annum for all customers (ie, 90 kL times the sewerage usage price). This amount is incorporated into the fixed service charge below. That is, residential customers do not face an explicit sewerage usage charge.	Calculated as actual water usage times that customer's discharge factor, times the sewerage usage price. *No change to the current approach*
Fixed charge	Standard charge applied to all residential customers that is calculated as: 20mm meter charge x 70% discharge factor.	Meter based charge (20mm meter equivalence) times the individual discharge factor. *No change to the current approach*

In the following subsections we discuss the reasons for:

- Our pricing structure, and
- Setting the deemed usage amount for residential customers at 90 kL per annum.

133 Essential Water pricing proposal to IPART, July 2018, p 191.

134 A discharge factor is an estimate of the percentage of incoming water to a property that is discharged to the sewerage network. It is estimated by Essential Water. According to Essential Water, the NSW Government's *Guidelines for Best Practice Management of Water Supply and Sewerage* specify that the charge for a non-residential customer who discharges 70% of the water it purchases into the sewerage system should equate to the charge for a residential customer (Essential Water proposal to IPART, September 2013, p 57).

135 Essential Water pricing proposal to IPART, July 2018, p 191.

Introducing a deemed usage component for residential customers

For non-residential customers, water usage can be used as a proxy for sewerage usage.[136] For residential customers, it is not practical to meter sewerage usage, and water usage may not be a highly correlated proxy for sewerage usage. That is, increased water usage for a particular household is likely to be associated with higher discretionary use (eg, gardens), and limited discharge to the sewerage system. Using the average residential sewerage discharge is an available proxy of sewerage usage for residential customers, which would ensure that residential and non-residential customers who impose similar costs on the system would pay similar prices, on average.

Essential Water did not support introducing a deemed sewerage usage component to residential bills, because its customer feedback suggested that 55% of residential customers would not be prepared to pay $10 to reduce the price differential between residential and non-residential customers.[137] No other stakeholder submissions specifically commented on this issue.

We consider that introducing a deemed usage component for residential customers is appropriate primarily because it is more cost-reflective. Both residential and non-residential customers impose costs on the sewerage system when they discharge. The marginal cost of supplying sewerage services does not differ between residential and non-residential customers. Therefore, both residential and non-residential customers should face sewerage usage prices (noting the discussion above regarding sewerage not being metered).

In addition, we consider that introducing this component would be:

- Unlikely to have a major impact on customers – total residential water and sewerage bills will increase in line with inflation (at an annual average increase of 2.2% per year). See Chapter 11 for analysis on bill impacts.
- Simple to implement.
- More consistent with how we set sewerage charges for other utilities, including Sydney Water, Hunter Water and the Central Coast Council.

Setting the deemed discharge allowance for residential customers at 90 kL per annum

Essential Water estimates that average residential sewerage discharge is 90 kL per year, and we accept this estimate. However, we note that it is significantly lower than average residential water usage (260 kL per year).[138] This would imply a discharge factor of about 35%, which is half the 70% discharge factor assumed when setting residential service prices.

In our view, a deemed amount of 90 kL per annum is appropriate as a transitional measure. Although this estimate may be somewhat conservative, given average water usage, a lower deemed amount reduces the impact of the change on residential bills in this price review. We encourage Essential Water to further refine its estimate of average residential sewerage discharges at the next price review.

136 The NSW Department of Industry has established benchmark discharge factors that can be applied to different types of non-residential customers.
137 Essential Water pricing proposal to IPART, July 2018, p 195.
138 Essential Water pricing proposal to IPART, July 2018, p 26.

9.5 Reduce sewerage service prices

After calculating the revenue from trade waste charges and sewerage usage charges, sewerage service charges are calculated as a residual to recover Essential Water's efficient costs of providing sewerage services.

Our decision is to set the sewerage service charge at $522.08 for all residential customers (houses and apartments), inclusive of the deemed discharge allowance of 90 kL per year. We have also decided to set the base 20mm sewerage service change at $581.25 for non-residential customers.

Non-residential customers pay sewerage service charges that are meter based and have discharge factors applied. We set a base 20mm meter charge and then non-residential customers with a 20mm meter will pay that price multiplied by a discharge factor (which is assigned by Essential Water). The charges for larger meter sizes are then calculated with reference to the 20mm meter base charge using the formula:

[(meter size)^2 x 20mm meter charge / 400] x discharge factor

The non-residential service charges presented in Table 9.1 assume a 100% discharge factor – however, actual bills will depend on each customer's discharge factor.

9.6 Maintain the sewerage service charge for the mines

We made a decision

34 To maintain the current pricing approach for the mines' sewerage service charges.

Essential Water currently charges each of the mines the sewerage service charge applicable to a 100mm meter with a 100% discharge factor (Table 9.2 above).[139] In its modelling of prices, Essential Water has proposed to maintain its current approach. No other stakeholder submissions commented on this issue.

We decided to accept Essential Water's proposal to set the mines' charge for sewerage services at a single 100mm meter charge (with a 100% discharge factor). At the 2014 Determination, our expenditure review consultant examined Essential Water's approach to charging mines for sewerage services.[140] It noted that:

- An outflow meter was installed by the mines which meant that actual discharges could be measured accurately and charged appropriately using the sewerage usage price.
- Total sewerage discharges from the mines represented a small proportion (2%) of all sewerage volumes treated by Essential Water.

Given that the provision of sewerage services to the mines represented a small amount of overall revenue, our consultant considered that it was unlikely that a detailed investigation

139 At the 2014 Determination, we accepted Essential Water's existing approach at the time of charging the mines a 100mm meter sewerage service charge, where the discharge factor to be applied would be assigned by Essential Water.

140 Sinclair Knight Merz, Strategic Management Overview and Review of Operating and Capital Expenditure for Essential Energy's water and sewerage business in Broken Hill, Final Report, 26 January 2014.

and a potentially more complex approach would result in materially different charges. Therefore, our consultant found Essential Water's approach to be reasonable.

We note that the current situation is largely unchanged, and that the mines are subject to trade waste charges for higher strength discharges. Therefore, we consider it reasonable to maintain the current approach.

We also note that the mines will pay a lower sewerage service charge compared to 2018-19, due to the price structure changes we have made.

10 Prices for other services

In this chapter, we present and explain prices for the trade waste, miscellaneous and recycled water services supplied by Essential Water. We also discuss our decisions for unmetered and unconnected properties.

Essential Water's trade waste services are supplied to a subset of non-residential customers. Currently, the costs of providing trade waste services are not recovered from trade waste customers (with the exception of mining customers which are each charged an annual fee for trade waste). We received very limited stakeholder feedback on trade waste services.

We engaged a specialist consultant – Marsden Jacobs Associates (in partnership with Inside Infrastructure; MJA) – to advise us in our review of these prices. The sections below summarise our decisions, Essential Water's proposal, MJA's assessment and our assessment. We then explain how the revenue from these prices is subtracted from the NRR.

10.1 Summary of our decisions on trade waste and miscellaneous prices

Our decisions will encourage Essential Water to charge customers receiving trade waste services. Specifically, we decided to:

- Set volume-based trade waste prices for low and medium risk customers,[141] by gradually transitioning *towards* the volume-based prices in the NSW Department of Industry's (DoI's) Liquid Trade Waste Regulation Guidelines[142] (for the purpose of setting prices for the 2019 determination period, we have used a transition rate of about 10% per year).
- Transition mass-based trade waste prices for high risk customers *towards* mass-based prices in the DoI's guidelines (again, we have used a transition rate of about 10% per year, for the purpose of setting prices over the 2019 determination period).
- Subtract $377,000 per year in trade waste revenue from Essential Water's sewerage NRR in each year of the determination – our best estimate of the cost of treating trade waste (or the revenue that Essential Water would receive under fully cost-reflective prices). This ensures that other sewerage customers do not pay for trade waste services.

We then recommend that the shortfall between the revenue ($377,000 per year) that Essential Water would recover under DoI's guideline prices and the forecast revenue Essential Water will recover under our transitioned (2019 Determination) prices, is funded by a NSW Government subsidy. Our view is that the 'price shock' of fully cost-reflective trade waste prices on trade waste customers would be too great in the 2019 determination period (hence the need for a gradual transition *towards* more cost-reflective prices), and that customers who do not receive trade waste services should not pay for the cost of this transition.

141 Essential Water's approved Liquid Trade Waste Policy sets 4 different trade waste charging categories: 1, 1a, 2 and 3. The higher the category, the higher the risks of discharge to the sewerage system. For example, category 3 charges are typically intended for large, high risk industrial dischargers.

142 NSW Department of Industry, Liquid Trade Waste Regulation Guidelines, April 2009.

In the Draft Report, we set volume-based trade waste prices for all trade waste customers, and did not set mass-based trade waste prices. We also made a draft decision that the shortfall in revenue between cost-reflective trade waste prices and transitional prices would be directly borne by Essential Water. That is, we subtracted $377,000 per year from Essential Water's revenue. We have changed these draft decisions following stakeholder feedback in response to the Draft Report, as well as consultation with officers from DoI.

For miscellaneous charges, we have accepted Essential Water's proposed prices and forecasts. We have also accepted Essential Water's proposal to treat recycled water services as non-regulated revenue.

We also discuss our decisions that unmetered properties should pay the standard residential water and sewerage service charges, plus a deemed level of water consumption. Lastly, we outline our decision that unconnected properties should not pay water and sewerage services charges.

Our final decisions on miscellaneous charges, recycled water, unmetered and unconnected properties are unchanged from our draft decisions. We did not receive stakeholder feedback on these draft decisions.

10.2 Trade waste charges

Trade waste is wastewater with concentrations of pollutants that exceed a domestic equivalent. Trade waste is largely discharged by commercial and industrial customers.

We made decisions

35 To set volume-based trade waste prices for Category 1, 1a and 2 customers, by transitioning towards the NSW Department of Industry's guideline prices.

36 To set mass-based trade waste prices for Category 3 customers, by transitioning towards the NSW Department of Industry's guideline prices.

37 To set the maximum prices Essential Water can charge for trade waste services as set out in Appendix I.

38 To remove the full revenue from trade waste charges that Essential Water would recover under DoI's guideline trade waste charges from Essential Water's sewerage Notional Revenue Requirement (NRR), as per Table 10.2.

We recommend

4 That Essential Water should conduct customer consultations, ahead of the next determination period, to better understand the costs of treating trade waste and the prices that should be set to recover these costs.

5 That the NSW Government fund the cost of transitioning trade waste prices for three years – that is, the difference between the revenue that Essential Water would recover under the Department of Industry's guideline prices and the revenue under the transitional prices set in the 2019 Determination.

In the following subsections we discuss Essential Water's proposal, MJA's findings, and the reasons for our decisions.

10.2.1 Essential Water's proposal

Essential Water proposed to increase trade waste charges by the change in its total annual revenue requirement over the determination period (ie, about 4.2% per year without inflation).

Essential Water's Trade Waste Policy explains its processes for accepting trade waste discharge, how discharge is categorised into charging categories (ie, 1, 1a, 2 and 3), and the types of trade waste fees and charges.[143] See Box 10.1 for a short introduction to trade waste charges. Despite its Trade Waste Policy, in practice, the only trade waste fees Essential Water charges is an annual fee to the two mining customers.[144]

Box 10.1 Trade waste charges

Trade waste is any liquid waste other than sewage of a domestic nature. Trade waste discharge places greater demands on the sewerage system and has higher costs of treatment than domestic sewage. If trade waste is not managed well, it could pose problems for the sewerage system, as well as to public health and the environment.

Trade waste charging categories

Essential Water has four charging categories – 1, 1a, 2 and 3. The higher the category, the higher the risks of discharge to the sewerage system. Category 1 dischargers require nil or minimal pre-treatment. Category 1a dischargers are low risk. Category 2 dischargers are medium risk and have prescribed pre-treatment. Category 3 dischargers are high risk and are usually large industrial businesses.

Essential Water's policy sets usage charges (volume-based) for Category 2 dischargers, and excess mass charges (mass-based) for Category 3 dischargers.

All trade waste discharge customers are also subject to application fees, annual fees, and charges for non-compliance (eg, for exceeding acceptance levels for discharge).

Source: Essential Water, Discharge of Liquid Trade Waste Policy, October 2016.

10.2.2 Marsden Jacob Associates analysis

As part of our review, we engaged MJA to assess Essential Water's trade waste and miscellaneous charges and revenue forecasts for the 2019 determination period. This is the first time we have had a consultant review trade waste charges in detail for Essential Water.

MJA found that Essential Water's proposed prices and charges do not appear to be based on the capacity of its trade waste system to transport, treat or dispose of waste, and cannot be shown to be cost-reflective.[145]

143 Essential Water, Discharge of Liquid Trade Waste Policy, October 2016.
144 Essential Water email correspondence to IPART, 16 August 2018.
145 Marsden Jacob Associates, Review of proposed prices for trade waste and miscellaneous prices – Essential Water, February 2019, p 4.

MJA analysed trade waste flows and loads of treatable pollutants, and how the costs for sewerage treatment can be assigned on a flow and load basis. MJA estimated that approximately 13% of flows in Essential Water's sewerage catchments may be trade waste related. Based on an assessment of volumetric based trade waste charges, MJA estimated that Essential Water should be recovering **between $370,000 and $534,000 per annum** from trade waste customers.[146]

MJA noted that its analysis was constrained by the quality and quantity of information provided by Essential Water. Therefore, MJA recommended that Essential Water should not apply its own calculated volumetric charge until it has collected better data. Rather, MJA proposed that – in the absence of better data on the costs of providing trade waste services – these prices could be set with reference to the Department of Industry's guidelines for trade waste charging,[147] with a transition period of 10 years.

Essential Water did not provide any comments or raise any concerns with MJA's review of trade waste charges. We consider MJA's findings and recommendations to be reasonable.

10.2.3 Essential Water does not currently charge for trade waste

Essential Water has forecast trade waste revenue at approximately **$2,000 per annum** ($2018-19) over the determination period. We understand that Essential Water's current under-recovery reflects a number of factors:

- Essential Water supplies trade waste services to around 270 trade waste customers,[148] but only levies an annual trade waste fee on two customers (Perilya and CBH). It does not recover any trade waste revenue from other trade waste customers.
- Our 2014 determination included annual charges for all customers, and mass-based prices for Category 3 customers (ie, the amount of particular materials in trade waste discharge that require additional treatment). However, Essential Water currently has insufficient information (about the concentration and load of the substances in sewerage inflows) from Category 3 customers to charge on this basis.
- Our 2014 determination included volume-based prices (ie, per kL of sewerage discharge from trade waste customers) for Category 1a and 2 customers.[149] However, Essential Water does not currently levy these charges.

Because Essential Water is not recovering the costs of trade waste services from these customers, all other residential and non-residential customers are implicitly paying for the treatment of trade waste, regardless of whether they actually discharge trade waste or not. This is not cost-reflective, as customers who are imposing costs on the system by discharging trade waste are not directly paying for those services. Since trade waste revenue is removed from Essential Water's revenue requirement prior to setting other prices, the current under-

146 Marsden Jacob Associates, Review of proposed prices for trade waste and miscellaneous prices – Essential Water, February 2019, p 8.
147 Department of Primary Industries, Liquid Trade Waste Regulation Guidelines, April 2009.
148 Marsden Jacob Associates, Review of proposed prices for trade waste and miscellaneous prices – Essential Water, February 2019, p 8.
149 The 2014 determination sets 4 different trade waste charging categories consistent with Essential Water's Trade Waste Policy: 1, 1a, 2 and 3.

recovery means that other customers are paying more than their efficient costs of sewerage services.

We consider that Essential Water is able to measure and collect revenue on a volume basis. Other utilities that we regulate, such as Sydney Water, Hunter Water and the Central Coast Council, have volume-based charges in their determinations.

10.2.4 Transition volume-based trade waste prices over time

We have accepted MJA's recommendation to set trade waste prices with reference to DoI's guideline prices for volume-based charges, with a transition path to gradually increase prices. The transition period is intended to minimise the impact of sudden price changes on trade waste customers. The transition period also allows Essential Water to consult its trade waste customers on how it can best collect data[150] to establish the efficient cost of providing trade waste services, and how best to levy charges. We recommend that Essential Water conducts customer consultations in the 2019-22 determination period, to better understand customer impacts and inform its prices for its next pricing proposal.

In the Draft Report, we decided to set volume-based charges for all trade waste customers (and not set mass-based charges) as an interim measure. This would allow Essential Water to immediately recover some of the costs of treating trade waste from all customers, while giving the utility time before the next determination period to implement mass-based charges, where appropriate.

Following the Draft Report, we consulted with DoI at an officer level, and decided to:

- Set volume-based charges for Categories 1, 1a and 2 customers, and
- Set mass-based charges for Category 3 customers.

We have decided to set prices for volume-based charges for Categories 1, 1a, and 2 customers, by transitioning towards the volume-based charges in the DoI's Liquid Trade Waste Regulation Guidelines, at an assumed transition rate of 10% per year. These volume-based trade waste charges are additional to sewerage charges. The transition path is unchanged from our draft decision.

Our reasons for setting mass-based charges for Category 3 customers are discussed in the next section.

10.2.5 Transition mass-based trade waste prices over time

As discussed in the previous sections, our draft decision was to not set mass-based charges. However, following consultation with the DoI, we have decided to set mass-based charges for Category 3 customers. Our reasons are set out below.

