Essential Water expenditure review

A review of capital and operating expenditure

A Final Report prepared for the Independent Pricing and Regulatory Tribunal

Friday 25 January 2019

AITHER

Contents

Tables

Figures

Executive summary

Overview

The review of Essential Water's past and proposed future capital and operating expenditure has been based on information provided by Essential Water and interviews conducted with its staff. Assessment was complicated by delays in information provision, and for some elements, gaps in information provision.

However, sufficient information has been made available and reviewed to allow the team to make conclusions with respect to the three major aspects of the review: strategic management, capital expenditure and operating expenditure. The review finds that strategic management is generally sound, and that with a number of exceptions and recommended adjustments, proposed capital and operating expenditure is generally prudent and efficient. However, the lack of information to justify changes in operating expenditure is a consistent theme for Essential Water and a concern looking forward.

Strategic review

In terms of our review of Essential Water's strategic planning, the following outlines our key findings:

- There is no explicit long-term supply demand planning for Essential Water as there is currently no forecast increase in the demand for water in either the short or long-term. We consider this to be reasonable given the circumstances of Broken Hill, however we are of the view that Essential Water should continue to monitor the situation (adopt a 'watching brief') and develop a long-term supply demand plan if circumstances in the region change in the future.
- There remains heavy reliance on spreadsheets for much information and renewal decision making processes. These are maintained by individuals and quality varies, and without a corporate system backing there are associated risks of data loss, verification issues and consistency of analysis leading to inefficient decision making over time.
- The risk register is comprehensive and aligned with a clear framework. However, application of risk principles in decision making on projects appears deficient. On critical projects reviewed there was no clear application of the framework to risk / cost trade-offs nor any quantitative assessment of risks.
- Corporate business cases aligned with documented requirements containing clear statements of need, cost development, options presented etc. However, there were inconsistencies on contingencies allowances, analysis of options and overhead applications which creates difficulty in reviewing prudency and efficiency. There was little evidence of sensitivity testing on decision or risk.
- There was little evidence showing that practices applied by personnel are clearly documented. Without such practices transparency in decision making is not possible and outcomes will vary between individuals.

Further to this, IPART sought to consider whether alternative pricing arrangements could be implemented that would result in more economically efficient outcomes. Our review found that there is insufficient information to develop alternative pricing arrangements that are based on robust cost-reflective information. Given this, adopting an alternative pricing arrangement is unlikely to generate economic efficiencies.

Capital expenditure

Overall conclusions

The review has identified that Essential Water's proposed capital expenditure for the upcoming regulatory period is inefficient without our recommended adjustments. Additionally, the review has found some minor adjustments are also required to Essential Water's 2018-19 forecast capital expenditure in order for it to be deemed efficient.

In addition to the standard capital expenditure that has been proposed by Essential Water, we have also assessed the consequential works that are proposed by Essential Water as a result of the construction of the Wentworth to Broken Hill pipeline. This expenditure was assessed as a decision is yet to be made regarding any government funding and Essential Water has proposed to recover any shortfall in funding via a pass-through mechanism with its customers. Our review of the consequential works identified several concerns regarding the timing of proposed works and highlighted a need for further investigation. This resulted in a number of the projects being deemed as inefficient with a recommended reduction in expenditure if those works are to be funded through IPART-regulated charges (if government funding is not provided in full).

Essential Water is not proposing any changes to the existing service standard targets. We note that several quantified targets currently lack information to measure the performance of the business against the target. The lack of measures and shortage of information provided throughout the review means that Aither is unable to consider any appropriate changes to non-compulsory service targets for the upcoming regulatory period. We note that Essential Water has identified the lack of measures against its response time targets and specifies it will implement appropriate procedures to capture performance. Aither advises that these procedures should be in place prior to the beginning of the 2019 determination period.

In terms of the deliverability of the proposed capital program, we note that Essential Water is proposing a significant increase in the level of capital expenditure for the upcoming regulatory period. This significant increase creates increased delivery risk given the size of previous capital programs that have been delivered by Essential Water. As outlined in Section 4.6, we have recommended a number of changes to Essential Water's proposed capital program (including the consequential works). These recommended changes have a considerable impact on the overall size of the capital program for the upcoming regulatory period and provide an opportunity to re-profile the capital program and alleviate our concerns regarding deliverability. If these recommendations are not adopted, we would be concerned with Essential Water's capacity to deliver its proposed capital program over the upcoming regulatory period.

Review of past and forecast capital expenditure for the current regulatory period

From our review of the 2014-15 to 2018-19 period capital expenditure, Aither considered the majority of expenditure was prudent and efficient. The current regulatory period was affected by drought relief programs and the decision by the government to construct the Wentworth to Broken Hill pipeline. This resulted in a number of adjustments to Essential Water's capital program within the period. In our view, these adjustments were generally prudent investment decisions that addressed issues of importance within the period.

Aither has recommended a reduction in relation to forecast capital expenditure for 2018-19:

- a reduction of $1.3 million (inclusive of overheads) in 2018-19 for inefficiencies arising from premature corrosion requiring remedial work at the Mica St WTP. It is considered that although

the works should proceed more appropriate measures during construction of the asset would have resulted in this corrosion remedial work not being required. Given the time since commissioning (2010) earlier attention to this issue would possibly have reduced costs and enhanced cost recovery opportunities.

There are no other recommended reductions for the 2014-2019 IPART determination period.

In relation to the past non-system capital expenditure, we consider that further explanation following IPART's Draft Report on the 2017-18 expenditure is required to ensure it is considered prudent and efficient. This is based on a material increase in the expenditure in revised information provided by Essential Water that requires further justification.

Table 1 Recommended capital expenditure showing corporate overheads ($000s)

Expenditure	2013-14 actual	2014-15 actual	2015-16 actual	2016-17 actual	2017-18 actual	Total 2014-18	2018-19 forecast	Total 2014-19
IPART determination 2014	3,859	8,366	7,646	12,913	13,575	**42,500**	N/A	
Actual Forecast expenditure excluding government funded works	4,491	6,009	4,069	5,690	5,924	**21,692**	16,232	**37,924**
Actual Direct costs excluding government funded works	**3,798**	**5,024**	**3,440**	**3,866**	**5,550**	**17,879**	**13,999**	**31,878**
Overheads	693	985	629	1,824	374	3,813	2,233	**6,046**
Recommended project adjustments direct cost	0	0	0	0	0	**0**	(1,080)	**(1,080)**
Total Recommend direct expenditure	**3,798**	**5,024**	**3,440**	**3,866**	**5,550**	**17,879**	**12,919**	**30,798**
Overhead adjustment							(194)	**(194)**
Total overhead	**693**	**985**	**629**	**1,824**	**374**	**3,813**	**2,039**	**5,852**
Total Recommend capital expenditure	**4,491**	**6,009**	**4,069**	**5,690**	**5,924**	**21,692**	**14,958**	**36,650**
Recommended Water capital expenditure	3,392	3,179	2,349	2,166	3,974	11,668	10,675	22,343
Recommended Sewerage capital expenditure	1,099	2,830	1,720	3,524	1,950	10,024	4,283	14,307

Source: All data sourced from Essential Water's Submission to IPART updated by commercial in confidence document EW September AIRSIR – Final 21 Sept. and consideration by Aither of recommended project adjustments.

Review of future capital expenditure

In reviewing the capital expenditure proposed by Essential Water, it is important to note the two different capital programs:

- Essential Water's proposed capital expenditure, and
- the consequential works program.

The following outlines the recommendations from our review of each of these two programs separately.

Essential Water's proposed capital expenditure

Our review identified that the majority of the capital projects proposed by Essential Water were both prudent and efficient, with sufficient documentation to justify the need for the project. There were two projects that were deemed to be inefficient and we have made recommendations to reduce the expenditure for these projects:

- Wills St WWTP be reduced from a total of $34.3 million to a total of $9.3 million including overheads (or from $29.1 million to $7.9 million in direct expenditure) a reduction of 73 per cent over the upcoming regulatory period allowing Essential Water to monitor the success of the existing measures and to undertake further reviews to identify opportunities for savings in future works and in management and coordination costs. It is however anticipated that construction work on a major upgrade will commence in 2022-23 and continue into the next determination period.
- Consistent with the review of historical capital expenditure above, we consider there are inefficiencies within the Mica St WTP expenditure relating to premature corrosion and have therefore reduced the proposed expenditure by $2.2 million (including overheads or $1.8 million direct expenditure) in 2019-20.