Firstly, mass-based charges for high risk, Category 3 customers are consistent with Essential Water's existing Trade Waste Policy. Setting volume-based charges for these customers would

150 Essential Water could collect data to support its proposed charges at the next pricing proposal, such as annual fees, application fees, reinspection fees and volumetric usage charges.

potentially pose problems for Essential Water in implementing its Trade Waste Policy, which has been approved by DoI, and is consistent with DoI's Liquid Trade Waste Regulation Guidelines.[151]

Secondly, based on information from Essential Water and advice from DoI, on balance we consider that it would be reasonable for Essential Water to implement mass-based charges starting from 2019-20. We understand that:

- Essential Water's 2016 Trade Waste Policy sets out how it will charge Category 3 customers. That is, the policy and charging framework is already established.
- Essential Water already has some information on its Category 3 customers, including the type of business undertaken. This means that it is likely to be aware of typical discharges.
- Essential Water would need to audit samples of discharges from Category 3 customers.

Therefore, we have decided to set mass-based charges for Category 3 customers (see Appendix I).[152] We have set mass-based prices by transitioning towards DoI's guideline prices (assuming a transition rate of about 10% per year, for the purpose of setting prices over the 2019 determination period). Similar to volume-based charges, the transition is intended to minimise bill impacts (or avoid price shocks) for trade waste customers.

We also support MJA's recommendation that Essential Water should collect trade waste quality data from Category 3 customers over the 2019 determination period, to support the calculation of mass-based charges. Once more data is available, we will review how best to set mass-based charges at the next determination.

10.2.6 Fixed trade waste charges

In the Draft Report, we set annual fixed charges for trade waste equal to DoI's guideline prices for non-mining customers, and maintained the current fixed charge (in $2018-19 terms) for mining customers. We have maintained our draft decisions on annual fixed charges. These annual charges will be less than $200 per year for most trade waste customers, and are slightly lower than the current fixed charges in our 2014 determination. We did not receive any stakeholder comments on these annual charges.

Following consultation with DoI since the Draft Report, we have also decided to include non-compliance charges for Categories 1a, 2, and 3 customers. Non-compliance charges apply if a trade waste discharger exceeds agreed acceptance levels for discharge strength. DoI noted that non-compliance charges provide an important financial incentive to install appropriate on-site pre-treatment, which lowers the burden on the sewerage system. We agree with DoI's recommendation.

Consistent with volume-based and mass-based charges, we have transitioned charges for non-compliance over a 10 year period, to reduce bill impacts on trade waste customers.

151 As a local water authority under the *Water Management Act 2000*, Essential Water must adhere to a trade waste policy approved by the Minister for Water.

152 Category 3 customers are large, industrial dischargers that impose high costs on the sewerage treatment system.

10.2.7 Exclude the revenue recovered from trade waste charges from the NRR

In our Draft Report, we made a draft decision to subtract $377,000 per year (starting in 2019-20) from Essential Water's sewerage notional revenue requirement, before setting sewerage prices for all non-residential and residential customers. This is our forecast of the revenue Essential Water would recover from trade waste customers, if DoI's guideline volume-based charges applied over the 2019 determination period. It is our best available estimate of the costs of supplying trade waste services to these customers.

In response to our Draft Report, Essential Water submitted that a more equitable response would be to deduct 10% of this value in Year 1 (ie, $37,700) and then 20% in Year 2 (ie $75,400) and so on. This is because, even if it were to charge IPART's maximum prices as set in the 2019 Determination, it would not be able to recover the full $377,000 per year. Essential Water also submitted that the continuing reduction could be re-assessed at the next determination and adjusted if necessary.

If Essential Water levied the charges as set in the 2019 Determination, we estimate that it would recover between $90,000 to $154,000 each year, over the 2019 determination period (Table 10.1).

Table 10.1 Trade waste revenue estimates – IPART decision compared to Essential Water's forecast and MJA's recommendation ($000, $2018-19)

	2019-20	2020-21	2021-22
Essential Water forecast	2.2	2.3	2.4
MJA recommended	37	74	111
IPART decision	**90**	**122**	**154**
Usage charges	**32**	**64**	**96**
Annual fees	**58**	**58**	**58**

Source: Essential Water pricing submission to IPART, June 2018; Marsden Jacob Associates, Review of Proposed prices for trade waste and miscellaneous services – Essential Water, February 2019; IPART analysis.

Taking Essential Water's feedback into account, we have recommended that the difference between the full revenue ($377,000 per year) that Essential Water would recover under DoI's guideline prices and the revenue Essential Water is expected to recover under our transitioned prices is funded by a NSW Government subsidy. This means that the cost of transitioning trade waste prices would not be borne by Essential Water or its other customers.

We consider that this is appropriate as Essential Water cannot recover the full costs of providing trade waste services ($377,000) under the prices set in the 2019 Determination. Our final decision still provides Essential Water with a financial incentive to start charging for trade waste. However, if Essential Water does not address its trade waste charging over the next three years, then we would carefully consider whether to change this approach at the next review.

For transparency we present the recommended Government funding contribution for transitioning trade waste prices below in Table 10.2 (also see Section 4.5). We have recommended this subsidy because our view remains that other sewerage customers who do not receive trade waste services should not pay for the cost of the transition. Our final decision is still to subtract the full $377,000 per year from Essential Water's sewerage NRR.

Table 10.2 Trade waste revenue to be deducted from Essential Water's sewerage NRR ($000, $2018-19)

	2019-20	2020-21	2021-22
Estimated full revenue from trade waste charges	377	377	377
Revenue recovered from transitioned trade waste charges in the 2019 Determination	90	122	154
Recommended NSW Government contribution for trade waste transition	287	255	223

Source: IPART analysis.

10.3 Miscellaneous charges

We made a decision

39 To set the maximum prices Essential Water can charge for miscellaneous services as set out in Appendix J.

Essential Water provides a range of miscellaneous services to its water and sewerage customers, generally for one-off services such as connections and disconnections, replacing damaged services, plumbing inspections, site inspections and building plan approvals. These charges are levied on a relatively small number of customers, as they are incurred (ie, as the service is provided).

While miscellaneous charges represent a small impact on Essential Water's costs and revenue, they can represent significant costs to a small number of customers. Stakeholders did not comment specifically on Essential Water's miscellaneous charges.

10.3.1 Essential Water's proposal

Essential Water currently recovers approximately $109,000 per annum from miscellaneous charges. Three charges account for over 80% of forecast revenue from miscellaneous charges:

- Conveyancing certificates with meter reads
- Drainage diagrams, and
- Personal service of final warning notice for late payment prior to restriction.

Essential Water proposed keeping its miscellaneous charges constant in real terms, ie, indexed by inflation.

10.3.2 Marsden Jacob Associates analysis

MJA assessed Essential Water's miscellaneous charges and revenue forecasts for the 2019 determination period.

MJA assessed whether direct cost and overheads are efficient and directly related to the delivery of the service. MJA did not recommend any changes from Essential Water's proposed unit prices and revenue forecasts.

While some of Essential Water's actual costs to deliver the services are higher than its proposed prices, MJA's analysis suggests that Essential Water's proposed unit prices reflect the efficient cost to deliver the services. In particular, the proposed prices for conveyancing certificates and drainage diagrams are more comparable, than Essential Water's actual costs, to the current charges for similar services provided by other water businesses.

MJA also recommended that Essential Water should review its current practices for final warning notices to ensure its processes for managing its late paying customers and bad debts are efficient. We understand that individual warning notices are delivered in person, which is unlikely to be cost efficient.

Essential Water did not provide any comments or raise any concerns with MJA's recommendations on miscellaneous charges.

10.3.3 IPART's analysis

We consider that MJA's findings and recommendations are reasonable. Our decision is to accept MJA's recommendations on miscellaneous charges, and adopt Essential Water's proposed prices and revenue forecasts.

10.4 Recycled water pricing

We made a decision

40 Not to set effluent water prices, and to accept Essential Water's proposal that 50% of the forecast revenue from effluent water sales is shared with customers.

Essential Water currently supplies recycled water (also known as effluent water) to eight customers, by treating water collected from its sewer reticulation network.

10.4.1 Essential Water's proposal

Essential Water has proposed to continue the current practice of treating effluent water as a non-regulated income, with revenue shared 50:50 between Essential Water and customers.

To do this, we deduct 50% of the expected revenue from effluent water from the revenue to be recovered through prices for sewerage services, before prices are calculated. This means lower prices for customers, and allows Essential Water to retain 50% of the revenue.

The 2010 determination set effluent water prices at $0.62 per kL ($2013-14), but in our 2014 determination we did not set a price for this service. At the time of the 2014 price review, Essential Water was charging $0.17 per kL ($2013-14) plus a fixed service charge negotiated with customers.[153]

In our 2014 determination, to reflect Essential Water's charging practice at that time, we decided to treat effluent water as a non-regulated income source, and share this income

153 IPART, Essential Energy's water and sewerage services in Broken Hill, Review of prices from 1 July 2014 to 30 June 2018 - Final Report, June 2014, p 99.

equally between Essential Water and its customers. Essential Water had already established contracts with its customers for the supply of effluent. By not setting a price, we allowed Essential Water to continue its practice.

10.4.2 IPART's analysis

We are conducting a full review of our approach to regulating recycled water prices of water utilities concurrent to this review. Our review of pricing arrangements for recycled water services will cover all metropolitan water utilities we regulate, including Essential Water. Our view is that our recycled water pricing review is the most appropriate forum to reconsider our approach to recycled water pricing and ensure we address any stakeholder concerns.

Therefore, our decision is not to set maximum recycled water prices for Essential Water as part of Essential Water's 2019 price review. Rather, we would seek to apply the outcomes of our 2018-19 recycled water pricing review at the next review of the Essential Water's prices.

We note that Essential Water's recycled water customers are 'voluntary' and the draft position in our recycled water review is to **not** set prices for these customers unless we are requested to do so.

We did not receive comment from stakeholders specifically on setting recycled water prices.

10.5 Prices for unmetered properties

We made decisions

41 To set water prices for all unmetered residential and non-residential customers as:

- The standard residential water service charge, plus
- A water usage charge for a deemed consumption of 300 kL per year, for the applicable water quality.

42 To set sewerage prices for all unmetered residential and non-residential customers as the standard residential sewerage service charge (which includes a deemed usage of 90 kL per year).

The 2014 Essential Water determination set prices for all unmetered residential and non-residential customers. Essential Water's pricing proposal did not explicitly discuss unmetered properties, and we did not receive any stakeholder comments about these properties.

Consistent with the current approach, our decision is that unmetered residential and non-residential properties will pay the standard residential water service charge, plus a deemed level of water consumption.

The average level of residential consumption over the 2014 Determination period was around 260 kL per annum.[154] Therefore, we have maintained the deemed consumption at 300 kL per

[154] Essential Water pricing proposal to IPART, July 2018, 2018, p 26.

year, which potentially provides an incentive for small water users to have a meter installed. This is consistent with the approach we apply for the other utilities we regulate.[155]

Following the same approach, our decision is that unmetered residential and non-residential properties will pay the standard residential sewerage service charge, which includes a deemed usage of 90 kL per year (as discussed in Section 8.6).

10.6 Prices for unconnected properties

We made decisions

43 To set water service charges for properties not connected to the water supply system to zero.

44 To set sewerage service charges for properties not connected to the sewerage system to zero.

Essential Water may levy water and sewerage service charges to unconnected properties under the *Water Management Act 2000*, as long as in the utility's opinion it is reasonably practicable for water and sewerage services to be provided to that land.[156] Unconnected properties represent about 3% of Essential Water's customer base.

By contrast, water and sewerage service charges are set to zero for unconnected properties in the Sydney Water and Hunter Water 2016 Determinations.

Most of Essential Water's unconnected properties are vacant land, and Essential Water currently charges water and sewerage service charges to these properties. It also proposed to maintain its existing approach.

However, we understand that in practice, Essential Water has difficulty in recovering these charges, especially when owners cannot be traced. This creates additional expenses for Essential Water to pursue debt recovery.

We did not receive any stakeholder submissions about unconnected properties.

Our decision is that properties that are not connected to the water or sewerage system should not pay water or sewerage service charges.[157] We consider this to be a pragmatic approach that recognises that generally:

- Properties that are not connected to the water or sewerage system are not directly imposing costs on Essential Water's network, and that
- Properties that have been disconnected due to non-payment of fees should not continue to be levied water or sewerage service charges.

155 For example, our Sydney Water and Hunter Water reviews (see IPART, Review of prices for Hunter Water Corporation – Final report, June 2016, p 143; IPART, Review of prices for Sydney Water Corporation – Final Report, June 2016, pp. 177-178).

156 Section 311 of the *Water Management Act 2000* (NSW).

157 Under our decision, if a property is not connected to the sewerage system but is connected to the water supply system, then it will be charged an applicable water service charge, vice versa. Properties that are not connected to both the water and sewerage system, will not face any water and sewerage service charges.

11 Customer bill impacts of our pricing decisions

This chapter outlines the bill impacts of our pricing decisions for Essential Water's customers. Bills have been calculated using the prices set out in Chapters 8 to 10.

Throughout this report, figures have generally been presented in real dollars ($2018-19), including our prices. However, for each year of the 2019 determination period, our prices will be indexed in line with inflation and the bills actually paid by customers will be based on nominal prices (that is, including the effects of inflation).

Therefore, in this chapter we present the impact of our decisions on customer bills in nominal dollars, unless stated otherwise. This means that we have included the impact of our estimate of inflation (6.4% over the 3-year period)[158] on future prices. This is to assist customers in understanding the likely impact of our prices on their bills throughout the 2019 determination period, including the effects of inflation.

In summary, under our decisions:

- Most residential customers will see their annual treated water and sewerage bill increase by slightly less than inflation
- Chlorinated water customers will see their bills increase by more than inflation
- Most non-residential customers will also see their annual treated water and sewerage bill increase by less than inflation, except for trade waste customers whose bills will increase (as discussed in Chapter 10).
- Water and sewerage bills for mining customers will increase by slightly less than inflation.
- Non-residential pipeline customers (who currently receive water directly from the Menindee, Stephens Creek and Umberumberka pipelines) will see their untreated water bill increase by about 34% over three years (including inflation) – this is to eventually transition them to the same usage price faced by other untreated water customers.

Under Essential Water's proposal, prices would have generally increased by around 6.8% per year including inflation, or around 20% over three years.

11.1 Impacts for residential customers

Table 11.1 presents indicative water and sewerage bills for different residential customers under our prices. Actual bill impacts for customers will depend on their water usage.

Over the 2019 determination period, the annual water and sewerage bill for a residential customer with **treated water** usage of 300 kL per year will increase by about $75 (or 5%) over the 3-year determination period. The increase is less than inflation due to sewerage service charges decreasing marginally in real terms for residential customers. Whilst our decision to

158 In calculating indicative bills, we have applied inflation of 1.3% for 2019-20 and then forecast inflation of 2.5% per year thereafter. This results in a cumulative expected inflation of 6.4% over the 3 years.

introduce a 90 kL per year discharge allowance will otherwise increase service charges, it has been more than offset by our decision to subtract the full costs of trade waste before setting sewerage prices (discussed in Chapter 9 and 10 respectively).

Over the 2019 determination period, a household consuming 300 kL per year of **chlorinated water** will see its annual water bill increase by around $101 (or 15%) in nominal terms. This represents an average increase of $34 per year. The increase is due to the increase in usage prices for chlorinated water, which, as discussed in Chapter 8, reflects our decision to transition this price towards the untreated water usage price.

Table 11.1 Residential annual water and sewerage bills ($nominal)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2021-22
Residential – treated water – non pensioner					
200kL	1,223	1,225	1,255	1,287	5%
300kL	1,403	1,407	1,442	1,478	5%
400kL	1,583	1,589	1,629	1,669	5%
Residential – treated water – pensioner					
200kL	1,048	1,050	1,080	1,112	6%
300kL	1,228	1,232	1,267	1,303	6%
400kL	1,408	1,414	1,454	1,494	6%
Residential – chlorinated water (water bills only as no sewerage services are provided)					
200kL	560	580	607	635	13%
300kL	676	704	740	777	15%
400kL	792	828	873	920	16%

Note: Bills are calculated assuming individual 20mm meter connections. Bill impacts include our estimate of cumulative inflation of 6.4% over the 2019 determination period.

Source: Essential Water pricing model, September 2018 (based in $2018-19); IPART analysis.

11.2 Impacts for non-residential customers

Non-residential customer bill impacts will depend on their meter size and discharge factors, as well as their individual water usage.

Under our prices, treated water and sewerage bills for businesses will generally increase by less than inflation, mainly due to the reduction in sewerage service charges. Sewerage service charges have decreased for non-residential customers by more than residential customers, because we have:

- Included a discharge allowance of 90 kL per year in residential customers' sewerage service charges, and
- Subtracted our estimate of the full cost of treating trade waste before calculating sewerage charges.

These changes mean less revenue needs to be collected through non-residential sewerage service charges.

Table 11.2 shows the indicative water and sewerage bill impacts on businesses with differing meter sizes and levels of water consumption. A typical non-residential customer consuming 2,100 kL of treated water per year will see a water and sewerage bill increase of $44 or 0.5% over the 3-year determination period.