Table 2 and Table 3 summarises the outcome of our review of the proposed capital expenditure.

Table 2 Recommended direct water capital expenditure ($000s, $2018-19)[1]

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct capital expenditure	**9,518**	**3,870**	**1,771**	**3,468**	**18,626**
Adjustments					
Project 12 Mica St WTP	(1,843)				(1,843)
Total recommended direct capital expenditure	**7,675**	**3,870**	**1,771**	**3,468**	**16,783**

Source: All data sourced from Essential Water's Submission to IPART updated by commercial in confidence document EW September AIRSIR – Final 21 Sept. and consideration by Aither of recommended project adjustments.

[1] Overheads associated with this direct capital expenditure is considered in Section 5.5; non-system capital expenditure is considered as its own capital project within Appendix A.

Table 3 Recommended direct sewerage capital expenditure ($000s, $2018-19)[2]

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct capital expenditure	**2,193**	**13,375**	**13,350**	**4,633**	**33,550**
Adjustments					
Project 13 Wills St WWTP		(11,312)	(10,665)	818	(21,159)
Total recommended direct capital expenditure	**2,193**	**2,063**	**2,685**	**5,451**	**12,391**

Source: All data sourced from Essential Water's Submission to IPART updated by commercial in confidence document EW September AIRSIR – Final 21 Sept. and consideration by Aither of recommended project adjustments.

Consequential works program

As a result of our review, we consider that the consequential works program for the 2019-2023 period should be reduced from the proposed total capital expenditure of $59.1 million to $20.4 million (this represents a 65 per cent reduction). This recommended reduction in expenditure is based on:

- Item 1: Stephens Creek PS, Rocla pipeline section 4 and 5

  Stephens Creek off-line storage and associated upgrade works was assessed as inefficient without further robust analysis of the need for the proposed works to support supply reliability works. A provision was recommended to provide replacement of some works to meet other service obligations. The recommended expenditure on these works in the 2018-2023 period is $4.1 million which is a reduction from the proposal of $33.2 million.

- Item 3 Stephens Creek to Menindee pipeline grazier supply

  The current solution is not considered efficient without further work on alternatives. Expenditure has been recommended for the period to delay works and investigate alternatives, support the graziers to manage possible water quality issues in the interim and to commence works late in the period. The proposed expenditure of $11.4 million has been reduced by 55 per cent to $5.3 million.

- Item 4 Pre-treatment at Mica Street WTP

  The proposed project is considered inefficient and a better understanding of the risk / cost trade-off is recommended. A reduction from $2.3 million to $1 million has been recommended to proceed with an interim solution which is capable of being added to if the long-term risks warrant additional measures.

- Brine pond disposal

  The proposed expenditure is considered inefficient as there are concerns regarding the accuracy of the proposed budget. Adoption of the lowest estimate plus an allowance for a significantly increased contingency is considered reasonable. It is recommended the proposed expenditure be revised down to $8.5 million. Successful trials may well reduce the expenditure needs further.

The bulk of the efficiency issues that have been identified with Essential Water's consequential works submission relate to methods of analysis that adopt worst case, least-risk approach to proposed works. Recommendations in all these cases have been made to undertake more investigative work to

[2] Overheads associated with this direct capital expenditure is considered in Section 5.5; non-system capital expenditure is considered as its own capital project within Appendix A.

ensure the solution the best approach is taken to address the consequential works. These investigations will take time, and in most cases will mean delay in expenditure. However, it is not considered that this will expose Essential Water to any unmanageable service risk and still allow operational cost savings from the early decommissioning of the pumping stations on the Menindee to Stephens Creek pipeline.

Total recommended capital expenditure

The following table presents the recommendations for the total capital expenditure for Essential Water. It should be noted that discussion on the analysis for corporate overheads is contained further below in the Executive Summary.

Table 4 Recommended total capital expenditure ($000s, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed total capital expenditure	**15,413**	**21,322**	**18,604**	**10,329**	**65,667**
Recommendations					
Recommended direct water capital expenditure	7,675	3,870	1,771	3,468	16,783
Recommended direct sewerage capital expenditure	2,193	2,063	2,685	5,451	12,391
Recommended corporate overheads	1,727	1,008	735	1,427	4,898
Recommended non-system expenditure	1,594	973	761	770	4,098
Total recommended capital expenditure	**13,189**	**7,914**	**5,952**	**11,116**	**38,170**

Operating expenditure

Overall conclusions

Based on the information provided throughout the review, we have concluded that the forecast operating expenditure does not reflect prudent and efficient forecasts. This conclusion is based on a consideration of the historical expenditure for the business and forecast changes that are not sufficiently justified based on the information provided.

Given the reasonably stable nature of the business in terms of no future growth or augmentation requirements, we would expect that the business would have a reasonable platform for robust forecasts of expected expenditure. This is slightly complicated by the introduction of the Wentworth to Broken Hill pipeline, however this is designed to reduce operating expenditure overall going forward.

Some of the key findings from our review include:

- we had concerns regarding the level of information provided to justify changes to operating expenditure.
- the capitalisation policy that is adopted by Essential Water appears appropriate however we note that other utilities do not capitalise operating expenditure overheads. Essential Water's process of

recovering corporate overheads through direct expenditure creates issues in determining an efficient base level of corporate overheads.

- Essential Water stated that it had incorporated some efficiencies such as reduced FTEs from the decommissioning of the Menindee pipeline, however this was not able to be verified from the cost information provided.
- Essential Water stated that fluctuations in the labour costs are primarily driven by changes to the operating and capital programs and how labour is capitalised. When reviewing the proposed expenditure, we note that this does not correlate with the actual forecasts of labour costs – i.e. in some cases the capital expenditure is increasing, while operating expenditure is also increasing.

  Further to this, the proposed capital program is higher than previous (even accounting for our recommended reductions in the capital program) and therefore it would be expected, at a high-level, that there would be upward pressure on the capitalisation of labour. This would result in further reductions to labour operating expenditure.
- limited information was provided regarding electricity cost forecasts in order to determine whether the forecasts are efficient.

In some cases, such as materials and hire services, the annual average of forecast expenditure is materially higher than the average annual historical expenditure, however no information has been provided to justify this increase. For example:

- average historical hire services expenditure was $0.67 million (excluding 2017-18[3]), whereas the average forecast annual hire services expenditure is $1.026 million.
- average historical materials expenditure was $1.75 million, whereas the average forecast materials expenditure is $2.167 million.

Given the lack of information provided, we have used the historical information to inform our recommendations for efficient forecasts of these expenditure items.

Review of past operating expenditure

In summary, Essential Water overspent the allowance set by IPART's 2014 determination by approximately $8 million (equivalent to 14 per cent). While actual operating expenditure in 2014-15 is lower than the allowed operating expenditure for that year, the later years of overspend are of a significantly greater magnitude. Some of the key reasons for the overspend include:

- combination of increases in electricity prices and the need to pump during peak energy tariff periods due to the drought
- increases in chlorine costs and an increased need for chemical treatment
- higher than expected consultancy costs for project assessments and business case development
- lower than anticipated capital expenditure over the period, resulting in a higher proportion of corporate overheads being allocated to operating expenditure.

We note that outside of labour, materials and electricity, the remaining cost categories were reasonably constant from 2014-15 to 2016-17.

[3] We have excluded this year from this comparison as the significant cost increase appears to be driven by larger, one-off projects.

On face value, the underlying reasons for Essential Water's higher actual operating expenditure than IPART's 2014 determination appear reasonable. However, Aither is unable to verify the prudency and efficiency of Essential Water's actual expenditure over the period due to the limited detail provided by Essential Water in its submission and in response to our questions.

Due to the timing of the pricing submission, Essential Water's expenditure information was based on forecast actuals for 2017-18. This information was subsequently updated by Essential Water through the provision of a revised AIR based on actual expenditure information for 2017-18. Although the information was provided only three months apart, this revised information resulted in a considerable change in the operating expenditure for 2017-18.