Untreated water (non-pipeline) customers will see their annual water bill increase approximately in line with inflation, whereas pipeline customers will see bills increase by around 34% over three years (see Section 11.3 below for details).

Table 11.2 Non-residential annual water and sewerage bills ($nominal)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2021-22
Non-residential – treated water					
20mm with 250kL usage	1,537	1,427	1,463	1,500	-2%
25mm with 1,000kL usage	4,045	3,893	3,993	4,094	1%
40mm with 2,100kL usage	9,114	8,709	8,933	9,158	0%
80mm with 21,000kL usage	70,427	69,236	71,024	72,820	3%
Non-residential – untreated water, non-pipeline customers (water bills only as no sewerage services are provided)					
20mm with 250kL usage	723	732	750	769	6%
25mm with 1,000kL usage	2,092	2,119	2,172	2,226	6%
40mm with 2,100kL usage	4,629	4,688	4,805	4,925	6%
80mm with 21,000kL usage	38,423	38,911	39,884	40,881	6%

Note: Bill impacts include our estimate of cumulative inflation of 6.4% over the 2019 determination period.

Sewerage service charges for non-residential customers are based on water meter size. The applicable meter charge is set using the formula: (meter size)^2 x 20mm meter charge / 400.

We have calculated service charges for larger meter sizes using this formula, based on Essential Water's stated 20mm price. We have estimated bills using a standard discharge factor of 70% discharge factor, as indicated in Essential Water's pricing proposal (p 200). Actual bills will depend on discharge factors for individual customers.

Source: Essential Water pricing model, September 2018 (based in $2018-19); IPART analysis.

For some non-residential customers, the sewerage bill decrease will be offset by the introduction of trade waste charges, as per our prices for trade waste (see Appendix I).[159] We have estimated trade waste discharge volumes based on standard discharge factors recommended in the NSW Department of Industry's Liquid Trade Waste Regulation Guidelines.[160]

Table 11.3 presents indicative sewerage and trade waste bills for a range of businesses, assuming a 20mm meter and average water consumption of 2,100 kL per annum. For example, a bakery's combined sewerage and trade waste bill will increase by about 22% over 2018-19 to 2021-22.[161] While Table 11.3 presents bills assuming the same consumption for all business types (ie, 2,100kL per annum), actual bills will depend on individual usage volumes, which are likely to vary between different businesses.

159 The 2014 determination set maximum prices for trade waste services, but Essential Water did not actually levy trade waste charges on customers (except the mines).

160 NSW Department of Industry, Liquid Trade Waste Regulation Guidelines, April 2009, p306.

161 Assuming single 20mm meter, 2,100 kL of water usage and 70% sewerage discharge factor.

We encourage Essential Water to conduct customer consultation during the 2019 determination period, to better understand customer impacts and inform its pricing structures for trade waste charges going forward.

Table 11.3 Indicative combined annual sewerage and trade waste bills ($nominal)

	Trade waste discharge factor (%)	2018-19	2019-20	2020-21	2021-22	% change 2018-19 to 2021-22
Bakery	25	2,417	2,616	2,783	2,952	22%
Butcher	90	2,417	2,861	3,301	3,741	55%
Patisserie	50	2,417	2,710	2,982	3,255	35%
Car wash	70	2,417	2,786	3,142	3,498	45%
Mechanic	70	2,417	2,786	3,142	3,498	45%
Restaurant	50	2,417	2,710	2,982	3,255	35%
Service station	70	2,417	2,783	3,124	3,496	45%

Note: Sewerage service charges for non-residential customers are based on water meter size. Non-residential service prices also assume a 70% sewerage discharge factor, bills will depend on discharge factors for individual customers. We have estimated sewerage bills based on 20mm meters and 2,100 kL of annual water consumption.

The trade waste discharge factor is set using the formula: (liquid trade waste / total water consumption) x 100. We have calculated volumetric charges using the trade waste discharge factor. We have also assumed that businesses are classified as Category 2 customers, for the purposes of estimating fixed annual charges.

Bill impacts include our estimate of cumulative inflation of 6.4% over the 2019 determination period.

Source: IPART Analysis.

11.3 Impacts for untreated water (pipeline) customers

Water bills for pipeline customers will increase under our final prices, due to an increase in the usage price from the current $0.78 per kL to $1.02 per kL in 2021-22 ($2018-19).

Information provided by Essential Water[162] shows that in aggregate, pipeline customers are forecast to use 77,000 kL of untreated water annually. There are 11 customers along the Menindee pipeline, plus a small number along the Stephens Creek and Umberumberka pipelines. We understand that some customers have multiple meters on their properties.

There are a total of 48 meters, ranging in size from 20mm to 50mm. The majority of meters are 25mm (28 out of 48 meters).

Table 11.4 presents indicative bill impacts for untreated water (we note these bills are for water only as pipeline customers do not receive sewerage services). Actual bills will depend on meter sizes and individual usage. Because pipeline customers have relatively high usage, we estimate bill increases of around 34% over three years to 2021-22.

162 Essential Water Annual Information Return, July 2018.

Table 11.4 Pipeline customer water bills ($nominal)

	2018-19	2019-20	2020-21	2021-22	Change 2018-19 to 2021-22
Pipeline customers – untreated water					
20mm with 2,000kL usage	1,888	2,072	2,288	2,513	33%
25mm with 4,000kL usage	3,632	3,999	4,427	4,873	34%
40mm with 8,000kL usage	7,551	8,288	9,151	10,052	33%
50mm with 14,000kL usage	12,968	14,255	15,759	17,330	34%

Note: Service charges for pipeline customers are based on water meter size. The applicable meter charge is set using the formula: (meter size)^2 x 20mm meter charge / 400. We have calculated service charges for larger meter sizes using this formula, based on Essential Water's stated 20mm price.

Bill impacts include our estimate of cumulative inflation of 6.4% over the 2019 determination period.

Source: Essential Water pricing model (based in $2018-19); IPART Analysis.

We consider that the increase in usage price for pipeline customers is appropriate, because the costs to supply pipeline and non-pipeline customers are similar for untreated water (see Section 8.6). Therefore, we consider that pipeline customers (and other customers across the network) should pay the same price as non-pipeline customers. Taking stakeholder submissions on affordability into account, we decided to gradually transition the price increase to minimise bill impacts.

12 Implications of pricing decisions

This chapter outlines implications of our pricing decisions for Essential Water and other matters that we must consider under the IPART Act (see Appendix A), including:

- Essential Water's service standards
- Essential Water's financial viability and shareholders
- General inflation, and
- The environment.

The implications of our pricing decisions are largely unchanged from the Draft Report, except the financial ratios in the financeability test, which have been updated to reflect our final decisions.

We are satisfied that the 2019 Determination achieves an appropriate balance between these matters.

12.1 Implications for Essential Water's service standards

Under our determination, we expect Essential Water to achieve both operating and capital efficiency savings, and are satisfied that Essential Water can achieve these savings. We consider Essential Water would receive sufficient revenue, if it receives our recommended NSW Government funding contribution, to achieve service standards at or above those expected by customers and to meet the standards required by its regulators.

Essential Water considered its proposal would permit it to provide services in accordance with regulatory requirements. This was based on its proposed operating and capital expenditure.[163]

Our decision on Essential Water's efficient expenditure is lower than Essential Water's proposed expenditure, to take account of efficiencies.

In our decision on Essential Water's capital program, its proposed projects have largely been maintained.[164] Our decision provides funds for Essential Water to plan and deliver its capital program at a lower cost in this determination period, while further improvements to options analysis are undertaken to better demonstrate the efficiency of expenditures. Aither found that whilst there was a substantial improvement in Essential Water's asset management system since IPART's 2014 Determination, it could be further improved through documentation of practices, improving the application of risk/cost analysis in option reviews for significant projects and addressing inconsistencies in the quality of business cases.[165]

163 Essential Water, IPART submission, July 2018 p 17.

164 We note that we have adjusted the timing of certain expenditures, eg, for Essential Water's proposal to replace the Wills St sewerage treatment plant, as we consider that further investigation and planning is required by Essential Water to establish the efficient amount of expenditure required.

165 Aither, Essential Water expenditure review – Final Report, January 2019, p 15.

We note that following robust options analysis, if actual expenditure over the 2019 determination period is higher than what we have allowed, and we deem it to be prudent when we next review prices (which will be at the end of the 2019 determination period), then we will include this expenditure in Essential Water's RAB so that it can earn a return on assets and depreciation through prices at the next determination.

We therefore consider that our expenditure allowances will permit Essential Water to meet service standards expected by customers and to continue to meet the requirements of its regulators.

12.2 Implications for Essential Water's financeability

Before finalising our pricing decisions, we undertake a financeability test to assess how our pricing decisions are likely to affect the business's financial sustainability and ability to raise funds to manage its activities over the upcoming regulatory period.

In 2018, we reviewed the financeability test we use as part of our price regulation process.[166] In this review, we decided to:

- Conduct a financeability test if the prices we set determine the revenues of the business and if the business has, or is part of an entity with, a distinct capital structure
- Broaden the test by calculating financeability tests for both the benchmark and actual business
- Adjust the target ratios used to assess financeability
- Clarify the process to identify any financeability concerns, and
- Tailor the remedy for a financeability concern based on its source.

The 2018 financeability test will apply to pricing decisions on or after 1 July 2019.

To assess Essential Water's financeability over the 2019 determination, we analysed its forecast financial performance, financial position and cash flows for both the benchmark and actual business. We then forecast financial ratios for both tests and assessed Essential Water's financial ratios to our target ratios.

The three financial ratios we include in our financeability test, and the target ratios, are summarised in Table 12.1.

Table 12.1 Target ratios for the benchmark and actual test

Ratio	Benchmark test (real cost of debt)	Actual test (actual cost of debt)
Interest cover	>2.2x	>1.8x
Funds from operations (FFO) over debt	>7.0%	>6.0%
Gearing	<70%	<70%

Source: IPART analysis.

166 IPART, Review of our financeability test, November 2018, p 1.

The financeability test is done for Essential Water's notional revenue requirement for its water and sewerage business only

We have conducted the financeability tests using the revenues and costs for Essential Water only (ie, as opposed to Essential Energy as a whole). This is consistent with our decisions for Essential Water's tax allowance and post-tax WACC parameters.

However, because Essential Energy was unable to provide disaggregated financial information (eg, debt gearing and interest expense) for Essential Water only, we did not have all the information required to accurately conduct the actual test. As a result, when conducting the actual test we have used debt gearing and interest expense information for Essential Energy as a whole.

In addition, we assume that Essential Water would recover our full Notional Revenue Requirement (NRR) for the water and sewerage businesses. That is, we assume our recommended NSW Government funding contribution is accepted.

The benchmark test indicates no financial concern for Essential Water

Under our NRR, an efficient benchmark business would exceed our target ratio for the Real Interest Cover Ratio (RICR) and gearing ratio over the regulatory period (see Table 12.2). While the benchmark business's real FFO over debt would be slightly below our target ratio, this trend of this ratio shows an improvement over the period.

Taken together, these results suggest no financeability concern for the benchmark business. They suggest that our prices will allow an efficient investment grade rated business to raise debt finance, have sufficient operating cash flows to service this debt, and remain financeable during the regulatory period.

Table 12.2 Financial ratios for the benchmark test

Ratio	Target	2019-20	2020-21	2021-22
Real Interest Cover	>2.2x	2.9	3.0	3.2
Real FFO over Debt	>7.0%	5.6%	5.9%	6.3%
Real Gearing	<70%	60%	60%	60%

Source: IPART analysis.

The actual test indicates some concerns due to a high actual cost of debt and gearing

In considering the impact of our decisions on the actual business, we note that Essential Water's total NRR represents less than 3.6% of Essential Energy's revenue. The revenue collected from Essential Water's customers is 1.9% of Essential Energy's customer revenue. This suggests that the prices we set for Essential Water will not materially impact the financial viability of Essential Energy as a whole.

As noted above, we did not have all the information required to accurately conduct the actual test for Essential Water. As a proxy for this information, we have calculated financial ratios using the cost of debt and debt gearing of Essential Energy. However, we have exercised caution in interpreting the results of the actual test, due to these assumptions.

Using the actual financial information provided by Essential Energy, our NRR would result in:

- An interest coverage ratio (ICR) below the target ratio
- A FFO over Debt ratio well-below the target ratio, and
- A gearing ratio marginally higher than our target ratio (Table 12.3).

Table 12.3 Financial ratios for the actual test

Ratio	Target	2019-20	2020-21	2021-22
Interest cover	>1.8x	1.4	1.3	1.3
FFO over Debt	>6.0%	2.3%	1.7%	2.0%
Gearing	<70%	73%	74%	74%

Source: IPART analysis.

Our analysis shows that this is largely due to a high actual cost of debt and gearing. The average nominal cost of debt was 7.1% for Essential Water, compared to a nominal BBB-rated cost of debt of 5.6% in the WACC for this review.

If Essential Water maintained a benchmark gearing ratio, and if its debt raising costs matched our estimate of the cost of debt in the WACC, our analysis suggests that the actual business's financeability will improve towards the target for the ICR and gearing ratios. The FFO over Debt ratio will be below the target but trend up to be just short of the target in 2021-2022.

Our analysis shows that our NRR will allow a benchmark business to remain financeable over the regulatory period. And while the financeability test using actual financial information does not meet our target ratios, this can largely be explained by the high cost of debt and gearing of the business. Accordingly, we do not consider any adjustments to our decision is necessary.

Furthermore, Essential Energy and NSW Treasury can consider the results of our tests to address any actual financeability concerns the business may face as a result of its financing and investment decisions.

12.3 Impact on the Consolidated Fund

Under Section 16 of the IPART Act, IPART is required to report on the likely impact to the Consolidated Fund if prices are not increased to the maximum levels permitted. If this is the case, then the level of tax equivalents and dividends paid to the Consolidated Fund will fall. The extent of this fall will depend on NSW Treasury's application of its financial distribution policy and how the change affects after-tax profit.

Our financial modelling is based on a tax rate of 30% for pre-tax profit and dividend payments at 70% of after-tax profit. Under our modelling, a $1 decrease in pre-tax profit would result in a loss of revenue to the Consolidated Fund of 49 cents in total, which is 70% of the decrease in after-tax profit of 70 cents.

If Essential Water sought the Treasurer's approval under section 18(2) of the IPART Act to charge below the maximum prices of the determination then, if requested, we could provide advice on the likely impact to the Consolidated Fund.

We have also recommended a NSW Government contribution of $68.4 million over the 3-year determination period to Essential Water. This amount is net of any tax implications – that is, we consider that any tax implications of the NSW Government contribution is a matter between the NSW Government and Essential Water.

12.4 Implications for the environment

The NSW Government is responsible for determining the risk of negative impacts of Essential Water on the environment, and imposing standards or requirements to address these risks and minimise any impacts.

For example, the Office of Environment and Heritage is responsible for setting standards for, and monitoring the environmental impacts of, the effluent Essential Water discharges from its treatment plants and sewerage systems.

Essential Water's environment-related programs include:

- Water savings initiatives, including the provision of educational resources to manage water consumption, and active monitoring of high water accounts and customer visits to address water consumption.
- The re-use of partially treated wastewater (effluent water) for non-drinking purposes, which is sold to a range of customers in selected areas of Broken Hill.[167]

In determining Essential Energy's revenue requirements, we have ensured it can fully recover all efficient costs it incurs in meetings its environmental obligations.

12.5 Implications on general inflation

Under Section 15 of the IPART Act, we are required to consider the effect of our determinations on general price inflation. As the Australian Bureau of Statistics (ABS) does not collect data on Essential Energy's water and sewerage impact on the consumer price index, we have derived an estimate of their impact on general price inflation using the ABS estimate of Sydney Water's impact on the consumer price index (CPI).

Currently, water and sewerage prices in Sydney contribute about 0.76% towards the consumer price index (all groups, 8 capital cities).[168] Using Essential Energy's customer numbers (around 11,000) relative to Sydney Water's (around 1,900,000) we estimate the relative contribution of Essential Energy towards general inflation to be about 0.004%.

Under our decisions, the annual average increase in the water and sewerage bill for a customer consuming 200 kL of water per year is -0.5% (in real terms). Therefore, the annual impact on general nation-wide price inflation is negligible.

167 http://www.essentialwater.com.au/content/services, accessed 1 March 2019.
168 Australian Bureau of Statistics, Consumer Price Index – 2018 Weighting Pattern, December 2018.

Appendices

A Matters to be considered by IPART under Section 15 of the IPART Act

In making determinations, IPART is required, under Section 15 of the IPART Act, to have regard to the following matters (in addition to any other matters IPART considers relevant):

a) The cost of providing the services concerned

b) The protection of consumers from abuses of monopoly power in terms of prices, pricing policies and standard of services

c) The appropriate rate of return on public sector assets, including appropriate payment of dividends to the Government for the benefit of the people of New South Wales

d) The effect on general price inflation over the medium term

e) The need for greater efficiency in the supply of services so as to reduce costs for the benefit of consumers and taxpayers

f) The need to maintain ecologically sustainable development (within the meaning of section 6 of the *Protection of the Environment Administration Act 1991*) by appropriate pricing policies that take account of all the feasible options available to protect the environment

g) The impact on pricing policies of borrowing, capital and dividend requirements of the government agency concerned and, in particular, the impact of any need to renew or increase relevant assets

h) The impact on pricing policies of any arrangements that the government agency concerned has entered into for the exercise of its functions by some other person or body

i) The need to promote competition in the supply of the services concerned

j) Considerations of demand management (including levels of demand) and least cost planning

k) The social impact of the determinations and recommendations

l) Standards of quality, reliability and safety of the services concerned (whether those standards are specified by legislation, agreement or otherwise).