We are concerned that the considerable change in the 2017-18 actual information from the forecast actuals within the pricing submission is reflective of Essential Water's broader forecasting processes. We have taken this into account when considering the efficiency of Essential Water's forecast operating expenditure.

Review of future operating expenditure

Based on the information provided throughout the review, we had concerns regarding the robustness of Essential Water's forecast operating expenditure. Limited information was provided to justify material changes in the forecast operating expenditure, therefore in some cases we have sought to use historical averages as a guide and/or take a more granular approach to forecasting expenditure.

Our review has recommended the following adjustments to Essential Water's forecast operating expenditure for the upcoming regulatory period:

- reductions in labour to more accurately reflect historical labour costs, overtime reductions, FTE savings and redundancy costs from the decommissioning of the Menindee pipeline and labour cost escalation factor
- reductions in materials to reflect the historical average of materials cost over the previous regulatory period
- reductions in electricity to reflect a zero-price increase over the upcoming regulatory period, and
- reductions to hire services to reflect the historical average of hire services cost over the previous regulatory period.

The following tables provide our recommended direct operating expenditure for the upcoming regulatory period and a breakdown of the recommended adjustments. Recommended changes to the corporate overheads are considered further below.

Table 5 Water recommended direct operating expenditure ($000s, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct water operating expenditure	**9,478**	**8,898**	**9,009**	**9,485**	**36,870**
Adjustments					
Changes to labour	(769)	(410)	(465)	(560)	(2,204)
Changes to materials	(371)	(280)	(324)	(441)	(1,416)
Changes to electricity	42	9	(133)	(377)	(459)
Changes to hire services	(245)	(196)	(203)	(102)	(746)
Sub-total recommended adjustments	**(1,343)**	**(876)**	**(1,125)**	**(1,480)**	**(4,825)**
Sub-total recommended direct operating expenditure	**8,135**	**8,022**	**7,884**	**8,005**	**32,045**
Efficiency adjustment (1% to non-labour direct expenditure)	(44)	(87)	(132)	(186)	(448)
Total recommended direct water operating expenditure	**8,091**	**7,935**	**7,751**	**7,819**	**31,597**

Table 6 Sewerage recommended direct operating expenditure ($000s, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct sewerage operating expenditure	**2,933**	**2,792**	**2,866**	**3,058**	**11,649**
Adjustments					
Changes to labour	(617)	(529)	(588)	(728)	(2,462)
Changes to materials	(67)	(50)	(58)	(79)	(254)
Changes to electricity	66	64	55	42	226
Changes to hire services	(79)	(63)	(65)	(33)	(240)
Sub-total recommended adjustments	**(697)**	**(578)**	**(657)**	**(798)**	**(2,729)**
Sub-total recommended direct sewerage operating expenditure	**2,237**	**2,214**	**2,209**	**2,260**	**8,920**
Efficiency adjustment (1% to non-labour direct expenditure)	(8)	(16)	(25)	(36)	(86)
Total recommended direct sewerage operating expenditure	**2,228**	**2,198**	**2,185**	**2,223**	**8,834**

.

Table 7 Total recommended direct operating expenditure ($000s, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct sewerage operating expenditure	**12,411**	**11,690**	**11,876**	**12,543**	**48,520**
Recommended adjustments	(2,091)	(1,557)	(1,940)	(2,500)	(8,088)
Total recommended direct operating expenditure	**10,320**	**10,133**	**9,936**	**10,043**	**40,432**

In terms of the corporate overheads, Aither notes that the recommended reductions in capital and operating expenditure result in a reduction in the average annual corporate overhead expenditure from $4.5 million per annum down to $2.9 million per annum. This average annual expenditure on corporate overheads is less than the actual corporate overheads annual average for the previous IPART determination period of $3.8 million.

While we consider a reduction to the overall level of corporate overheads appropriate, we consider that a more appropriate forecast of corporate overheads expenditure would be based on a bottom up assessment of corporate-related functions for the business. The complicating factor for Essential Water is that it receives its corporate services from Essential Energy and therefore the allocation of corporate overheads to Essential Water is impacted by the level of expenditure for Essential Energy.

In the absence of information, we have maintained the allocation of corporate overheads between operating and capital expenditure on direct expenditure, however we are recommending an overall corporate overhead forecast rather than recommending a specific allocation rate. This is because we

expect a more robust approach to forecasting of corporate overheads going forward. We also echo SKM's recommendation from 2014 that a comprehensive and detailed review of Essential Water's share of corporate costs should be undertaken before the next pricing submission.

In generating the recommended corporate overheads, Aither has based its recommendations on the impact of the reductions in direct expenditure and future efficiency gains for corporate overheads.

Table 8 Essential Water proposed, and Aither recommended changes to forecast corporate overhead cost ($000's, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total
Capital expenditure					
Essential Water forecast	2,108	3,104	2,722	1,458	9,392
Recommended Water Corporate Overheads	1,343	658	292	555	2,848
Recommended Sewerage Corporate Overheads	384	351	443	872	2,050
Total Recommended Corporate Overheads	**1,727**	**1,008**	**735**	**1,427**	**4,898**
Difference	(381)	(2,096)	(1,987)	(31)	(4,494)
Percentage change	(18%)	(68%)	(73%)	(2%)	(48%)
Operating expenditure					
Essential Water forecast	2,234	2,104	2,138	2,258	8,734
Recommended Water Corporate Overheads	1,416	1,349	1,279	1,251	5,295
Recommended Sewerage Corporate Overheads	390	374	360	356	1,480
Total Recommended Corporate Overheads	**1,806**	**1,723**	**1,640**	**1,607**	**6,775**
Difference	(428)	(381)	(498)	(651)	(1,959)
Percentage change	(19%)	(18%)	(23%)	(29%)	(22%)

1. Introduction

1.1. Overview

Aither, and its subcontractor Rex Dusting (the review team), were engaged by the New South Wales Independent Pricing and Regulatory Tribunal (IPART) to undertake a review of past and proposed future water and wastewater related capital and operating expenditure for Essential Water. This report documents the outcomes of the review and will support IPART in making its determination on the maximum prices that Essential Water can charge from 1 July 2019.

1.2. Background

1.2.1. Role of IPART

IPART is conferred by several pieces of state legislation to regulate the prices for government monopoly services such as energy, public transport and water services in New South Wales (NSW). The *Independent Pricing and Regulatory Tribunal Act 1992* was amended in 1996 to establish the six primary responsibilities for IPART. Under the *Independent Pricing and Regulatory Tribunal Act 1992*, IPART is required to regulate, review and set the (maximum) prices that public water utilities may charge for water. IPART is responsible for maintaining competitive neutrality for water utilities and ensuring that costs which are recovered through water charges are prudent and efficient.

In order to meet its responsibilities, IPART has various review or assessment processes associated with price determinations. One such process is independent expenditure reviews, which help determine whether utilities have incurred or are proposing prudent and efficient costs. Expenditure reviews, which assess capital and operating expenditure of regulated water businesses, are an input to allow IPART to determine maximum prices.

2019 price review

IPART is conducting a review of the maximum prices that Essential Water can charge for services provided by its Essential Water business to its customers from 1 July 2019. The maximum prices determined by IPART for the new determination period will cover a period of up to five years. The length of the determination will be determined by IPART during the course of the review. The current price determination for Essential Water commenced on 1 July 2014 and set prices until 30 June 2018 (the 2014 Determination). These prices apply until 30 June 2019 as IPART agreed to delay the next price review by 12 months due to uncertainties surrounding the Wentworth to Broken Hill Pipeline.[4]

1.2.2. About Essential Water

Business overview

Essential Water is part of Essential Energy's Network Operations division and provides water supply, sewerage and trade waste services to approximately 10,000 residential, business and industrial

[4] IPART, *Review of Essential Energy's prices for water and sewerage services in Broken Hill: Issues Paper*, September 2018, p.1.

customers in Broken Hill and surrounding areas. Services are provided for a population of approximately 18,000 people in Broken Hill, Menindee, Sunset Strip and Silverton. Essential Water also provides sewerage and trade waste services to Broken Hill.

Primary functions include water supply, sewerage, liquid trade waste and miscellaneous services to customers. Essential Water supplies treated water to Broken Hill and Menindee and chlorinated (but unfiltered) water to Sunset Strip and Silverton. Essential Water also provides non-potable water to 47 rural outlets along the Menindee to Broken Hill pipeline for stock and domestic purposes.

Essential's Water's largest customer is a mining company which uses approximately 25 per cent of the total water supplied. A second mine also operates close to Broken Hill, and accounts for approximately eight per cent of total water consumption. Essential Water provides sewerage services to approximately 9,500 properties and operates two sewerage treatment plants. Approximately half the treated effluent is sold for non-drinking purposes. The remaining half is discharged to the environment via tertiary ponds

Essential Water provides liquid trade waste services to non-residential customers in the city of Broken Hill. It also provides a range of miscellaneous services to its water and sewerage customers. These are generally one-off service charges such as connections and disconnections, replacing damaged services, plumbing inspections, site inspections and building plan approvals. Charges for these miscellaneous services are charged on an as incurred basis.

1.3. Previous expenditure review and pricing determination

1.3.1. Previous expenditure review of Essential Energy

In January 2014, SKM completed an independent review of Essential Water's operating and capital expenditure on behalf of IPART. SKM also reviewed Essential Water's proposed method of allocating costs to mines and a review of asset management systems and practices. The review was an input into IPART's 2014 price determination for Essential Water for the regulatory period from 1 July 2014.

SKM's review investigated past and proposed capital expenditure, associated with regulatory period immediately prior to 2014, and for up to 5 years from 1 July 2014.

Key conclusions, findings or recommendations included:

- the capital program planning process could be improved to strengthen robustness of the decision-making process via a quantitative process to provide greater transparency and less subjectivity
- in the long-term there is risk of Essential Water not meeting its service obligations due to focus on short-term projects and lack of sound long-term strategies
- recommended reductions of 18 per cent to the forecast capital spend proposed by Essential Water
- no removal of projects from the proposed capital program, but adjustments to the timing and costs
- Essential Water had exceeded IPART's approved regulatory operating expenditure in the current period, largely due to changes in the value of corporate overheads.
- a general productivity target of 1 per cent per annum (in real terms) be adopted for both water and sewerage direct operating expenditure

- specific allowance for personnel transferring from operating to capital expenditure as the existing approach was not transparent and appeared low
- a need to capture operating expenditure savings arising from the capital expenditure program
- a reduction in corporate overheads and recommendation of a comprehensive and detailed analysis of reasonable corporate costs
- enhancements to Essential Water's model and approach for cost allocation to mines to address the appearance of cross-subsidy by urban customers.

1.3.2. Summary of IPART's previous pricing determination

In relation to Essential Water's proposal and SKM's review of expenditure, IPART's determination allowed for:[5]

- An operating expenditure allowance which was 4.6 per cent lower than Essential Water's proposed operating expenditure over the same period considering the efficiencies and reductions in corporate overheads identified by SKM.
- Prudent and efficient capex that was 26 per cent lower than proposed by Essential Water over the same period. IPART largely maintained the capital projects proposed by Essential Energy, however IPART accepted SKM's recommendation to reduce Essential Water's proposed capital expenditure by 18 per cent. Furthermore, IPART excluded the majority of the expenditure for the Rocky Hill Service Reservoir project from the determination period.

1.4. Review objectives and scope

1.4.1. Review objectives

The objectives set for this review by IPART were to undertake:

- a strategic review of the utility's long-term investment plans and asset management systems and practices for its water and sewerage business
- a detailed review of the utility's past and proposed operating and capital expenditures
- a review of performance against past output measures and to propose new output measures for the next determination period if appropriate, and
- targeted, written advice on expenditure issues raised in submissions to IPART's Draft Reports for Essential Water (an optional task, subject to IPART confirmation following the Draft Report).

1.4.2. Scope of review

Consistent with the review objectives, the scope of work for the review covers four main areas: strategic considerations, detailed review of operational expenditure, detailed review of capital

[5] 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.4.

expenditure, review of performance against past output measures and proposal of new measures if appropriate.

Strategic considerations

The strategic component of the review includes consideration of Essential Water's investment planning, and its asset management systems and practices. This includes reviewing medium and long-term investments plans and strategies, and associated or supporting systems, including for asset management.

Operational expenditure

The operational expenditure component includes reviewing the efficiency of past operating expenditure (for the 2014 determination period) and proposed expenditure for the 2019 determination period. This includes assessing any variance from that allowed under the 2014 determination, and how expenditure relates to regulated services, and if it has delivered against required service standards.

Assessment of proposed expenditure includes consideration of the level required to efficiently undertake the regulated business, consideration of the potential for cost reductions and efficiency gains, and the appropriateness of cost allocation methods or approaches. Furthermore, the prudency and efficiency of past and proposed electricity expenditure over the 2014 and 2019 determination period will be assessed.

The assessment will also identify the consequential impacts on capital expenditure and have regard to productivity benchmarking where appropriate.

Capital expenditure

The capital expenditure is informed in part by the strategic review, but also by a review of a sample of Essential Water's past and proposed capital projects. The capital program as a whole is reviewed, and a detailed investigation is made into planning and outcomes for the sample of capital projects. The capital projects are assessed specifically in relation to prudence and efficiency. Cost allocation for capital projects, and asset lives, are also considered.

Both past and proposed capital expenditure is considered, including whether past expenditure has contributed to meeting standards and outcomes, and consideration of variance between actual expenditure and that allowed under the current determination. Future expenditure is considered in relation to what is viewed as prudent and efficient for Essential Water to deliver its regulated business, and the potential for efficiency savings is also considered in this context.

Output measures

Essential Water's performance against its output measures for the current determination period was also considered. There are nine output measures for the current period which relate to capital projects or programs. Recommendations were also made for output measures for the next period.

1.5. Report outline

The report is broadly structured to align with the objectives and scope of work, in addition to further detailed requirements set by IPART. Specifically:

- This **Section 1** provides background on IPART and its role, that of Essential Water, and the objectives and scope of this review.
- **Section 2** outlines the methodology and associated considerations for the review.
- **Section 3** documents the results of the strategic assessment component of the review, including planning and strategic management systems, processes and documentation.
- **Section 4** documents the analysis, findings and recommendations associated with past and proposed capital expenditure, including in relation to a sample of capital projects (detailed project information is contained at Appendix A). The section also considers performance against output measures.
- **Section 5** documents the results of the operating expenditure review, including past and proposed expenditure.
- **Section 6** summarises the assessment and findings and recommendations of the review.
- **Appendix A** contains detailed summaries of the reviews undertaken of capital expenditure projects and programs.

2. Review methodology

2.1. Overview

The overall approach to delivering the review involved four phases, as follows:

- **Initiation** – gathering initial documentation, and selecting capital projects for review
- **Information discovery** – reviewing available information, developing and submitting further information requests, confirming the evaluation criteria and approach, and undertaking meetings or interviews with Essential Water staff
- **Analysis and review** – completing analysis in support of the major components of the review, follow up information requests, and consolidation of findings across review elements
- **Reporting** – documenting the results of the analysis and review (this report).

The methodology was designed to assess:

- the extent to which strategic and capital planning, and asset management systems are conducive to ensuring efficient expenditure
- the prudence and efficiency of operational and capital expenditure, and
- progress against agreed output measures.

The review was undertaken from August to October 2018, with a visit to Broken Hill to meet with Essential Water staff in September 2018.

2.2. Assessment framework

The framework for assessment of expenditure under this review is based on *prudence* and *efficiency* tests, as required by IPART. Application of these tests in relation to each of the review elements is explained further below, but the terms are defined here.

Prudence test

The prudence test assesses whether, in the circumstances existing at the time, the decision to invest in an asset is one that Essential Water, acting prudently, would be expected to make. In assessing prudence, it is necessary to assess both *how the decision was made*, and *how the investment was executed* where the asset has been built, having regard to information available at the time. In examining forecast expenditure, the prudency test examines the consistency of this expenditure with Essential Water's longer-term capital expenditure program.[6]

Efficiency test

In reviewing expenditure, the efficiency test is used to determine how much of Essential Water's proposed expenditure (operating and capital) for the upcoming determination period (commencing on 1 July 2019) will go into IPART's determination of Essential Water's revenue requirement. The

[6] IPART Scope of Work, p.4.

efficiency test should examine whether Essential Water's proposed expenditure represents the best and most cost-effective way of meeting the community's need for the relevant services.[7]

2.3. Information sources

The major information sources that have informed the review include:

- the Annual Information Return / Special Information Return, prepared by Essential Water and provided by IPART
- the Essential Water pricing submission to IPART, including confidential attachments to the submission
- various documentation supplied by Essential Water, and
- the results of discussions with Essential Water staff.