Table A.1 outlines the sections of the report that address each matter.

Table A.1 Consideration of section 15 matters by IPART

Section 15(1)		Report reference
a)	the cost of providing the services	Chapter 4 sets out our forecast of the total efficient costs Essential Water will incur to deliver its services (including the Pipeline transportation costs and consequential works). Further detail is provided in Chapters 5 and 6 on prudent historical expenditure and efficient forecast expenditure.
b)	the protection of consumers from abuses of monopoly power	We consider our decisions will protect consumers from abuses of monopoly power, as they reflect the efficient costs Essential Water requires to deliver its services (less our recommended NSW Government contribution). This is addressed throughout the report, particularly in Chapter 4, and Chapters 8 and 9 (where we set out our draft pricing decisions).
c)	the appropriate rate of return and dividends	Chapter 4 and Appendix F outline that we have allowed a market-based rate of return on debt and equity, and that this will enable a benchmark business to return an efficient level of dividends to its owner.
d)	the effect on general price inflation	Chapter 12 outlines that the impact of our final prices on general inflation is negligible.
e)	the need for greater efficiency in the supply of services	Chapters 5 and 6 set out our decisions on Essential Water's prudent historical expenditure and efficient forecast expenditure, including that we have incorporated an on-going efficiency adjustment to its operating expenditure. Further, Chapter 3 discusses our decision to introduce an 'efficiency carryover mechanism' to encourage Essential Water to identify further efficiencies.
f)	ecologically sustainable development	Chapter 5 and 6 set out Essential Water's prudent historical expenditure and efficient forecast expenditure that allows it to meet all of its regulatory requirements, including its environmental obligations.
g)	the impact on borrowing, capital and dividend requirements	Chapter 4, Chapter 12 and Appendix F explain how we have provided Essential Water with an allowance for a return on and of capital, and our assessment of its financeability.
h)	impact on pricing policies of any arrangements that the government agency concerned has entered into for the exercise of its functions by some other person or body	Chapters 5 and 6 determines Essential Water's prudent historical and forecast efficient expenditure, including the efficient costs of any contracted works to deliver its capital expenditures.
i)	need to promote competition	In determining efficient costs, we have been mindful of relevant principles such as competitive neutrality (eg, we have included a tax allowance for Essential Water as set out in Chapter 4). However, we have also been mindful of the NSW Government's commitment and have recommended a contribution as set out in Chapter 4. This means that our prices recover less than Essential Water's efficient costs, and would be below the prices expected to prevail in a competitive market.
j)	considerations of demand management and least cost planning	Chapter 8 and 9 outline how we have set usage prices with reference to marginal cost to send price signals to consumers about the impact of their demand on Essential Water's supply capacity. Chapters 5 and 6 outline how we have assessed Essential Water's prudent historical and efficient forecast expenditure required to manage its supply capacity at least cost.

k)	the social impact	Chapter 11 and 12 considers the potential impact of our pricing decisions on Essential Water, its customers and the NSW Government (on behalf of the broader community).
l)	standards of quality, reliability and safety	Chapters 5, 6 and 12 detail our assessment of Essential Water's prudent historical and efficient forecast costs so that it can meet the required standards of quality, reliability and safety in delivering its services. Section 12.1 discusses implications of our decisions on Essential Water's service standards.

B Essential Water's regulatory framework

A number of regulators oversee Essential Water's water and sewerage functions. Essential Water's primary regulators include:

- **IPART**, which is responsible for setting the maximum prices charged by Essential Water for its monopoly services.
- The **Department of Industry - Water** (DoI Water) which:
  - Administers ministerial approval to construct, extend or modify works for water and sewage treatment, and for reusing effluent and biosolids under the *Water Management Act 2000*.[169] This approval process aims to provide assurance that the infrastructure is fit for purpose; protects public health and safety, and the environment; and provides a robust, cost-effective solution that meets community needs.[170]
  - Oversees the performance of Local Water Utilities based on the requirements of the *NSW Best-Practice Management of Water Supply and Sewerage Guidelines*.[171]
  - Publishes the annual *NSW Water Supply and Sewerage Performance Monitoring Report*, which benchmarks of the performance of all NSW water utilities.
- The **Dams Safety Committee**, which is responsible (under the *Dams Safety Act 1978)* for formulating measures to ensure the safety of dams and maintaining surveillance of prescribed dams, including those under the management of Essential Water. Under the *Mining Act 1992*, the Dams Safety Committee has statutory functions, through advice to the responsible Minister, in determining the type and extent of mining allowed near dams and their storages.
- **NSW Health**, which is responsible for regulating the quality and safety of Essential Water's drinking water, consistent with the *Australian Drinking Water Guidelines 2011*.
- The **NSW Environment Protection Authority** (EPA), which is responsible for licencing and monitoring sewage discharges from Essential Water's sewerage system under the *Protection of the Environment Operations Act 1997*.
- The **Natural Resource Access Regulator** (NRAR), which is responsible for compliance and enforcement of natural resources management legislation. Its functions are conducted under the *Natural Resources Access Regulator Act 2017*. Essential Water's water licence limits its extraction of water from surface and groundwater sources under the *Water Management Act 2000* and the *Water Act 1912*.

169 See section 292 of *Water Management Act 2000* (and clause 116 of the *Water Management General Regulation 2011*).

170 DoI Water has a role in approving medium and high risk liquid trade waste applications, and approving local council water utility policy for liquid trade waste regulation. It performs these roles to address the potential risks to public health and safety and the environment (see clause 142 of the *Water Management General Regulation 2011*.)

171 NSW Government, *Guidelines for Best Practice Management of Water Supply and Sewerage*, August 2007.

C What prices would be affordable?

In our Issues Paper, we outlined a framework for setting prices in this review, which included analysis so that the prices we set would be affordable for customers. Setting water and sewerage services in Broken Hill so that they are affordable, given the potential impact that the Pipeline would have on prices, has been a key issue throughout our review.

Numerous stakeholders highlighted the socioeconomic circumstances of Broken Hill which generally impacts customers' ability to pay - particularly given that Broken Hill has, compared with the rest of NSW, a large number of part-time workers, pensioners, those on low incomes and those receiving income support.[172]

In November 2018, the NSW Government announced that it would subsidise the efficient costs of the Pipeline for a 4-year period, so that prices would not rise for end-use customers in real terms as a result of the Pipeline.[173] We have considered this announcement in setting prices, and recommended a Government funding contribution.

As prices for almost all customers would not rise in real terms, and our view is that current prices are affordable, we consider that our prices are affordable for customers.

Nevertheless, in this appendix we outline what prices could be affordable for residential customers, by benchmarking prices and incomes in Broken Hill, to other areas.

C.1 Essential Water considered what is affordable for customers

Essential Water submitted that its pricing proposal was informed by its stakeholder engagement with customers in Broken Hill (which included both residential customers and businesses).[174] Essential Water indicated that setting affordable prices was one of the most important factors for customers, as well as the provision of reliable water and sewerage services and safe drinking water.[175]

In its proposal, Essential Water undertook benchmarking of residential water and sewerage bills and noted that the average annual water and sewerage bill in Broken Hill (of $1,223) was ranked 11th lowest out of the 36 water utilities it examined across Australia (where the average water and sewerage bill was $1,369).[176] However, it also noted that Broken Hill has a high proportion (22%) of its population that is 65 years of age or older, and that the ABS analysis

172 For example, IPART, Review of Essential Energy's prices for water and sewerage services in Broken Hill and WaterNSW's prices for the Broken Hill Pipeline – Transcript, November 2018, pp 33, 40, 53; Broken Hill City Council, Submission to Issues Paper, October 2018, pp 3-4; PIAC, Submission to Issues Paper, November 2018, pp 1-3.

173 NSW Government, Letter to the Chair – IPART, 21 November 2018. Available at: https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/pricing-reviews-water-services-metro-water-legislative-requirements-prices-for-essential-energys-water-and-sewerage-services-in-broken-hill-from-1-july-2019/letter-from-the-minister-on-the-broken-hill-pipeline.pdf

174 Essential Water pricing proposal to IPART, July 2018, p 6.

175 Essential Water pricing proposal to IPART, July 2018, p 14.

176 Essential Water pricing proposal to IPART, July 2018, p 15.

of 'Relative Socio-economic Disadvantage' placed it in the lowest 10% band in Australia and in NSW.[177] These concerns were also raised in response to our Issues Paper and at the public hearing in Broken Hill.

Essential Water also submitted that addressing what is affordable for customers and the impacts on disadvantaged customers would continue to be an important issue for the community.[178] Thus, it stated that it had considered this in developing its proposal, and had scrutinised its expenditure plans to ensure they were both necessary and efficient, to minimise the pressure on prices. With this in mind, Essential Water proposed increases of 4.2% per year (in real terms) for all customers, excluding the transportation costs of the Pipeline and consequential works.[179]

C.2 What residential customers can afford to pay

We examined a range of measures to assess how affordable water and sewerage services are in Broken Hill compared to other areas. We looked at:

- Median income levels, as well as the composition of customers who have incomes below the median income level
- The proportion of customers seeking financial assistance or are on welfare payments
- The percentage of those on payment assistance plans, and
- Typical water and sewerage bills.

These various measures were outlined in our Issues Paper.[180]

We have further analysed water and sewerage bills against median incomes across regional NSW. For our analysis, we have focussed on:

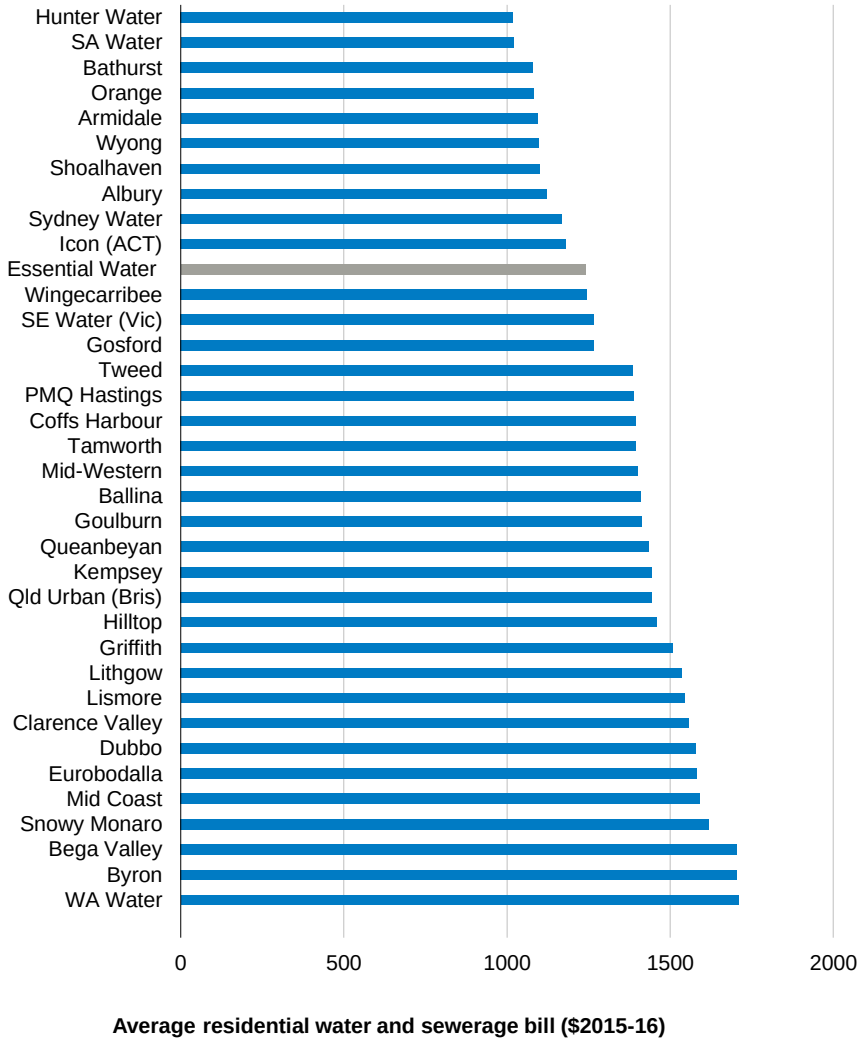
- Median incomes, rather than average incomes. Stakeholders also raised the importance of examining median income levels when assessing what is affordable, rather than average income levels, given the disparity in incomes between those who work in the mines and those who do not.[181] We note that there are many customers in Broken Hill on lower incomes (including the pension) and receiving income support.
- The 'average' water use that customers in each area consume, rather than assuming the same level of water usage across all areas. This is to recognise that different regions may require varying levels of water usage for particular uses. For example, for customers in Broken Hill, a certain portion of water consumption is used to address health concerns, such as supressing lead dust pollution. Hence, water needs in Broken Hill can be higher than other regions and we were mindful of this when considering what customers in Broken Hill can afford to pay.

177 Essential Water pricing proposal to IPART, July 2018, p 8.
178 Essential Water pricing proposal to IPART, July 2018, pp 8,25.
179 Essential Water pricing proposal to IPART – Addendum to pricing proposal, September 2018, p 1.
180 IPART, Review of Essential Energy's prices for water and sewerage services in Broken Hill – Issues Paper, September 2018, pp 34-40.
181 IPART, Review of Essential Energy's prices for water and sewerage services in Broken Hill and WaterNSW's prices for the Broken Hill Pipeline – Transcript, November 2018, pp. 32; Broken Hill Darling River Action Group Inc, Submission to Issues Paper, October 2018, p 2.

- Median incomes and average water and sewerage bills for 2015-16, given that the latest census data is from 2016. For 2015-16, the average residential water usage reported to the 2015-16 NSW water supply and sewerage benchmarking report was 233 kL per year for Essential Water.

In Figure C.1, we compared current water and sewerage bills in Broken Hill to those of other utilities. This analysis suggests that average bills are lower in Broken Hill than the average across most other utilities.

Figure C.1 Essential Water bills and rankings compared against other utilities ($2015-16, real)



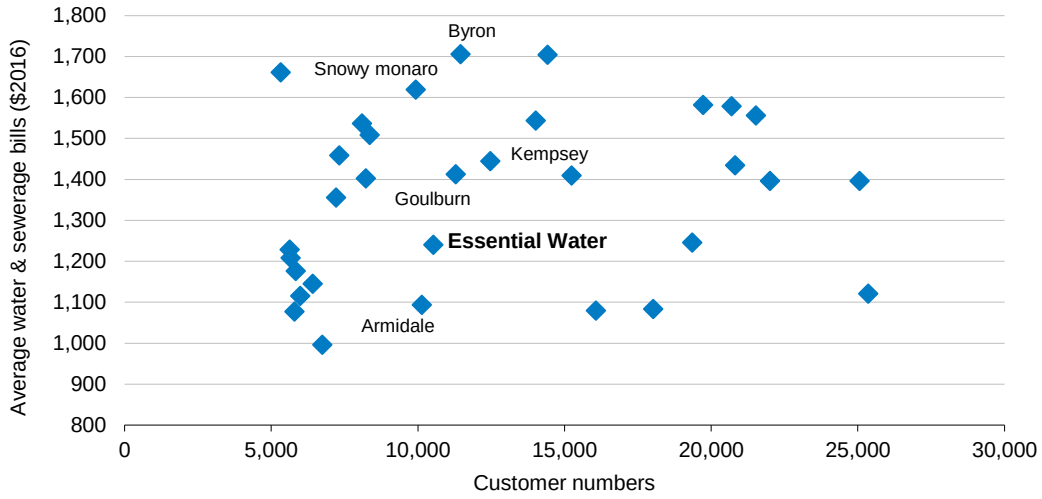
Note: We have used average water usage for Essential Water, reported as 233 kL by Essential Water to the NSW water supply and sewerage benchmarking report.

Source: Essential Water pricing proposal to IPART, July 2018, p 43; Essential Water pricing proposal to IPART, Addendum, September 2018; 2015-16 NSW Water Supply and Sewerage Benchmarking Report, p 116.

To account for the impact of utility size on cost, we compared average water and sewerage bills in Broken Hill to other similar sized utilities in NSW (Figure C.2). This suggests that

Essential Water's current bills are comparable with other similar sized utilities, with some utilities having slightly lower average bills (eg, Armidale), as well as others having higher average bills (eg, Goulburn).