2.4. Review of strategic management

The review of strategic management was primarily undertaken on a qualitative basis, and focused on Essential Water or NSW Government policy, regulatory and planning matters that may be driving decisions, investments, and processes within Essential Water. The review team considered:

- planning matters, including in relation to long-term supply and demand and other long-term strategic considerations that may influence large capital investments
- Essential Water's capital investment strategy, including over short and longer-term horizons, and alignment, risks and efficiency of the strategy
- Essential Water's approach to asset management including whole of lifecycle planning, risk, asset condition assessment and reporting, asset life, and similar matters, and
- systems or processes associated that may have a bearing on the prudence or efficiency of decisions, including risk management, procurement, project management, and others.

2.5. Assessment of operating expenditure

To provide sufficient depth of analysis in support of any findings in relation to prudency and efficiency of operating expenditure, the review team sought to first understand, and then critique, the methodology and underlying assumptions adopted by Essential Water to establish their forecasts. As a result, the review team focused on:

- understanding the factors driving Essential Water's future costs, and
- ascertaining the assumptions and methodologies Essential Water adopted to translate those cost drivers into an operational expenditure forecast.

Having regard to the above, our assessment of the prudency and efficiency of Essential Water's operating expenditure involved the following tasks, amongst other things:

[7] Ibid.

- reviewing Essential Water's regulatory submission to identify key forecasting issues and assumptions.
- providing Essential Water with a detailed questionnaire related to their operating expenditure forecasts. This step was complicated by the fact that Essential Water did not provide responses to a number of our operational expenditure information requests until very late in the review process. Amongst other things, this initial questionnaire addressed:
  - the methodology Essential Water used to develop its operational expenditure forecasts – so that the review team could better understand Essential Water's overarching forecasting methodology
  - cost allocation methodology – so that the review team could better understand how costs are allocated between Essential Energy and Essential Water
  - escalators and growth drivers – so that the review team could understand how Essential Water has escalated its forecasts over the period covered by the regulatory submission to account for potential changes in the real cost of labour, materials and electricity costs, as well as changes in the underlying drivers of those costs.
  - capitalisation policy – to ensure that Essential Water has not included in its operational expenditure forecasts, the labour costs that it expects to capitalise over the regulatory period (i.e. to ensure there is no double counting), and
  - cost reductions and efficiencies – to better understand how Essential Water's operational expenditure forecasts include, either directly or indirectly, allowances for on-going productivity improvements.
- conducting interviews with Essential Water to discuss their operational expenditure forecasts.

2.6. Assessment of capital expenditure

2.6.1. Overview

An assessment was made of the prudent and efficient expenditure compared to actual and proposed expenditure, as outlined in Section 4 of this report. The assessment of prudency and efficiency of Essential Water's capital expenditure was based on understanding, and then critiquing, the methodology, underlying assumptions and models that were used to establish capital expenditure forecasts. This was given effect through the following tasks:

- desktop review of information provided by Essential Water including AIR/SIR, policies and procedures, strategies, and documentation relating to individual projects or programs
- desktop review of information found in the public domain
- meeting with key Essential Water staff (and contractors) to discuss key issues in relation to a number of individual capital projects selected for detailed review and the broader capital program
- further desktop review of documentation provided by Essential Water following these interviews
- assessment of prudence and efficiency of the sample capital projects, including drawing on the professional judgement of Rex Dusting in relation to the efficiency of proposed capital expenditure
- assessment of the prudence and efficiency of the overall portfolio of actual and proposed capital expenditure, considering whether the findings of the review of sample projects and programs indicate any systemic imprudence or inefficiencies.

With respect to making an assessment of past expenditure the approach was to gain a view as to whether there is any evidence of systemic inefficiencies or imprudent decisions. This was carried out by reviewing how decisions were made on individual projects, what actual spending was compared to budget, and whether project outcomes were actually realised. The approach was that should any expenditure be found to have been clearly imprudent or inefficient, a recommendation would be made to not allow part or all of that expenditure.

For future expenditure the approach was similar though it is more focused on individual projects than at a portfolio level. However, the review team also considered if it is appropriate to apply a global reduction in Essential Water's forecast capital expenditure as a result of systematic inefficiencies. Our detailed method for this assessment is outlined further below.

Approach for selecting sample capital projects

In terms of the capital projects that were identified for review, there was not a high number of projects to consider, therefore the review sought to cover key capital projects and programs that Essential Water has forecast to undertake in the regulatory period. The consideration of these projects also included the proposed 'consequential works' for Essential Water arising from the Wentworth to Broken Hill pipeline.[8] Other projects were selected that were representative of on-going renewal and replacement programs, activities with unusual expenditure patterns and projects that had significant expenditure in future periods.

The proposed program is dominated by the Wills St WWTP upgrade and the consequential works program. As well as reviewing these dominant projects 67% of the remainder of the program was reviewed.

2.6.2. Assessment of capital projects

An assessment was carried out of the selected capital projects for prudency and efficiency. This was carried out by a combination of a desktop review of documents obtained as part of the strategic review, desktop review of documentation specific to each project, and meeting with Essential Water staff.

To aid the process a number of assessment criteria were developed. This gave effect to the prudency and efficiency tests as noted above. An indication of some of the elements of this are outlined below.

Prudency

Is the project need demonstrated by an obligation, for example:

- a constraint restricting capability to deliver service, a legal obligation, or business efficiency improvement.

If the need is not required through obligation, is evidence presented to show, for example:

- asset deterioration, asset capacity constraint or technological obsolescence
- the timing is appropriate (including no earlier or later than necessary to meet need), or
- corporate policy, objective or strategy alignment.

[8] See section 4.2.2 for further explanation of consequential works.

Efficiency

Is the project being delivered at lowest cost, for example:

- a complete set of options has been considered or alternative options were identified that were not considered
- the scope of work is appropriate to meet the need, and the standard of work is appropriate
- unit costs are based on market rates or otherwise shown to be efficient; costs are benchmarked; or, efficiency savings are recommended, or
- synergies with other projects are considered.

2.7. Review of output measures

The review of outputs was undertaken by reviewing information in the Essential Water pricing submission. Further to this, an information request to Essential Water asked:

- that evidence be provided to substantiate performance against specified service standards during the 2014 determination period, and
- whether any consideration had been given to the appropriateness or alignment between service levels and customer needs, given the customer service standards and customer feedback survey

Information provided by Essential Water on service standards was subsequently assessed, including in the context of the overall capital and operational expenditure review.

3. Strategic review

3.1. Overview

The extent to which Essential Water makes prudent and efficient capital investment and operating decisions is partly driven by its policy and operating context, including obligations placed upon it. It is also driven by its approach to strategic management of its assets and the business more broadly, including its strategic objectives, corporate management, and delivery systems.

This section considers the policy and operating context of Essential Water, and a range of corporate and management systems that are used to guide capital and operating spending and management decisions. While not a sufficient condition, the existence and use of effective strategic, corporate and management systems is a necessary condition to achieving prudent and efficient capital and operating expenditure.

3.2. Policy and operating context

Broken Hill and surrounding communities have historically faced water security issues. Broken Hill's major source of water has historically been from the Menindee Lakes, which forms part of the Murray Darling Basin. As an ephemeral water source, the Menindee Lakes is an inefficient and unreliable water storage system, with large levels of evaporation limiting long-term water security.

In 2015, frequent and severe droughts in Broken Hill and surrounding areas resulted in significant water insecurity for the region. A short-term emergency water solution was implemented in early 2015, with predicted exhaustion of all available surface water and ground water supply options by April 2019. As a consequence, the NSW Government investigated options to address the issues, and subsequently initiated a project to provide a secure, long-term water supply solution through the construction of a pipeline from the Murray River to Broken Hill. The project was initiated in 2016, with WaterNSW responsible for the construction, operation and maintenance of the pipeline. The pipeline is anticipated to be completed by December 2018 and will provide approximately 37.2ML/day of raw water from the Murray River.

The pipeline, including its integration into Essential Water's ongoing business in the future, will have a considerable impact on the operations of its water network in the future.

In addition to IPART regulations, Essential Water is also required to comply with the following regulators:[9]

- Department of Industry (Water) – the Department administers ministerial approval for construction works under the *Water Management Act 2008*; oversees the performance of local water utilities; and publishes annual benchmarking of performance for NSW water utilities
- Dams Safety Committee – ensuring safety of dams and maintaining surveillance of prescribed dams
- NSW Health – responsible for regulating the quality and safety of drinking water

[9] IPART, Review of Essential Energy's prices for water and sewerage services in Broken Hill: Issues Paper, September 2018, p.103.

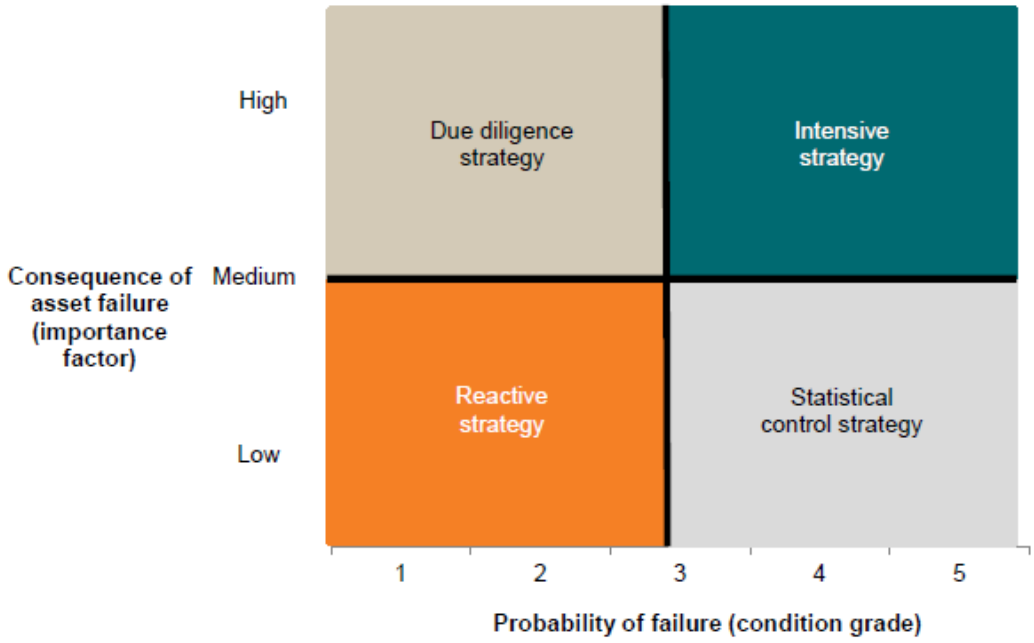
- NSW Environment Protection Authority – responsible for licensing and monitoring of sewage discharges from sewerage systems under the Protection of the Environment Operations Act 1997
- Natural Resource Access Regulator – a newly formed regulator that is responsible for compliance and enforcement of natural resources management legislation.

3.3. Our assessment of Essential Water's strategic planning and asset management

This section presents Aither's high-level assessment of the overall strategic planning and asset management approaches of Essential Water. Through our review, we note that the planning documentation covering Essential Water's services is governed by both Essential Water and Essential Energy. In some cases, planning is specific to Essential Water, whereas other documents, such as investment governance, is covered by broader Essential Energy governance. The governance of these processes appears appropriate, however the key to their effectiveness is how well they are implemented and updated – especially asset management systems (see further below).

In terms of investment planning, Essential Water provided documentation that outlines the focus on managing the risk associated with those assets whose consequence and probability of failure are the highest. For these assets, Essential Water states proactive renewals should be carried out through an intensive strategy.[10] Figure 1 from Essential Water's submission shows the management approach adopted for assets classed in other risk categories during infrastructure renewal planning.[11]

Figure 1 Infrastructure failure risk



In terms of the broader investment governance, Essential Water utilises the frameworks in place for Essential Energy. These include:

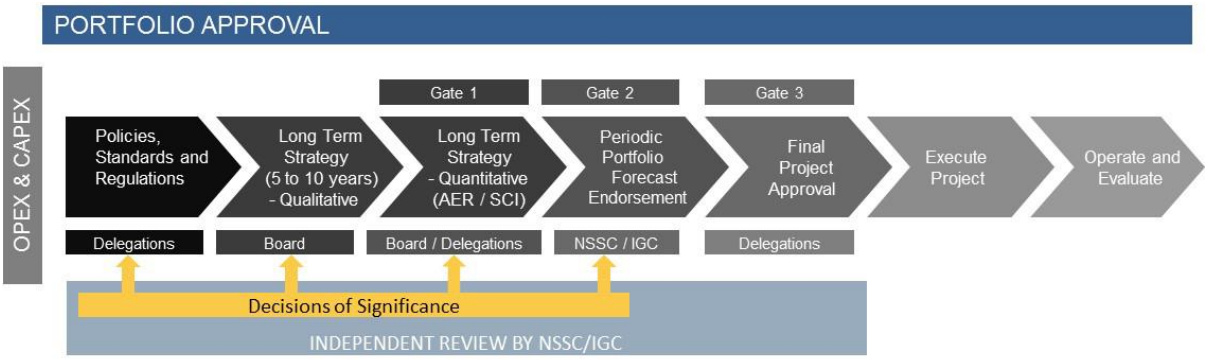
[10] JWP Country Water Asset Renewal Plan, December 2007, p.5

[11] *Essential Water IPART Submission*, July 2018, p.116

- procedures for preparing and reviewing financial evaluations on investment options, and
- governance procedures for obtaining endorsement for investments

These processes are designed for the electricity business, however for the most part they remain relevant for the Essential Water. Figure 2 shows that Essential Water's investment governance framework uses a gateway process overseen by the Non-System Steering Committee (NSSC) – Water.

Figure 2 Essential Water investment governance process



Source: *Essential Water IPART Submission*, July 2018, p.118

Essential Water provided further information on each of the steps involved in the process. At a high-level:[12]

- a long-term investment strategy (across the next 5 to 10 years) is developed on an annual basis which documents the operation priorities, investment objectives and performance targets of the company. This long-term strategy is submitted to the NSSC and the Investment Governance Committee (IGC) for endorsement.
- long-term financial plans are then developed (across the next 5 to 10 years) to support the long-term investment strategy in the previous step. The financial plan is submitted to the Investment Evaluation Unit (IEU) for financial analysis prior to submission to the NSSC for review, the IGC for endorsement and the Board for approval (Gate 1 Approval).
- updates to the approved financial plan forecast in Gate 1 is provided to the IEU for financial analysis prior to submission to the IGC for endorsement (Gate 2 approval).
- prior to commencement, final endorsement and approval (Gate 3 approval) is required in respect of each project and program. Key areas to be addressed include strategy, needs/benefits, options considered, project details, delivery model, financials and risks.

We note that there is no explicit long-term supply demand planning for Essential Water as there is currently no forecast increase in the demand for water in either the short or long-term. We consider this to be reasonable given the circumstances of Broken Hill, however we are of the view that Essential Water should continue to monitor the situation (adopt a 'watching brief') and develop a long-term supply demand plan if circumstances in the region change in the future.

[12] *CECP0002.33 Governance*, June 2017, pp. 4-9

Asset management

Asset management system and practices in Essential Water were reviewed as part of the assessment of the organisation's understanding of their assets and the role those assets play in delivering services, identification of performance risks and issues to address, the robustness of planning processes and decision making on capital and maintenance services.

The review involved understanding Essential Water's Water Asset Management Plan dated March 2018 (confidential attachment to the IPART submission), business case documentation, risk framework documents and registers, condition assessment reports and discussions with Essential Water personnel including demonstration of system processes and documentation. In the detailed review of capital projects, the application of asset management principles to those were taken as evidence of Essential Water's application of those principles across its program. The consultant engaged by IPART for the previous review undertook a thorough assessment of the Essential Water's asset management system at that time and their report was also reviewed to help understand changes in the intervening time.