Figure C.2 Comparison of average residential water and sewerage bills by customer numbers ($2015-16, real)



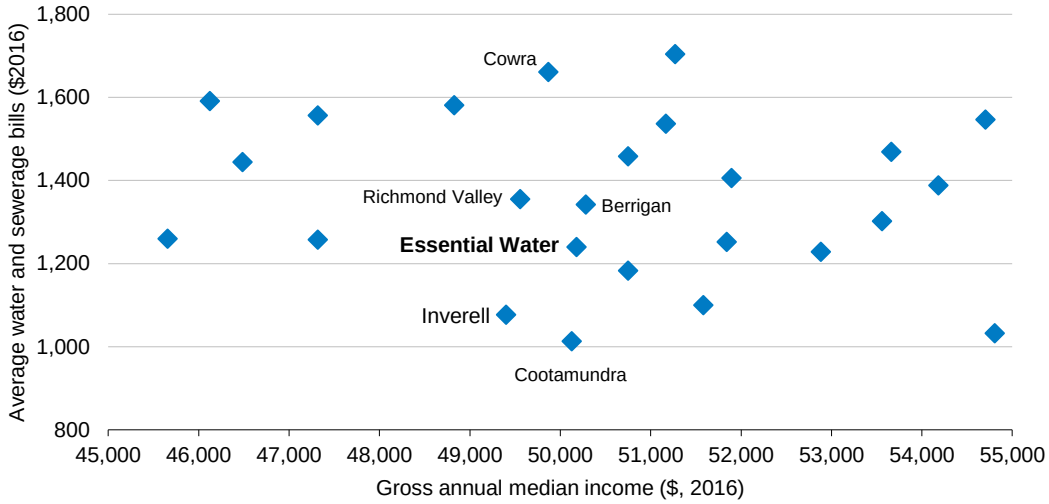
Note: 'Average' is based on the average residential usage for each utility as reported to DPI. For Essential Energy it has been reported as 233kL; for Armidale 207kL; for Goulburn 162kL; for Kempsey 149kL for Snowy Monaro 151kL; and for Byron 169kL.

Source: 2015-16 NSW Water Supply and Sewerage Benchmarking Report, p 116; ABS, Census of Population and Housing, Australia 2016.

Then, to account for the impact of median incomes, Figure C.3 compares how average bills compare to other NSW utilities with similar median incomes. Again, it suggests that Essential Water's current bills are comparable with other areas that have similar median incomes. In particular, there are other utilities (eg, Cowra) with similar median incomes that have higher bills.

Figure C.3 does not suggest a clear link between the cost of supplying water and sewerage services compared with median income levels. Instead, differences in water bills likely reflect the underlying differences in the costs of supplying these services across areas.

Figure C.3 Comparison of average residential water and sewerage bills by gross annual median income ($2015-16, real)

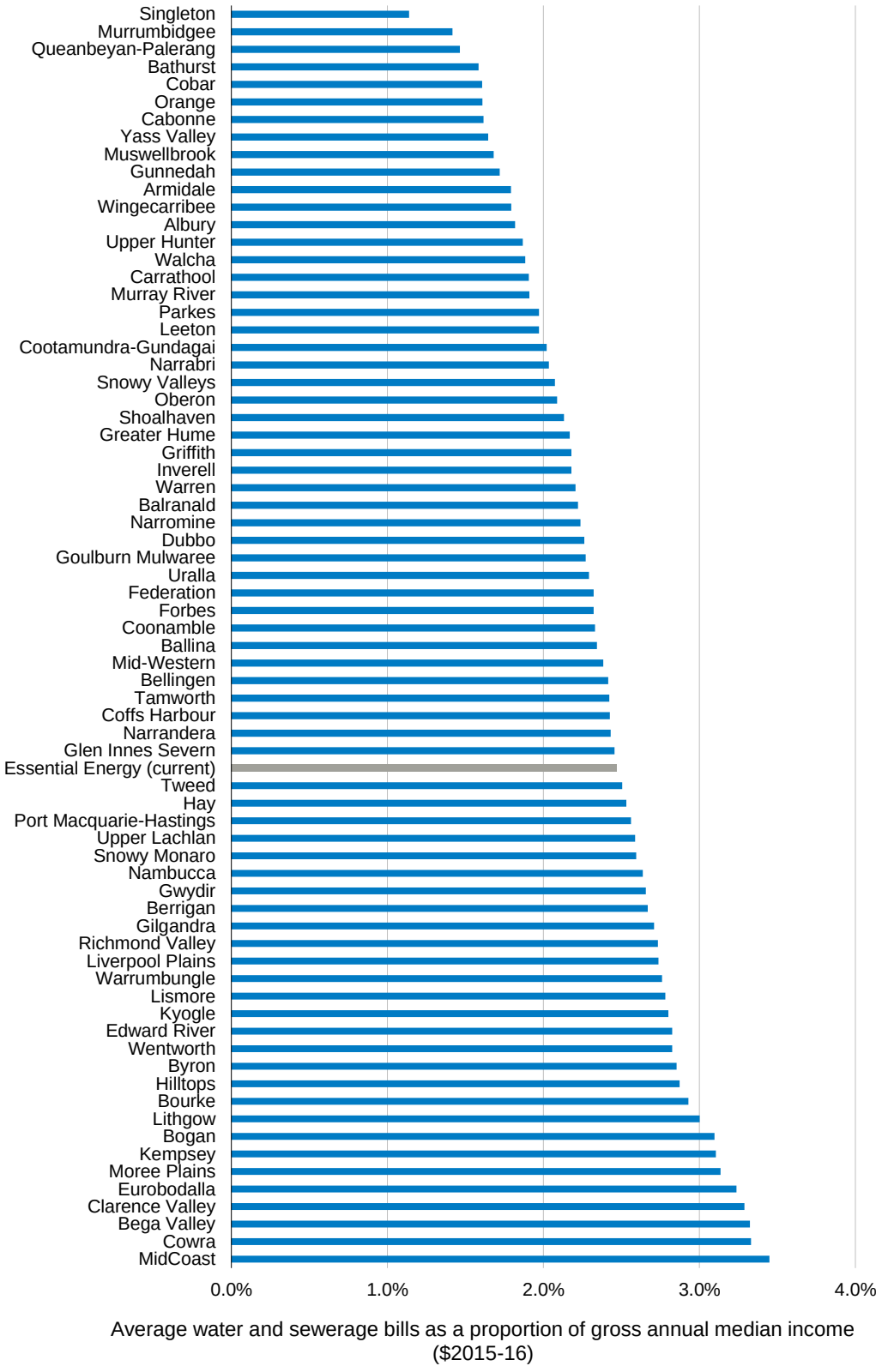


Source: 2015-16 NSW Water Supply and Sewerage Benchmarking Report, p 116; ABS, Census of Population and Housing, Australia 2016.

In Figure C.4, we compared current water and sewerage bills in Broken Hill as a share of median incomes to other regional areas. Water and sewerage bills in Broken Hill are about 2.5% of median income, which is comparable with the average across all other regional NSW utilities.[182] Average bills are less than 3% of income for most utilities.

182 Bills as a percentage of median income is also about 2.5% (see IPART, Review of Essential Energy's prices for water and sewerage services in Broken Hill – Issues Paper, September 2018, p 37).

Figure C.4 Essential Water bills as a proportion of gross annual median income compared with other utilities ($2015-16, real)



Source: 2015-16 NSW Water Supply and Sewerage Benchmarking Report, p 116; ABS, Census of Population and Housing, Australia 2016.

We consider that currently bills are generally affordable for residential customers in Broken Hill compared with other regional areas – as noted previously, bills represent about 2.5% of median income in Broken Hill. Although, given that average bills are less than 3% of median income for most utilities, we consider that bills would continue to remain affordable if they are at, or below, 3% of the median income in Broken Hill.

We note that many customers in Broken Hill are on lower incomes (including the pension). The capacity to pay of pensioners is likely to be less than the average residential customer. However, this is true irrespective of whether pensioners are in Broken Hill or in other areas. Therefore, the difference between water and sewerage prices for pensioners in Broken Hill, relative to the water and sewerage bills paid by pensioners in other regions is likely to be similar to the differences in Figure C.1 to C.4. That is, the average water and sewerage bills in Figure C.1 to Figure C.4 would all be reduced by $175 for pensioners (ie, the pensioner rebate)[183] but adjusted for differing average water usage for pensioners in each region.

[183] Essential Water provides the same rebate to pensioners (of $175) as other Councils in regional NSW providing water and sewerage services.

D The Efficiency Carryover Mechanism

In this Appendix, we explain why an Efficiency Carryover Mechanism (ECM) would remove an incentive for the utility to delay efficiency savings it identifies during a regulatory period until the beginning of the following period. It provides worked examples of how the ECM removes this incentive by identifying efficiency savings that are permanent, and allowing the utility to retain permanent efficiencies savings for the same amount of time, regardless of when they are implemented by the utility. For example, for a 3-year determination, any permanent efficiency savings would be retained for three years.

Sections D.1 and D.2 below compare the 'profits' that a utility would enjoy if it implemented a permanent efficiency saving under the current regulatory framework, with those available under the ECM. Section D.3 explains how the ECM is applied. Section D.4 explains why we implement the ECM with a 1-year lag.

D.1 Current regulatory framework

The three tables in Figure D.1 show the profits that a regulated utility retains after making an efficiency improvement **decrease** the further into a regulatory period that the efficiency is made. The efficiency is then incorporated into the regulatory allowance – in the form of lower prices to customers – in the next determination period and the utility gains no more profit from that efficiency. This creates the incentive for the utility to delay efficiencies to the first year of a new regulatory period.

Figure D.1 assumes that an efficiency saving implemented by a utility in the final year of a determination would be identified by IPART in the expenditure review process.

Figure D.1 How the current framework incentivises delaying efficiencies

Permanent saving made in year 1

	Regulatory Period 1			Regulatory Period 2		
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Allowance	100	100	100	80	80	80
Actual	80	80	80	80	80	80
Annual profit	20	20	20	-	-	-
Total profit in period		**60**				

Permanent saving made in year 2

	Regulatory Period 1			Regulatory Period 2		
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Allowance	100	100	100	80	80	80
Actual	100	80	80	80	80	80
Annual profit	-	20	20	-	-	-
Total profit in period		**40**				

Permanent saving made in year 3

	Regulatory Period 1			Regulatory Period 2		
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Allowance	100	100	100	80	80	80
Actual	100	100	80	80	80	80
Annual profit	-	-	20	-	-	-
Total profit in period		**20**				

Note: Regulatory period 2 does not necessarily have to be the same length as previous regulatory period. We have not made a decision on the length of the subsequent regulatory period. The tables in this figure are illustrative only.

D.2 How the ECM removes the incentive to delay savings

The ECM removes the incentive to delay savings by allowing the utility to retain profits for each permanent saving as though the saving were made in year 1 of the determination period in the scenario above. That is, the total profit for the utility is the same regardless of which year the efficiency was made.

The three tables in Figure D.2 demonstrate the ECM for a 3-year determination. Using the same example as in Figure D.1, the utility retains a $60 profit regardless of which determination year it makes the saving in. This is because we calculate a "carryover" into the next determination period.

After three years, the saving is passed onto customers.

Figure D.2 How the ECM removes incentives to delay efficiencies

	Regulatory Period 1			Regulatory Period 2		
Permanent saving made in year 1						
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Base allowance	100	100	100	80	80	80
Actual	80	80	80	80	80	80
Permanent saving	20	20	20	-	-	-
Incremental saving	20	20	20	-	-	-
Carryover calc	N/A	N/A	N/A			
Net allowance	100	100	100	80	80	80
Annual profit	20	20	20	-	-	-
Total profit in period		60				
Permanent saving made in year 2						
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Base allowance	100	100	100	80	80	80
Actual	100	80	80	80	80	80
Permanent saving	-	20	20	-	-	-
Incremental saving	-	20	20	-	-	-
Carryover calc			20	20		
Net allowance	100	100	100	100	80	80
Annual profit	-	20	20	20	-	-
Total profit in period		40			20	
Permanent saving made in year 3						
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Base allowance	100	100	100	80	80	80
Actual	100	100	80	80	80	80
Permanent saving			20			
Incremental saving			20			
Carryover calc				20	20	
Net allowance	100	100	100	100	100	80
Annual profit	-	-	20	20	20	-
Total profit in period		20			40	

Note: Regulatory period 2 does not necessarily have to be the same length as previous regulatory period. We have not made a decision on the length of the subsequent regulatory period. The tables in this figure are illustrative only.

D.3 Applying the ECM

If the utility decides to apply the ECM, the utility would need to calculate the following values:

- **Under (over):** first the utility identifies the difference between the base allowance set by IPART to its actual expenditure.
- **Outperformance:** second, the utility only reports where it underspends against our allowances (overspends are omitted).
- **Permanent gain:** working backwards from year 3 to year 1, the utility then determines how much of the outperformance in year 3 also occurred in year 2, how much of the outperformance that occurred in both year 3 and 2 occurred in year 1.

- **Incremental gain:** working forwards from year 1 to 3, it then determines the first year that a permanent saving occurred. It is this 'incremental gain' in each year that would be carried forward for three years through the ECM calculation that follows.
- **ECM calculations:** ensures that any incremental gain is carried forward and held for three years.

At the next determination period, we would consider these calculations, and decide whether the savings identified by the utility are permanent.

D.4 Why there is a 1-year lag in implementation

In practice, at the time we undertake our review, we only have a forecast of expenditure in the final year of the determination period.

To address this limitation, we make three adjustments.

First, we lag the implementation of the ECM by one year. For example, with a 4-year determination period, we apply the ECM calculation to the first three years of the current determination period (years 1, 2, and 3), and to the final year of the previous regulatory period (ie, year 0). Efficiency savings in the final year of the current period (year 4) would be included in the ECM calculation for the following determination period.

Second, we assume an efficiency saving made in year 3 is permanent. Therefore, the benefit is held in year 3 and year 4, and the ECM allows the benefit to be carried forward in years 5 and 6.

Figure D.3 shows the first two adjustments. In this example, the two regulatory periods are years 1 to 4 (regulatory period 1), and year 5 to 8 (regulatory period 2). The ECM is then applied to operating expenditure in Years 0 to 3 in the first regulatory period, and years 4 to 7 in the second.

Figure D.3 ECM is lagged one year so that it is based on actuals

		Regulatory Period 1				Regulatory Period 2			
	ECM1				ECM2				
Year	-	1	2	3	4	5	6	7	8
	$	$	$	$	$	$	$	$	$
Base allowance	100	100	100	100	100	80	80	80	80
Actual	100	100	100	80	80	80	80	80	80
Under (over)	-	-	-	20	20	-	-	-	-
Outperformance	-	-	-	20	20	-	-	-	-
Performance gain	-	-	-	20					
Incremental gain	-	-	-	20					
ECM1 calc									
- year 0	-	-	-	-	-				
- year 1		-	-	-	-	-			
- year 2			-	-	-	-	-		
- year 3				20	20	20	20	-	
ECM benefit						20	20		
Total allowance		100	100	100	100	100	100	80	80
Total gain (loss)		-	-	20	20	20	20	-	-

Source: IPART analysis.

The third adjustment made is to ensure that any efficiency made in the final year of a determination period is only retained for one regulatory period, in present value terms. This is because we review efficiency savings made in the final year of a determination in the following period. For example, with a 4-year determination period, it is five years before we review this expenditure. Therefore, the utility would have retained these cost savings for five years.

Figure D.4 shows that we would calculate a 'year 0 adjustment' to ensure permanent savings made in the last year of a determination are only held for the length of the determination period, in this example for four (and not five) years.

In this example, a permanent efficiency saving of $20 is made in Year 0. Without an adjustment factor, the business would retain this saving for five years. The 'Year 0 adjustment' offsets the fifth year of benefit (received in year 4) with a corresponding negative adjustment to the allowance in the first year of the next regulatory period (ie, year 5). Note that we are inflating this adjustment term by the WACC[184] in order to ensure incentives are fully equalised in present value terms (because the WACC represents our view of the appropriate discount rate).

Figure D.4 ECM adjustment to ensure savings are held for no longer than determination

		Regulatory Period 1				Regulatory Period 2				
		ECM1			ECM2					
Year	-	1	2	3	4	5	6	7	8	
	$	$	$	$	$	$	$	$	$	
Base allowance	100	100	100	100	100	80	80	80	80	
Actual	80	80	80	80	80	80	80	80	80	
Under (over)	20	20	20	20	-	-	-	-	-	
Outperformance	20	20	20	20	-	-	-	-	-	
Performance gain	20	20	20	20						
Incremental gain	20	-	-	-						
ECM1 calc										
- year 0	20	20	20	20	20					
- year 1		-	-	-	-	-				
- year 2			-	-	-	-	-			
- year 3				-	-	-	-			
- year 0 adjustment						-21				
ECM benefit						-21	-	-	-	
Total allowance		100	100	100	100	59	80	80	80	
Total gain (loss)	20	20	20	20	20	-21	-	-	-	

Source: IPART analysis.

Retaining the saving for five years would be inconsistent with the purpose of the ECM of equalising incentives over time. The business may have an incentive to delay savings until the last year of a determination period in order to maximise returns.[185]

The adjustment term only applies to a permanent efficiency saving that is made in the final year of a regulatory period. Because the business receives this benefit for five years initially

184 If cash flows are assumed to occur at the end of each year, this should be the WACC used for regulatory period 2.

185 This incentive already exists under the current form of regulation.

(years 0, 1, 2, 3, and 4), the adjustment term inflates the fifth year of this benefit (received in year 4) by the WACC and returns it to customers in year 5.

E Essential Water's proposed cost pass-through events

Table E.1 below summarises Essential Water's proposed cost pass-through events and triggers.