Essential Water's asset management plan is now a comprehensive high-level document covering the full scope of the organisation's assets. The document is up to date in that it includes reference to the impending commissioning of the Wentworth to Broken Hill pipeline and the associated planned asset changes. The principles of asset management set out in the document are sound and clearly set out.

The challenge with most asset management systems is the robustness of their application.

Application of the asset management system in practice varied:

- Essential Water's personnel engaged in asset management planning and activities did demonstrate a good knowledge of the principles and their application. There was a strong understanding and demonstrated competence in decision making around a number of processes.
- There has been increased use of condition assessment techniques and their application to decision making with a move away from use of asset age as the prime criteria for asset renewal decisions.
- There has been increased development effort into a GIS based asset information system (AIS) for their network and this is an on-going process.
- Essential Water uses CMMS (Mainpac) to link maintenance activities and asset failures to individual assets. Condition assessment and failure information was accessible, allocated to specific assets and generally contained relevant information.
- However there remains heavy reliance on spreadsheets for much information and renewal decision making processes. These are maintained by individuals and quality varies, and without a corporate system backing there are associated risks of data loss, verification issues and consistency of analysis leading to inefficient decision making over time.
- Risk register is comprehensive and aligned with a clear framework. However, application of risk principles in decision making on projects appears deficient. On critical projects reviewed there was no clear application of the framework to risk / cost trade-offs nor any quantitative assessment of risks.
- Corporate business cases aligned with documented requirements with clear statements of need, cost development, options presented etc. However, there were inconsistencies on contingencies allowances, analysis of options and overhead applications which creates difficulty in reviewing prudency and efficiency. There was little evidence of sensitivity testing on decision or risk.
- There was little evidence presented that practices applied by personnel are clearly documented. Without such practices transparency in decision making is not possible, outcomes will vary with individuals.

In summary the asset management system appears to have a good foundation but is in a process of development. Improvements since the previous review have occurred with a wider scope of assets covered by the plan, increased use and reliance on condition assessment techniques in some critical areas and improvements to GIS systems underway.

However, gaps remaining include documentation of practices, reliance on individuals for information management and analysis, restricted application of risk / cost analysis in option reviews for significant projects and inconsistencies in quality of business cases. All these issues can lead to inefficiencies in project development and decision makings.

The effect of these asset management gaps on the efficiency of Essential Water's IPART determination submission has been assessed as part of the capital expenditure review. The impact of these asset management inefficiencies, where material, have been taken into account in recommendations for further analysis and/or variations to the proposed expenditure for the period.

3.4. Cost-based pricing

As part of the review, IPART sought to understand whether there was sufficient justification from Essential Water's cost information to consider alternative pricing arrangements that may reflect a more cost-reflective tariff structure. Two of the key methods in terms of alternative pricing arrangements that could be considered include:

- **geographical based pricing** – consideration of whether the costs to serve Broken Hill and other regions are sufficiently different to warrant alternative tariffs, and
- **product-based pricing** – consideration of whether tariffs could be structured in a way to acknowledge where customers receive different water products.

To adopt alternative pricing arrangements such as these two options, there are two key criteria that must be met:

- the new pricing arrangements result in an improvement in economic efficiency (i.e. the benefits arising from changes in customer behaviour as a result of the pricing arrangements outweigh the costs of implementing the arrangements), and
- robust and detailed costing information is available to ensure that the new pricing arrangements are in fact cost-reflective.

Our first consideration was whether there was sufficiently robust costing information to enable alternative pricing arrangements that are cost reflective. We note that in most cases, Essential Water's forecasts are based on a top-down approach that does not lend itself to a more sophisticated pricing approach based on underlying cost information. An example of this is Essential Water's forecast of operating expenditure by function whereby the change in forecast expenditure is the same for each different water and sewerage function. This demonstrates that Essential Water does not forecast expenditure based on actual activity and underlying drivers. Further to this, we have not identified any detailed expenditure forecasts based on different geographical locations.

Given the inability to accurately estimate costs on these different bases, any alternative pricing signals that are developed are unlikely to be cost-reflective and are therefore unlikely to result in more economically efficient outcomes.

3.5. Summary of key findings

Based on our review, our key findings are:

- There is no explicit long-term supply demand planning for Essential Water as there is currently no forecast increase in the demand for water in either the short or long-term. We consider this to be reasonable given the circumstances of Broken Hill, however we are of the view that Essential Water should continue to monitor the situation (adopt a 'watching brief') and develop a long-term supply demand plan if circumstances in the region change in the future.
- There remains heavy reliance on spreadsheets for much information and renewal decision making processes. These are maintained by individuals and quality varies, and without a corporate system backing there are associated risks of data loss, verification issues and consistency of analysis leading to inefficient decision making over time.
- Risk register is comprehensive and aligned with a clear framework. However, application of risk principles in decision making on projects appears deficient. On critical projects reviewed there was no clear application of the framework to risk / cost trade-offs nor any quantitative assessment of risks.
- Corporate business cases aligned with documented requirements with clear statements of need, cost development, options presented etc. However, there were inconsistencies on contingencies allowances, analysis of options and overhead applications which creates difficulty in reviewing prudency and efficiency. There was little evidence of sensitivity testing on decision or risk.
- There was little evidence presented that practices applied by personnel are clearly documented. Without such practices transparency in decision making is not possible, outcomes will vary with individuals.
- There is insufficient information to develop alternative pricing arrangements that are based on robust cost-reflective information. Given this, adopting an alternative pricing arrangement is unlikely to generate economic efficiencies.

4. Capital expenditure

4.1. Overview

This section summarises the review of the capital expenditure undertaken, discusses Essential Water's performance against output measures, and makes an overall assessment of capital expenditure with recommended adjustments in light of prudency or efficiency findings. It also discusses asset life assumptions. The outcome of our review of past and proposed expenditure and any adjustments recommended are presented herein with detail of the review of sample projects contained within Appendix A.

4.2. Summary of past and proposed expenditure

4.2.1. Past and proposed expenditure for IPART Determination review

In the 2014 determination IPART approved capital expenditure for Essential Water of $42.5 million ($2018-19) for the 2014-15 to 2017-18 period and Essential Water had actual expenditure of $21.7 million against that program. Essential Water also completed other Government funded works, such as the drought response program, which did not form part of the pricing determination. These works were required to address unforeseen circumstances at the time of the 2014 IPART determination.

The determination period was subsequently extended to include 2018-19 and the total forecast expenditure for the IPART determination 5-year period 2014-19, including the drought response works is $50.3 million. For the forthcoming 4-year determination period Essential Water has proposed approximately $65.7 million – not including the proposed government funded consequential works (see below). This is a significant increase on the capital expenditure on the previous 2014-15 to 2017-18 period.

Essential Water's actual and proposed capital expenditure for the 2014-15 to 2018-19 period is presented below and compared to the 2014 IPART determination allowances.

Table 9 Essential Water's actual and forecast capital expenditure including overheads ($000s)

Expenditure	2013-14 actual	2014-15 actual	2015-16 actual	2016-17 actual	2017-18 actual	Total 2014-18	2018-19 forecast	Total 2014-19
IPART determination 2014 ($2013-14) as per 2014 report	3,528	7,647	6,989	11,804	12,409-	38,849	N/A	
IPART determination 2014 ($2018-19)	3,859	8,366	7,646	12,913	13,575	42,500	N/A	
Actual Forecast expenditure excluding government funded works ($2018-19)	4,491	6,009	4,069	5,690	5,924	21,692	16,232	37,924
Actual/forecast including government funded works ($2018-19)	4,491	6,791	15,395	5,943	5,924	34,052	16,232	50,285
Total Variance to determination	1,026	(1,575)	7,749	(6,969)	(7,652)	(8,447)	N/A	
Variance to determination (%)	26%	(19%)	101%	(54%)	(56%)	(19%)	N/A	

Source: All data sourced from Essential Water's Submission to IPART and updated by commercial in confidence document EW September AIRSIR – Final 21 Sept.

Essential Water's proposed capital expenditure for the 2019-20 to 2022-23 period is presented by service requirement in Table 10 while Table 11 provides a further breakdown of corporate overheads.