Table E.1 Essential Water's proposed cost pass-through events

Pass-through event	Purpose	Summary of trigger criteria	Effect
A regulatory change event	To address revenue gained or lost through a change in the regulatory, legal or tax environment. Based on similar provisions in the AER regulatory framework.	During the regulatory period, a material increase or decrease in the cost of Essential Water providing a regulated service due to: ▼ a change in a regulation or requirement; or ▼ an administrative act or decision: – substantially varying the manner Essential Water is required to provide a regulated service – imposing, removing or varying minimum service standards applicable to regulated water or wastewater services – the nature or scope of regulated water or wastewater services provided by Essential Water; or ▼ an imposition or removal of a relevant tax or change in the rate of a tax, the way it is officially interpreted or how it is collected.	Essential Water would be able to pass on the costs of this change above a materiality threshold of 2.5% of the yearly revenue requirement or would be required to refund savings below a 2.5% threshold.
A drought relief event	To recover costs for government directed drought relief measures.	During the 2019-23 regulatory period, Essential Water is directed by government to ensure availability of water supply to customers in the Broken Hill region by: ▼ undertaking capital investment; and/or ▼ undertaking maintenance activities and the costs of this direction: ▼ causes Essential Water to incur costs beyond any drought relief allowances made by IPART in the determination; and ▼ these costs, net of any allowances, materially increase the cost of providing regulated services.	Essential Water would be able to pass on the costs of this change above a materiality threshold of 2.5% of the yearly revenue requirement or would be required to refund savings below a 2.5% threshold.

A Murray River to Broken Hill Pipeline event	To pass through unanticipated costs associated with the Murray River to Broken Hill Pipeline to customers.	During the 2019-23 regulatory period: ▼ the costs associated with the Pipeline as incurred by WaterNSW and passed through to Essential Water are materially higher than those allowed by IPART through this determination; ▼ the costs incurred by Essential Water to provide a safe and reliable water supply to the customers are materially higher than those provided for by IPART in the Essential Water determination. This includes, but is not limited to, the costs incurred by Essential Water related to the operation of the Pipeline; ▼ Essential Water is required by Government to undertake capital investment or operating activities to ensure availability of water supply to customers in the Broken Hill region as a result of major outages or design limitations associated with the Pipeline, or ▼ the costs beyond the allowances contained in the 2019-23 IPART determination (if any) materially increase the costs to Essential Water in providing regulated services.	Essential Water would be able to pass on the costs of this change above a materiality threshold of 2.5% of the yearly revenue requirement or would be required to refund savings below a 2.5% threshold.
A consequential works event	To pass through costs for Essential Water's proposed consequential works to customers if they are unable to secure alternative funding.	If Essential Water does not receive government funding for the consequential works; and ▼ in Essential Water's "reasonable assessment", the works are required to ensure the availability of water supply to customers and to maintain service standards in the Broken Hill region; ▼ Essential Water has attempted to and been unsuccessful in finding finance.	There is no materiality constraint in the wording of the criteria.

Source: Essential Water pricing proposal to IPART, July 2018, p 211-212.

F How we calculated the capital, tax and working capital allowances

This Appendix outlines how we calculated the capital allowance, and the tax and working capital allowances.

To calculate the capital allowance, we determined three key inputs:

- The value of Essential Water's regulatory asset base (RAB), in each year of the determination. This represents the economic value of the assets used to deliver the regulated services.
- The asset lives and depreciation method for Essential Water's RAB.
- The appropriate rate of return (eg, the WACC) on Essential Water's RAB.

After making our decisions on Essential Water's prudent historical and efficient forecast capital expenditure, and the appropriate economic lives for Essential Water's assets, we applied our standard approach to establish the RAB and depreciation allowances. We then applied our WACC method to establish the rate of return.

We then applied our 2018 working capital policy to set the working capital allowance, and then established a benchmark tax allowance.

The sections below provide an overview of our calculations.

F.1 Value of the regulatory asset base

The RAB represents the value of Essential Water's assets on which we consider it should earn a return on capital and an allowance for regulatory depreciation. In determining the value of the RAB over the 2019 determination period, we have calculated:

- The opening RAB at 1 July 2019, by rolling the RAB forward from 2013-14 to 2018-19, and
- The value of the RAB in each year of the 2019 determination period.

We have also identified separately the value of the consequential works.

Calculating the opening RAB

In calculating the opening RAB, we rolled forward the RAB over the 2014 determination period. This involved using the determined RAB as at 1 July 2013,[186] and making the following adjustments:

- adding prudent historical and efficient forecast capital expenditure (see Chapter 6)

[186] When we set the RAB at our 2014 Determination, the figures we used for 2013-14 were forecasts. Therefore, we need to adjust the 2013-14 figures for our actual figures including our decisions on capital expenditure for 2013-14.

- deducting cash capital contributions
- deducting the regulatory value of assets disposals
- deducting the regulatory depreciation we allowed at the 2014 Determination, and
- adding the annual indexation of the RAB.

This determines the opening RAB for the 2019 determination period. The calculation of the opening RAB is set out in Table F.1 below, and includes our decision on Essential Water's efficient consequential works for 2018-19. Our decisions regarding the treatment of cash contributions are discussed later in this appendix.

Table F.1 IPART's opening RAB calculation for Essential Water's 2019 Determination ($millions, $nominal)

	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Opening RAB	**89.4**	**94.6**	**100.3**	**105.7**	**110.4**	**114.1**
Plus: Actual prudent capex	4.1	6.3	14.4	5.7	3.8	21.3
Less: Cash capital contributions	0.0	0.0	7.9	0.6	0.0	0.0
Less: Asset disposals	0.0	0.0	0.0	0.0	0.0	0.0
Less: Allowed regulatory depreciation	1.6	2.1	2.2	2.3	2.5	2.5
Plus: Indexation	2.7	1.5	1.0	2.1	2.4	2.1
Closing RAB	**94.6**	**100.3**	**105.7**	**110.4**	**114.1**	**135.0**

Note: Columns may not sum due to rounding.

Our calculation results in a closing RAB value at 30 June 2019 that is similar to Essential Water's proposed closing RAB (Table F.2).

Table F.2 Comparison of IPART's and Essential Water's closing RAB at 30 June 2019 ($millions, $nominal)

	Essential Water	IPART	$ difference	% difference
Closing RAB value	**135.3**	**135.0**	**-0.3**	**-0.2%**

Source: Essential Water's pricing proposal to IPART, September 2018; IPART analysis

Calculating the RAB over the 2019 determination period

To calculate the RAB in each year of the 2019 determination period, we rolled forward the RAB to 2021-22 by:

- adding $53.0 million of efficient forecast capital expenditure over the period (see Chapter 6), and
- deducting $9.2 million for regulatory depreciation.

This gives the forecast RAB for each year of the 2019 determination period, which we have used to generate the allowances for the return on capital and regulatory depreciation in the notional revenue requirement.

The RAB roll-forward over the 2019 determination period is shown in Table F.3 below. With the exception of efficient forecast capital expenditure (see Chapter 6), we discuss our decisions on the various RAB adjustments in further detail in the sections below.

Table F.3 IPART's RAB for Essential Water's 2019 Determination ($millions, $2018-19)

	2019-20	2020-21	2021-22
Opening RAB	**135.0**	**158.8**	**167.9**
Plus: Forecast efficient capex	26.6	12.2	14.2
Less: Cash capital contributions	0.0	0.0	0.0
Less: Asset disposals	0.0	0.0	0.0
Less: Allowed regulatory depreciation	2.8	3.1	3.3
Plus: Indexation	0.0	0.0	0.0
Closing RAB	**158.8**	**167.9**	**178.8**

Note: Columns may not sum due to rounding.

Our calculation of the RAB for the 2019 determination period results in the RAB being slightly lower than Essential Water's proposal. Our decision to include the consequential works for the Pipeline has been largely offset by our decisions to reduce its proposed direct capital expenditure (see Chapter 6).

Table F.4 IPART's decision and Essential Water's proposed closing RAB for the 2019 Determination ($millions, $2018-19)

	2019-20	2020-21	2021-22
Essential Water proposed	147.6	165.6	180.4
IPART decision	158.8	167.9	178.8
Difference	11.2	2.3	-1.6

Note: Columns may not sum due to rounding.

Source: Essential Water pricing proposal to IPART, July 2018, p73; IPART analysis.

Our final decisions on Essential Water's RAB roll forward values are slightly lower than the draft values, reflecting that our updated inflation forecasts are lower than at the time of our Draft Report.

F.2 Cash capital contributions

Cash capital contributions that a utility receives from third parties towards its capital expenditure, such as government grants, are netted off capital expenditure (ie, they do not enter the RAB). This ensures that customers do not pay a return on assets or regulatory depreciation for capital expenditure that the utility has not funded.

With the exception of Government funding for emergency drought works in 2015-16, historical cash contributions have been relatively small (Table F.5).

Table F.5 IPART's decision and Essential Water's proposed historical cash contributions ($millions, $2018-19)

	2013-15	2014-15	2015-16	2016-17	2017-18	2018-19
Essential Water proposed	0.02	0.004	11.30	0.93	0.00	0.03
IPART decision	0.02	0.004	11.30	0.93	0.00	0.03

Note: The table presents the total cash contributions for water and sewerage.

Source: Essential Water Annual Information Return, September 2018.

Essential Water has forecast cash capital contributions of zero in all years over the next determination period. However, the NSW Government has not confirmed funding decisions for consequential works, which could take the form of cash capital contributions – that is, total capital costs for consequential works could be offset by grants and capital contributions from the NSW Government. Therefore, given the uncertainty around the exact form of funding from the NSW Government, we have decided to accept Essential Water's proposal of forecast cash capital contributions of zero.

We have not included any cash contributions from the NSW Government for the Pipeline in Essential Water's RAB. This is because any cash contribution would be used to directly offset any operating costs that Essential Water would pay to WaterNSW for the provision of bulk water – the cash contribution provided by the NSW Government would not be for any capital expenditures for Essential Water.

F.3 Adjustments for asset disposals

Disposals can include asset sales, write-offs and write-downs. The value of any regulatory assets Essential Water disposes of during the 2014 determination period and proposes to dispose of during the 2019 determination period are deducted from the RAB. This ensures customers are not charged a return on assets or regulatory depreciation for assets that are no longer used to provide regulated services.

Essential Water submitted that it had no asset disposals over the 2014 determination period. Further, it forecasts that it will have no asset disposals over its upcoming determination period. Based on its historical information, we have accepted its proposal as being reasonable. However, we will further examine this issue at its next price review and whether any write-offs or write-downs are appropriate for the 2019 determination period, in light of its capital program over the 2019-22 period.

F.4 Regulatory depreciation

An allowance for regulatory depreciation is included in the revenue requirement (and used in calculating the value of the RAB, as discussed above). This is intended to ensure that the capital invested in the regulatory assets is returned over the useful life of each asset.

To calculate this allowance, we determine the appropriate lives for the assets in Essential Water's RAB, and the appropriate depreciation method to use.

Essential Water used a straight-line depreciation method to calculate its proposed revenue requirement. This is the same approach we used in previous reviews and for this Draft Determination, we have decided to continue with it as we consider it is preferable to other methods in terms of simplicity, consistency and transparency.

Our allowance for the return of capital (regulatory depreciation) is slightly lower than Essential Water's proposed allowance (Table F.6). This is mainly due to our decisions on corporate costs related to capital expenditure (see Chapter 4 and Chapter 6). That is, our decisions to:

- Not re-allocate capitalised corporate overheads over the 2014 determination period to the newly created corporate RAB, and
- Not depreciate all corporate overheads over Essential Water's proposal of 25 years.

We decided that corporate overheads capitalised to water and sewerage capital expenditure would remain assigned to those water and sewerage capital expenditures and be depreciated over the relevant water and sewerage economic lives - which is a longer timeframe compared with Essential Water's proposed 25 years.[187] As such, our decisions result in slightly lower depreciation allowances compared to Essential Water's proposal.

Table F.6 IPART's decision and Essential Water's proposed return of assets ($millions, $2018-19)

	2019-20	2020-21	2021-22	Total
Essential Water proposed	3.0	3.3	3.7	10.0
IPART decision	2.7	3.0	3.2	9.0
Difference	-0.3	-0.3	-0.4	-1.0

Note: Columns may not sum due to rounding.

Source: Essential Water pricing proposal to IPART, July 2018; IPART analysis.

F.5 Return on capital

We include an allowance for a return on assets in the revenue requirement. This represents our assessment of the opportunity cost of the capital invested to provide the regulated services. Our approach ensures that the business can continue to make efficient capital investments in the future.

To calculate this allowance, we multiply the value of the RAB in each year of the determination period by an appropriate rate of return. As for previous reviews, we have determined the rate of return using an estimate of the Weighted Average Cost of Capital (WACC).

We applied our 2018 WACC method, which was developed in consultation with stakeholders.[188] This results in a WACC of 4.0%, which is lower than our draft decision of

187 The relevant economic lives of water and sewerage assets are 98 years and 89 years, respectively.

188 We completed a review of our WACC methodology in 2018 (IPART, *Review of our WACC method – Final Report*, February 2018).

4.2%. This is mainly due to a reduction in the risk free rate and debt margin since January 2019.

The WACC is based on market data (risk free rate, debt margin and inflation) sampled to 31 March 2019. Our decisions on parameters are shown in Table F.7.

Table F.7 shows that we have adopted an equity beta of 0.7, which is our current water industry beta.

Table F.7 IPART's WACC (sampled to 31 March 2019)

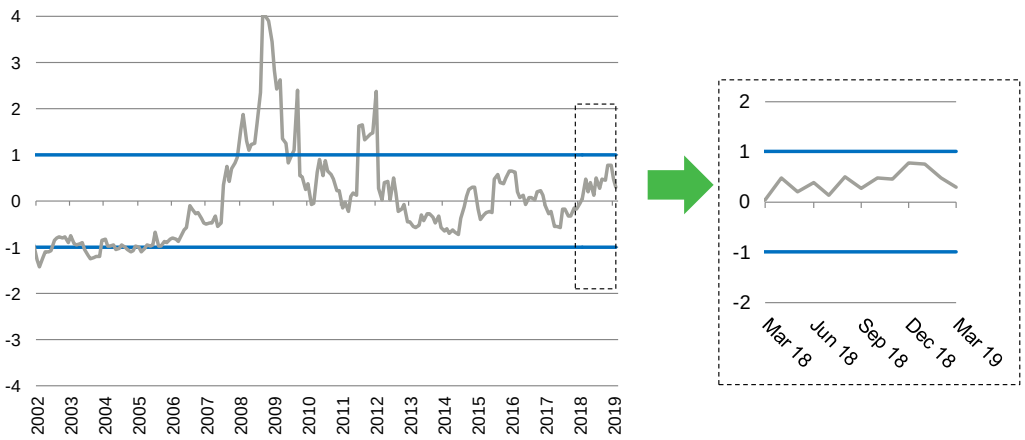
	Current market data	Long term averages	WACC range		
			Low	Mid	High
Nominal risk free rate	2.0%	3.6%			
Inflation	2.3%	2.3%			
Implied Debt margin	2.3%	2.6%			
Market risk premium	8.7%	6.0%			
Debt funding	60%	60%			
Equity funding	40%	40%			
Gamma	0.25	0.25			
Corporate tax rate	30%	30%			
Equity beta	0.70	0.70			
Cost of equity (nominal post-tax)	8.1%	7.8%			
Cost of equity (real-post tax)	5.7%	5.4%			
Cost of debt (nominal pre-tax)	4.4%	6.2%			
Cost of debt (real pre-tax)	2.1%	3.8%			
Nominal Vanilla post-tax WACC	5.9 %	6.8%	5.9%	6.4%	6.8%
Pre-tax real WACC	4.4%	5.3%	4.4%	4.9%	5.3%
Post-tax real WACC	3.5%	4.4%	3.5%	**4.0%**	4.4%

Source: Bloomberg, RBA and IPART calculations.

As our measure of market uncertainty is currently within one standard deviation of the long term average (Figure F.1), we have selected the midpoint WACC value. This is consistent with our decision rule for selecting a point within our range of WACC values.[189]

189 IPART, *Review of our WACC method – Final Report,* February 2018, p 67.

Figure F.1 IPART financial market uncertainty index



Source: Thomson Reuters, Bloomberg and IPART calculations.

Essential Water proposed a declining WACC of 4.5% to 4.1%.[190]

F.6 Return on assets

We multiply the RAB by the WACC to establish the return on assets. Our decisions have resulted in a slightly lower return on assets compared with Essential Water's proposal (Table F.8). This is because of our lower WACC and lower overall RAB values compared to Essential Water's proposal, as discussed above.

Table F.8 IPART's decision and Essential Water's proposed return on assets ($millions, $2018-19)

	2019-20	2020-21	2021-22	Total
Essential Water proposed	6.3	6.5	7.0	19.8
IPART decision	5.8	6.5	6.9	19.1
Difference	-0.5	0.0	-0.2	-0.7

Note: Columns may not sum due to rounding.

Source: Essential Water pricing proposal to IPART, July 2018; IPART analysis.

Our final decision on Essential Water's return on assets is slightly lower than our Draft Report decision due to our lower WACC and inflation values.

F.7 Allowance for tax and working capital

As discussed in Chapter 4, we include an explicit allowance for tax, because we use a post-tax WACC to estimate the allowance for a return on assets in the revenue requirement. This allowance reflects the regulated business's forecast tax liabilities. Our building block also includes a working capital allowance.

190 Essential Water pricing proposal to IPART, July 2018, p 165.

The tax allowance

We calculate the tax allowance for each year by applying the relevant tax rate, adjusted for the value of imputation credits (the 'gamma'), to the business's (nominal) taxable income. For this purpose, taxable income is the notional revenue requirement (excluding tax allowance) less operating cost allowances, tax depreciation, and interest expenses. As part of calculating the appropriate tax allowance, the business is required to provide forecast tax depreciation for the determination period. Other items such as interest expenses are based on the parameters used for the WACC, and the value of the RAB.[191]

The tax allowance is one of the last building block items we calculate, due to its dependence on other items such as operating cost allowances and WACC parameters.

To establish the tax allowance, we:

- Adopted a 30% tax rate.
- Accepted Essential Water's tax depreciation forecasts.
- Accepted Essential Water's forecast non-cash contributions.

Our tax allowance is shown in Table F.9.

Adopting a corporate statutory tax rate of 30%

In March 2017, the Australian Government enacted legislation that introduced different rates of corporate income tax for businesses of different sizes. Under the legislation, from 1 July 2018, businesses with an aggregated turnover of less than $50 million (base rate entities) pay 27.5% tax, while those with a higher turnover pay 30% tax on all their taxable income. From 2024-25, base rate entities will pay 27.0% tax, and this rate will reduce to 26.0% in the following year and 25.0% in 2026-27.[192]

For our decision we used a tax rate of 30%. This is because the revenue requirement (in nominal terms) inclusive of NSW Government contributions, exceeds the $50 million threshold. Thus, the reduced corporate income tax rates for small businesses have not been applied in this review.[193]

Accepting Essential Water's forecast of zero non-cash capital contributions

Non-cash capital contributions (also known as Assets Free of Charge, or 'AFOC') are assets that utilities receive for free. Non-cash capital contributions do not affect the RAB, and utilities do not earn a return on or of those assets. Utilities, however, are required to pay tax equivalents on the value of non-cash capital contributions. As such, we need to include forecast AFOC as revenue in the calculation of the regulatory tax allowance building block.

Essential Water has had zero non-cash capital contributions in all historical years, and have also forecast zero contributions. For the other metropolitan water utilities we regulate, AFOC

191 The nominal cost of debt is the sum of the nominal risk free rate and nominal debt margin.
192 The thresholds are not indexed for inflation.
193 We also conducted sensitivity testing using small business tax rates, which still resulted in revenue (in nominal terms) from tariffs being higher than the $50 million threshold over the 2019 determination period.

are typically gifted to the utilities from developers as a result of new development.[194] Given Essential Water's operating environment in Broken Hill we consider it unlikely that new development would occur in the short-term, and so we have accepted Essential Water's proposal.

Table F.9 IPART's decision and Essential Water's proposed tax allowance ($millions, $2018-19)

	2019-20	2020-21	2021-22	Total
Essential Water proposed	0.2	0.2	0.6	1.1
IPART decision	0.1	0.2	0.7	1.0
Difference	-0.1	-0.1	0.1	-0.1

Note: Columns may not sum due to rounding.

Source: Essential Water's pricing proposal to IPART, September 2018; IPART analysis.

The working capital allowance

IPART finalised its updated working capital policy in September 2018. Consequently, we have implemented the final policy in this decision, using updated data provided by Essential Water during our review of its September 2018 pricing proposal. Table F.10 shows our decision on working capital allowance for the 2019 Determination period.

Table F.10 IPART's decision and Essential Water's proposed working capital allowance ($millions, $2018-19)

	2019-20	2020-21	2021-22	Total
Essential Water proposed	0.02	0.00	0.02	0.04
IPART decision	0.17	0.25	0.25	0.67
Difference	0.15	0.25	0.23	0.63

Note: Columns may not sum due to rounding.

Source: Essential Water's pricing proposal to IPART, September 2018; IPART analysis.

Our higher allowance for working capital is largely due to the following factors:

- Our updated working capital method[195] has increased the working capital allowance.
- Our decisions on the levels of operating and capital expenditure. The inclusion of bulk water transportation costs and consequential works capital expenditure have resulted in an increase in the working capital allowance.

194 For example, developers are typically required to install reticulation to service new development and then gift these assets to the water utilities at no charge.

195 IPART, Working Capital Allowance Policy Paper, November 2018.

G Marginal cost of water supply and sewerage

In this review, we set the water and sewerage usage price with reference to estimates of marginal cost. The marginal cost of water (or sewerage) represents the additional cost to Essential Water of providing an additional unit of water to customers (or treating an additional unit of sewerage for customers).

Adopting a two-part tariff structure, where usage charges are set to reflect the marginal cost of supply, with fixed charges then set to recover the remaining efficient costs that are not received from usage charges, is generally accepted as an efficient approach to setting water prices.

G.1 Short run marginal cost or long run marginal cost?

The difference between short run marginal cost (SRMC) and long run marginal cost (LRMC) is the time frame under consideration. SRMC takes capacity as given, and so relates only to changes in costs to deliver an additional unit of water to customers **given existing capacity**. LRMC relaxes this capacity constraint because in the long run all factors of production are variable, including capital costs. Hence, LRMC also reflects the opportunity cost of consuming water, to the extent that it brings forward the need to increase capacity.

Essential Water has proposed to use LRMC as the basis for setting water usage prices. It submitted that including the cost of increasing physical capacity is an important price-setting signal even if augmentation is unlikely.

Our view is that where there is likely to be a supply capacity constraint in the foreseeable future, and therefore a potential need to invest in water supply augmentation and/or demand management measures, water usage prices should be set with reference to the LRMC. This signals the incremental cost of new supply augmentation and/or demand management measures to bring the demand and supply of water into balance over the longer term.

For the other metropolitan water utilities that we regulate, our practice has been to set usage prices with reference to LRMC. These utilities service growing populations and would face the prospect of capacity constraints, and therefore the need for supply augmentation in the foreseeable future.

However, we consider that it is unlikely that supply augmentation would be needed in Broken Hill in the foreseeable future. This is because Broken Hill's population and water consumption is declining (see Chapter 7 for more details). Furthermore, the Pipeline will provide up to 37.4 ML of bulk water per day, which is roughly 140% of Broken Hill's peak water demand.[196]

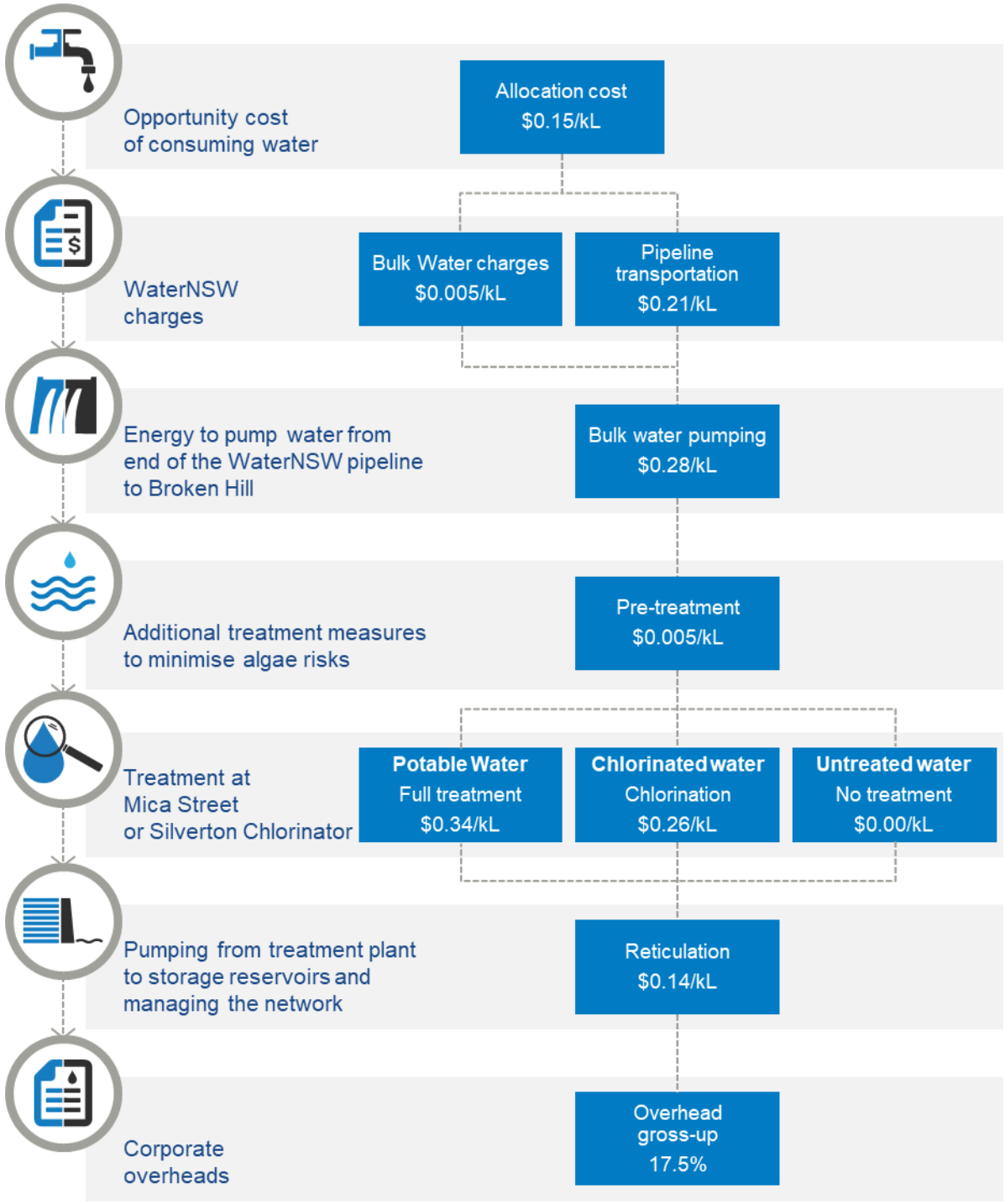
For this reason, we consider that Essential Water's SRMC of water supply effectively converges with its LRMC. That is, the water usage price should be set with reference to the SRMC, or simply the marginal cost of supply.

196 Essential Water annual information return to IPART, July 2018.

G.2 Essential Water's short-run marginal cost of water supply

We have estimated Essential Water's SRMC of supplying water by adding all the different costs incurred by Essential Water to supply one unit of water from 'catchment-to-tap' (Figure G.1). Below we outline how we have estimated each cost component.

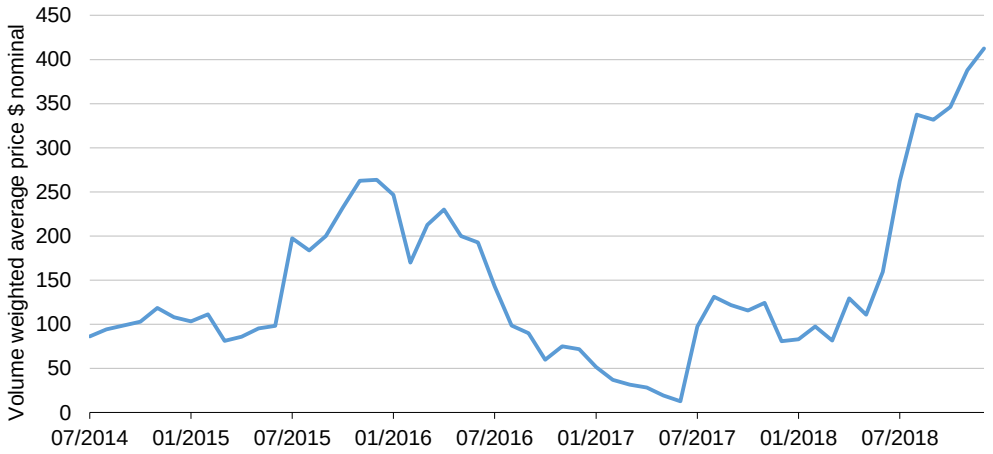
Figure G.1 Marginal cost of supplying water along the water supply network



The opportunity cost of consuming water (bulk water scarcity)

This is the opportunity cost of consuming water from the Murray River. We estimated a price of $0.15 per kL based on the value of allocation trades in the NSW Murray River, using data from the Bureau of Meteorology. We used a simple average of monthly volume weighted trading prices over 1 July 2014 to 31 December 2018 (as this was the date the current Basin Plan water trading rules came into place), using only trades with non-zero prices (see Figure G.2).

Figure G.2 NSW Murray River allocation prices ($/ML)



Source: Bureau of Meteorology

WaterNSW's bulk water charges

As a licenced holder of water entitlements, Essential Water is required to contribute to river management costs. WaterNSW receives these charges on behalf of a number of organisations. These costs are separate from WaterNSW's Pipeline transportation costs. Bulk water costs are directly observable, as they are the variable component of the Murray River entitlement charges we set in our 2017 determination.

This cost is small, and adds less than $0.01 per kL to the SRMC estimate.

WaterNSW's bulk water pumping costs

This is WaterNSW's cost of pumping water to the bulk water storage facility. This is directly observable, as it is the variable component of the Pipeline price set by IPART in the concurrent WaterNSW review.

We estimate that the efficient marginal cost of pumping water through the Pipeline is $0.21 per kL.

Essential Water's bulk water pumping costs

Essential Water incurs costs pumping water from the bulk water storage facility to its Mica Street treatment plant. We calculated the cost of pumping an additional kL of water using:

- The electricity prices from the Frontier Economics electricity price report for the Pipeline review, and
- The volume of energy required to pump this additional kL of water based on standard mathematical relationships.[197]

We estimate that this adds $0.28 per kL to the marginal cost.

Water treatment costs

These costs include pre-treatment costs, treatment costs, and post-treatment costs.

Pre-treatment costs will be incurred by Essential Water to address the risk of algal blooms, which we estimated using data provided by Essential Water. These costs add less than $0.01/kL to our estimate.

Treatment costs include:

- Electricity costs at the Mica Street treatment plant - we used data provided by Essential Water and the Frontier Economics electricity prices to estimate these costs.
- Chemicals costs - chemical costs for treated and chlorinated water were provided by Essential Water.
- Chlorination - customers in Silverton receive chlorinated water. For these customers we estimated chlorination costs using data provided by Essential Water.

Treatment costs add between $0.26 per kL to $0.34 per kL depending on whether treated or chlorinated water is supplied.

Post-treatment costs include reticulation and storage costs, of $0.14 per kL. Costs are incurred at the margin in pumping water throughout the water network. We have used information provided by Essential Water and Frontier Economics electricity prices to estimate these costs.

Corporate overheads

We included a provision for corporate overhead costs on all marginal cost components of 17.5%. This is because a corporate overhead is applied to every dollar of operating and capital expenditure (see Chapter 4 for our decision on corporate costs).

We excluded some cost components from our estimate

We excluded the following two cost components from our SRMC estimate:

- **Labour.** This is because we assumed all labour costs in the system do not vary with usage. For example, we have assumed that the labour costs involved in routine inspections and maintenance are not driven by usage, at the margin.

[197] For further information, see AECOM, *The Mathematics of Pumping Water*, available at: https://www.raeng.org.uk/publications/other/17-pumping-water

- **Maintenance costs.** We have not included maintenance renewals in our SRMC estimate because we did not have sufficient information to determine how much of Essential Water's capital expenditure spend should be attributed to marginal usage. If we assume 100% of maintenance renewals is marginal, this would add around $0.62 per kL to the SRMC for treated water (ie, an SRMC estimate of $1.93 per kL).

Table G.1 summarises our SRMC estimate for water, including key components.

Table G.1 SRMC estimates for water ($ per kL, $2018-19)

Cost component	$2018-19
Opportunity cost of consuming bulk water	0.15
WaterNSW bulk water extraction costs	0.005
WaterNSW bulk water transportation costs	0.21
Bulk water transportation costs incurred by Essential Water	0.28
Pre-treatment measures	0.005
Treatment costs – potable water	0.34
Treatment costs – chlorinated water	0.26
Treatment costs – untreated water	0.00
Reticulation and storage	0.14
Corporate overheads[a]	0.13-0.20
Total SRMC estimate	
Treated water	**1.31**
Chlorinated water	**1.22**
Untreated water	**0.92**

a The corporate overheads vary for treated, chlorinated and untreated water, because the corporate overhead is included as a gross-up on direct costs.

Source: Correspondence with Essential Water, June 2018; and IPART analysis.

We note that the accuracy of our SRMC estimate is affected by the following factors:

- We are unable to quantify how much of Essential Water's asset renewals are attributable to marginal usage. Including renewals capital expenditure, the marginal cost for treated water could be as high as $1.93 per kL. However, we chose to exclude these costs given this uncertainty.
- Essential Water's customer demand is highly variable based upon rainfall and the introduction of the Pipeline creates additional uncertainty. We have assumed that the marginal unit of water would be consumed from the Pipeline. We consider this to be a sound approach, because the past 20 years of data showed that in about 9 out of 10 years, some water was pumped from the Menindee pipeline.
- The opportunity cost of consuming from the Murray River is closely correlated to rainfall, and is therefore quite volatile over time. We have taken a simple average of monthly prices over the period July 2014 to December 2018.
- We have accounted for the fact that the marginal cost of pumping water scales non-linearly with increasing demand.

Overall, our final SRMC estimates are slightly higher than compared to the estimates in the Draft Report. This reflects that our final decisions on the energy costs of pumping water through the Pipeline are slightly higher than our draft decisions. For more information, see the concurrent review of WaterNSW's prices for the Murray River to Broken Hill Pipeline.

G.3 Essential Water's short-run marginal cost of sewerage treatment

Essential Water did not provide an estimate of the marginal cost of sewerage treatment. It has proposed to increase the current sewerage usage charge of $1.28 per kL (paid by non-residential customers only) by the average change in prices in each year of the regulatory period (4.2% per year in real terms).

We have estimated the SRMC for supplying sewerage by:

1. Determining the total sewerage volume forecast to be treated at all treatment plants.
2. Calculating average total variable costs as the historical sewerage treatment costs. These are the costs of: electricity, storage and reticulation, pumping costs, and corporate overheads.
3. Calculating SRMC as total variable costs divided by the total volume of sewerage treated.

We have estimated the SRMC for supplying sewerage at $0.22 per kL, using a 5-year average of Essential Water's sewerage operating costs (Table G.2). We did not consider that a more rigorous estimation was warranted given most cost components involved in sewerage such as pumping, treatment and discharge are predominately marginal. The costs we considered were:

- **Electricity** - this includes the costs of pumping stations and treatment plants.
- **Hire services** - this includes equipment and contractors.
- **Materials** - this includes chemicals and mechanical/electrical consumables.
- **Corporate overheads** - we have assumed a corporate overhead gross up of 17.0% on operating costs (same as for our SRMC estimate for water supply).

We have excluded the following costs from our SRMC estimate:

- **Labour** - we assumed that all labour costs in the system are not marginal, and are excluded from the calculation. This is consistent with our approach for the water SRMC estimate.
- **Fleet** - we also excluded fleet costs in our estimate because we did not have disaggregated information to separate marginal costs from fixed costs. It is likely that some portion of fleet costs are marginal, eg, fuel costs.
- **Maintenance costs** - we have excluded maintenance renewals in our SRMC estimate because we did not have sufficient information to determine how much of Essential Water's capital expenditure spend should be attributed to marginal usage. If we assume 100% of maintenance renewals is marginal, then up to $0.73/kL could be added to the SRMC for sewerage.

Table G.2 SRMC estimate for supplying sewerage services ($/kL, $2018-19)

Cost component	$2018-19
Electricity	0.06
Hire services	0.07
Materials	0.05
Corporate overheads	0.03
Total SRMC estimate	**0.22**

Source: Essential Water Annual Information Return, September 2018; additional information provided by Essential Water, October 2018; IPART analysis.

We note that our analysis is limited by the following factors:

- Essential Water's sewerage volumes are not metered and we have estimated these volumes from assumed discharge factors,[198] which may not reflect actual usage patterns.
- We do not have sufficient information on what the major cost drivers are within each cost component, such as the relative contribution of chemical costs to material costs.

For each cost component we have assumed that the average unit cost equals the marginal cost, because we did not have sufficient information on actual marginal costs.

198 We have assumed a discharge factor of 70% for residential customers and 82% for non-residential customers, which are averages used by Essential Water.

H Output measures

This appendix presents Essential Water's proposed output measures for the 2019 determination period.

In its pricing submission, Essential Water proposed maintaining its existing customer service level targets. These targets are presented in Table H.1 and Table H.2 below.

Table H.1 Water output measures

Target	Criteria
Availability of Water Supply	Minimum pressure 15m head of water in reticulation system, conveying 6 litres per minute per residential connection under normal conditions
	Water restrictions should not be applied more than 5% of the time
	3,000L/tenement/per day for residential potable water (4 month peak season)
	Planned works: residential customers 2 days written notice, non-residential 7 days written notice
	Water will be available from reticulation fire hydrants for fire-fighting at minimum flow rates determined by guidelines
Water quality	Potable water supply should meet Australian Drinking Water Guidelines
	Non-potable water supply should meet public health standards with respect to bacteria, contaminants and pathogens, consistent with its use
	Recycled water supply should meet Australian Guidelines for Water Recycling; Managing Health and Environmental Risks 2006
Response times	Priority 1 - defined as failure to maintain continuity or quality of supply to a large number of customers or to a critical use at a critical time. Response time: 30 minutes (business hours); 1 hour (after hours)
	Priority 2 - defined as failure to maintain continuity or quality of supply to a small number of customers or to a critical user at a non-critical time. Response time: 1 hour (business hours); 2 hours (after hours)
	Priority 3 - defined as failure to maintain continuity or quality of supply to a single customer. Response time: 1 working day
	Priority 4 - defined as a minor problem or complaint which can be dealt with at a time convenient to the customer and the water authority. Response time: Within 2 weeks
Customer complaints	Customer complaints other than supply failure: - Respond to 95% of written complaints or inquiries within 4 working days of receipt. - Respond to 95% of personal complaints or inquiries within 4 working days.

Source: Essential Water, Strategic Plan (confidential), May 2018.

Table H.2 Sewerage output measures

Target	Criteria
Availability of Sewerage Service	Connections for domestic sewage should be provided to all houses, units or businesses within the defined service area of Broken Hill. There are no plans at present for sewerage services to other locations.
	Acceptance of commercial and industrial waste (trade waste) should be in accordance with the approval conditions for each discharger.
Average system failures	Controlled, expected (overflow structure) - related to rainfall and design: Not more than 2 times in 1 year on average.
	Controlled, unexpected (flow relief structure): Not more than once in 5 years.
	Uncontrolled, unexpected: Private Property: not more than 50 per 1000 properties per year. Public Property - sensitive areas: not more than once per 3 years. Public Property - elsewhere: not more than once per 10 km of main per year.
Response times	Priority 1 - defined as 'major failure to contain sewage within the sewer system or any problem affecting a critical user at a critical time'. Response time: 30 minutes (working hours); 1 hours (after hours)
	Priority 2 - defined as 'minor failure to contain sewage within the sewer system or any problem affecting a critical user at a non-critical time'. Response time: 1 hour (working hours); 2 hours (after hours)
	Priority 3 - defined as 'minor failure to contain sewage affecting a single property or as bad odours'. Response time: next working day
Customer complaints	Respond to 95% of written complaints or inquiries within 4 working days of receipt. Respond to 95% of personal complaints or inquiries within 4 working days
Odours/Vectors	Not more than 2 incidents per year that results in complaints.
Impact of Sewerage Treatment Plants	The maximum level of noise should not be more than 5 dB above the background noise level.
	Odour should not be detectable outside the utility's buffer zone around the treatment works.
Effluent Discharge/Bio-solids Management	The minimum performance standards for effluent discharge and bio-solids management are set by statutory requirements and regulations through licensing.

Source: Essential Water, Strategic Plan (confidential), May 2018.

I Decisions on trade waste charges

Table I.1, Table I.2 and Table I.3 show our decisions on trade waste charges. In 2019-20 and each subsequent year of the determination period, these charges will increase each year in line with inflation.

Table I.1 IPART's decisions on fixed trade waste charges ($2019-20)

Description of charge	1 July 2019 to 30 June 2020
Annual Trade Waste fee for Category 1 Trade Waste Discharge	97.25
Annual Trade Waste fee for Category 1a Trade Waste Discharge	97.25
Annual Trade Waste fee for Category 2 Trade Waste Discharge	195.51
Annual Trade Waste fee for Category 3 Trade Waste Discharge	654.40
Annual Trade Waste fee per operating mine	1,629.92
Trade Waste discharge application fee	240.08
Trade Waste re-inspection fee	89.14
Food waste disposal charge (applicable to Category 2 dischargers only)	30.39/bed

Note: Prices should be adjusted annually by CPI.

Table I.2 IPART's decisions on variable trade waste charges ($/kL, $2019-20)

Description of charge	1 July 2019 to 30 June 2020	1 July 2020 to 30 June 2021	1 July 2021 to 30 June 2022
Trade Waste usage charge for Categories 1, 1a and 2 Trade Waste discharge	0.18	0.37 x CPI1	0.55 x CPI2
Non-compliant Trade Waste usage charge for Category 1a Trade Waste Discharge	0.21	0.42 x CPI1	0.62 x CPI2
Non-compliant Trade Waste usage charge for Category 2 Trade Waste Discharge	1.91	3.81 x CPI1	5.72 x CPI2
Non-compliant excess mass charge for Category 3 Trade Waste Discharge	As per Essential Water policy for Discharge of Liquid Trade Waste		
Charge for exceeding approved pH range for Category 3 Trade Waste Discharge	As per Essential Water policy for Discharge of Liquid Trade Waste		
Charge for exceeding approved BOD range for Category 3 Trade Waste Discharge	As per Essential Water policy for Discharge of Liquid Trade Waste		

Table I.3 Excess Mass Charge ($/kg, $2019-20)

Charge	1 July 2019 to 30 June 2020	1 July 2020 to 30 June 2021	1 July 2021 to 30 June 2022
Acid demand, pH>10	0.09	0.19 x CPI1	0.28 x CPI2
Alkali demand, pH<7	0.09	0.19 x CPI1	0.28 x CPI2
Aluminium	0.09	0.19 x CPI1	0.28 x CPI2
Ammonia (as Nitrogen)	0.28	0.57 x CPI1	0.85 x CPI2
Arsenic	9.38	18.76 x CPI1	28.14 x CPI2
Barium	4.62	9.24 x CPI1	13.85 x CPI2
Biochemical Oxygen Demand (BOD)	0.09	0.19 x CPI1	0.28 x CPI2
Boron	0.09	0.19 x CPI1	0.28 x CPI2
Bromine	1.87	3.73 x CPI1	5.60 x CPI2
Cadmium	43.29	86.59 x CPI1	129.88 x CPI2
Chloride	Nil	Nil	Nil
Chlorinated hydrocarbons	4.62	9.24 x CPI1	13.85 x CPI2
Chlorinated phenolic compounds	187.03	374.05 x CPI1	561.08 x CPI2
Chlorine	0.20	0.39 x CPI1	0.59 x CPI2
Chromium	3.14	6.27 x CPI1	9.41 x CPI2
Cobalt	1.94	3.89 x CPI1	5.83 x CPI2
Copper	1.94	3.89 x CPI1	5.83 x CPI2
Cyanide	9.38	18.76 x CPI1	28.14 x CPI2
Fluoride	0.46	0.92 x CPI1	1.39 x CPI2
Formaldehyde	0.20	0.39 x CPI1	0.59 x CPI2
Grease and Oil (total)	0.17	0.33 x CPI1	0.50 x CPI2
Herbicides/defoliants	93.51	187.02 x CPI1	280.54 x CPI2
Iron	0.20	0.39 x CPI1	0.59 x CPI2
Lead	4.62	9.24 x CPI1	13.85 x CPI2
Lithium	0.94	1.88 x CPI1	2.81 x CPI2
Manganese	0.94	1.88 x CPI1	2.81 x CPI2
Mercaptans	9.38	18.76 x CPI1	28.14 x CPI2
Mercury	311.71	623.42 x CPI1	935.13 x CPI2
Methylene blue active substances (MBAS)	0.09	0.19 x CPI1	0.28 x CPI2
Molybdenum	0.09	0.19 x CPI1	0.28 x CPI2
Nickel	3.14	6.27 x CPI1	9.41 x CPI2
Nitrogen (Total Kjedahl Nitrogen)	0.02	0.05 x CPI1	0.07 x CPI2
Organoarsenic compounds	93.51	187.02 x CPI1	280.54 x CPI2
Pesticides general (excludes organochlorines and organophosphates)	93.51	187.02 x CPI1	280.54 x CPI2
Petroleum hydrocarbons (non-flammable)	0.31	0.63 x CPI1	0.94 x CPI2
Phenolic compounds (non-chlorinated)	0.94	1.88 x CPI1	2.81 x CPI2
Phosphorus (Total)	0.20	0.39 x CPI1	0.59 x CPI2

Charge	1 July 2019 to 30 June 2020	1 July 2020 to 30 June 2021	1 July 2021 to 30 June 2022
Polynuclear aromatic hydrocarbons (PAH)	1.94	3.89 x CPI1	5.83 x CPI2
Selenium	6.57	13.14 x CPI1	19.71 x CPI2
Silver	0.15	0.30 x CPI1	0.45 x CPI2
Sulphate	0.02	0.04 x CPI1	0.05 x CPI2
Sulphide	0.20	0.39 x CPI1	0.59 x CPI2
Sulphite	0.21	0.42 x CPI1	0.63 x CPI2
Suspended Solids (SS)	0.12	0.24 x CPI1	0.36 x CPI2
Thiosulphate	0.03	0.06 x CPI1	0.10 x CPI2
Tin	0.94	1.88 x CPI1	2.81 x CPI2
Total Dissolved Solids (TDS)	0.01	0.01 x CPI1	0.02 x CPI2
Uranium	0.94	1.88 x CPI1	2.81 x CPI2
Zinc	1.91	3.82 x CPI1	5.73 x CPI2

J Decisions on miscellaneous charges

Table J.1 shows our decisions on miscellaneous charges. In 2019-20 and each subsequent year of the determination period, these charges will remain unchanged in real terms. That is, they will increase each year in line with inflation.

Table J.1 IPART's decisions on miscellaneous charges ($2019-20)

Ancillary and miscellaneous customer services	$2019-20
1. Conveyancing Certificate	
Statement of outstanding charges	
a) Full certificate with meter read	74.81
b) Updated meter read request (special meter read)	56.07
c) Full certificate with history search	131.69
d) Urgent full certificate with meter read (within 48 hours)	129.66
2. Meter Test	77.75
Refunded if meter is ± 3%	
3. Drainage Diagram	21.93
4. Plumbing Inspection	36.27
5. Plumbers application	38.75
6. Site inspection for water and sewerage	124.60
7. Statement of available water pressure	180.31
8. Building plan approval – extension	35.00
9. Building plan approval – new connection	52.88
10. Fire Service application	92.49
11. Relocation/increase in size of water service (tapping fee)	89.55
12. Backflow prevention device testing and certification (per hour plus materials)	74.96
13. Install Water Service	
a) 20mm Service up to 3 metres	767.85
b) 20mm Service over 3 metres and less than 30 metres	1,981.43
c) All others	By quote
14. Alter existing water service	
a) Actual Cost	By quote
b) Relocate existing service	By quote
15. Downgrade Meter Size	
a) 25mm to 20mm	98.72
b) All others	By quote
16. Repair damaged water service	
a) First repair within 5 year period	Nil
b) Second and subsequent repairs (per hour plus materials)	98.72
17. Rectification of Illegal Service	240.08
18. Replace Damaged Water Meter	
(a) First replacement in a 5 year period	Nil
(b) 20mm	115.48
(c) 25mm	227.93

Ancillary and miscellaneous customer services	$2019-20
(d) 32mm	331.25
(e) 40mm	798.24
(f) 50mm	995.78
(g) 80mm	1,094.04
(h)100mm or greater	By quote
19. Water Service Disconnection	
a) First disconnect within 1 year period	Nil
b) Capping	96.29
c) 20mm to 25mm	161.07
d) 32m or greater	By quote
e) Bitumen Repairs ($ per metre) (minimum 1 metre)	18.74
20. Water Service Reconnection	
a) First reconnect within 1 year period	Nil
b) Un-capping	103.33
c) 20mm to 25mm	173.22
d) 32m or greater	By quote
e) Bitumen Repairs ($ per metre) (minimum 1 metre)	18.74
21. Asset Location	
a) Major or Critical Infrastructure (per hour)	98.72
b) Minor or non-critical Initial Location	Nil
c) Reinspect asset location (per hour)	98.72
22. Relocate existing stop valve or hydrant	By quote
23. Replace water main before customer installations	By quote
24. Standpipe Hire	
a) Monthly (Minimum Charge)	31.91
b) Annually	382.91
c) Water usage charges ($ per kL)	
i. Treated	1.82
ii. Untreated	1.62
25. Personal Service of Final Warning Notice	21.83
26. Water Reconnections – after restrictions	
a) during business hours	94.21
b) outside business hours	130.68

Note: Prices will be adjusted annually by CPI.

K Glossary

2014 determination period	The period set by IPART from 1 July 2014 to 30 June 2018
2019 determination period	The period set by IPART in this review, from 1 July 2019 to 30 June 2022
Annual revenue requirement	The notional revenue requirement in each year of the determination period
Bulk water	Water delivered by WaterNSW to irrigators and other licence holders on regulated rivers across NSW
CPI	Consumer Price Index
Discharge factor	Percentage of incoming water to a property that is discharged to the sewerage network
ECM	Efficiency carryover mechanism
GL	Gigalitre (one billion litres)
IPART	Independent Pricing and Regulatory Tribunal of NSW
IPART Act	*Independent Pricing and Regulatory Tribunal Act 1992* (NSW)
kL	Kilolitre
LRMC	Long run marginal cost
ML	Megalitre (one thousand litres)
NRR	Notional revenue requirement. Revenue requirement set by IPART that represent the efficient costs of providing Essential Water's monopoly services
NPV	Net Present Value
RAB	Regulatory Asset Base
RO plant	Reverse osmosis plant

Section 16A direction	Ministerial direction pursuant to section 16A of the IPART Act
Section 20P directions	Ministerial directions pursuant to section 20P of the SOC Act
SOC Act	*State Owned Corporations Act 1989* (NSW)
SRMC	Short run marginal cost
Target revenue	The revenue Essential Water generates from maximum prices set by IPART
WACC	Weighted Average Cost of Capital