Table 10 Essential Water's proposed capital expenditure including allocated corporate overheads ($000s, $2018-19)

Financial year	2019-20	2020-21	2021-22	2022-23	Total
Water	11,231	4,566	2,089	4,092	21,979
Sewerage	2,588	15,782	15,753	5,467	39,590
Non-system[13]	1,594	973	761	770	4,098
Total	**15,413**	**21,322**	**18,604**	**10,329**	**65,667**

Source: All data sourced from Essential Water's Submission to IPART.

Table 11 Essential Water's proposed capital expenditure corporate overheads shown separately ($000s, $2018-19)

Financial year	2019-20	2020-21	2021-22	2022-23	Total
Water	9,518	3,870	1,771	3,468	18,626
Sewerage	2,193	13,375	13,350	6,633	33,550
Non-System	1,594	973	761	770	4,098
Corporate overheads	2,108	3,104	2,722	1,458	9,392
Total	**15,413**	**21,322**	**18,604**	**10,329**	**65,667**

4.2.2. Consequential Works Proposal

In addition to the capital expenditure above, Essential Water is also proposing to carry out a series of projects involving capital expenditure of $59.1 million ($2018-2019) – this has been classed as 'consequential works'. Essential Water states in its pricing submission that it has commissioned the NSW Department of Public Works (PWA) to conduct an assessment on additional, or 'consequential' works that it is required to undertake prior to the completion of the Wentworth to Broken Hill pipeline. Essential Water advised that this assessment included the provision of alternative water supplies to those customers who would be disadvantaged by the reconfiguration of the water supply system.[14]

Essential Water is seeking external funding from the NSW Government for the entire consequential works program. Essential Water's pricing submission proposed to include the consequential works as a pass-through event where Government funding for some, or all, of the works is not provided.[15] Given the proposed pass-through mechanism and the absence of confirmation from the NSW Government regarding government funding for the consequential works program, Aither has been requested by IPART to review these works to determine whether they should be funded by customers through the IPART-determined tariffs if the pass-through mechanism is required.

---

13 This relates to non-system capital expenditure, such as IT, fixtures and fittings, motor vehicles and buildings.

14 Essential Water Pricing Submission, p. 114.

15 Essential Water Pricing Submission, p. 126.

4.3. Capital projects overview

A detailed review of a representative sample of proposed capital projects was undertaken. The capital projects selected for this detailed review were primarily based on the cost and risk of the projects and, as outlined above, included a consideration of the consequential works program.

Appendix A outlines the detailed review and findings for each project that was reviewed. In considering the detailed project reviews, it is important to note the following points:

- Consistent with the approach taken in the rest of this document all water and sewer project capital expenditure figures, unless noted otherwise, include Essential Water's proposed corporate overhead allocation of 18 per cent and contingency allowances.
- Four of the projects reviewed (projects 7, 8, 12 and 13) are relevant in assessing the efficiency of capital expenditure within the current period. All projects other than projects 7 and 12 were considered in relation to future capital expenditure proposals.
- Other than on-going reticulation replacement programs only Stephens Creek Dam wall has significant expenditure ($11 million) in future regulatory periods.

Table 12 lists the capital projects that were assessed and their expenditure for each period. Capital projects other than the 'non-system expenditure' project are inclusive of a standard corporate overhead rate of 18 per cent (corporate overheads are assessed separately in section 5.5).

The annual breakdown of proposed capital expenditures for the projects making up the consequential works were not provided in the business case. To assist with analysis of the program, project timing information was taken from a draft 30-year capital works program provided by Essential Water and interpreted by adjusting the proposed expenditures set out in the 30-year capital works program for each of the projects, to match those totals set out in the Consequential Works Business Case submitted to the NSW government.

Table 12 Capital projects assessed ($000s, $2018-19 and including overhead allocation)

Project name	Past Period capital expenditure FY15-FY19 ($Actual/ forecast)	Proposed capital expenditure FY20-FY23 ($2018-2019)
PROJECTS FUNDED BY ESSENTIAL WATER (EW)		
Project 2 Stephens Creek Dam Wall	796	1,301
Project 5 Rocky Hill Reservoir Replacement	297	4,384
Project 7 Menindee WTP major works	4,757	1,786
Project 8 Broken Hill Water Reticulation Replacement	4,304	3,214
Project 12 Mica St WTP Capital Works Program	4,267	2,837
Project 13 Replacement of Wills St Waste Water Treatment Plant	5,958	34,253
Non-System Expenditure	2,735	4,095
TOTAL OF PROPOSED PROJECTS FUNDED BY EW	**23,114**	**51,870**
PROPOSED CONSEQUENTIAL WORKS SUBMISSION		
Item 1: Stephens Creek PS, Rocla pipeline section 4 & 5, Stephens Creek off-line storage	3,820	29,361
Item 2 Pipeline to the caravan park and Sunset Strip	200	1,416
Item 3 Stephens Creek to Menindee pipeline grazier supply	5,689	5,689
Item 4 Pre-treatment at Mica Street WTP	300	2,044
Brine pond disposal		10,535
CONSEQUENTIAL WORKS TOTAL	**10,010**	**49,045**

Source: Financial data sourced from Commercial-in-Confidence appendix 4 to Essential Water's submission to IPART and Broken Hill Long Term Water Supply Consequential Works Business Case April 2018. Project numbering is Essential Water's designation in these documents.

4.4. Past expenditure – 2014-5 to 2018-19

As detailed above in Table 9 (in $2018-19), Essential Water's actual capital expenditure for the 2014-15 to 2017-18 period is $34.1 million, which is $8.4 million or 19 per cent lower than the 2014 IPART determination. This expenditure includes government funded capital works of $12.8 million and actual expenditure in this period against the 2014 IPART determination is $21.1 million.

Essential Water's forecast expenditure for 2018-19 is $16.2 million bringing the 2014 to 2019 determination expenditure to $50.3 million. The following outlines our findings and recommendations relating to this past expenditure.

Past expenditure

The 2014-15 to 2017-18 period expenditure was impacted by two significant events - both driven by chronic water source shortages outside Essential Water's control and resulted in changes to Essential Water's capital program throughout the period. These were:

- the drought response works were a government funded program to provide short-term augmentation for the bulk water supply, and
- the decision by the government to fund the Wentworth to Broken Hill pipeline as a new long-term bulk water supply. Whilst the government decision on the new supply was pending planned capital expenditure on works that would possibly become redundant with the new bulk supply – amounting to $20 million – were not commenced.

The drought works have not been reviewed under this IPART submission as these works were funded through government subsidies, however it is understood that the works were delivered on time and enabled Essential Water to continue to meet its water supply obligation to its customers.

The projects that were delayed due to the Wentworth to Broken Hill pipeline decision included the following:

- Project 1: Stephens Creek emergency pumping station

  Stephens Creek pumping station currently plays a critical role in balancing the bulk supply from the Darling River to Broken Hill. Future proposed role is as part of back-up and supplementary supply to the Wentworth to Broken Hill pipeline. Further refurbishment is considered as part of the consequential works program.

- Project 3: Imperial Lake Reservoir dam wall rehabilitation

  This reservoir is now redundant and planned to be decommissioned in 2020. The assets involved with the other projects will now have different, less critical functions and works are proposed to adapt them to these new functions.[16] The decision to delay these works was therefore prudent and efficient.

- Project 10: Menindee pipeline repairs

  This pipeline currently provides the main link for the bulk supply from the Darling River to the Broken Hill township. After commissioning of the new supply from the Murray River it will serve local raw water customers only and under the Consequential works is proposed to be decommissioned and replaced with smaller pipelines.

- Project 11: Water pumping station refurbishment / overhauls

  These pump stations are also key parts of the bulk water supply from the Darling River and it is proposed that upon completion of the Wentworth to Broken Hill pipeline that they are decommissioned.

In addition to the changes related to the pipeline decision, there were other changes in the overall capital program where some projects have not been delivered and others brought forward. These changes included:

[16] These assets are being reviewed as part of the consequential works program.

- Project 7 Menindee WTP Replacement

  Expenditure was brought forward because of increasing occurrence and risk of breakdown resulting in drinking water quality risks

- Project 8 Mica St WTP

  This project had an increase in expenditure through premature corrosion which appears to have resulted from inadequate specification at the time of construction.

- Project 12 Broken Hill Water Reticulation Project

  This is an ongoing program which evolves to continue to meet its objectives with performance benchmarked consistently with its peer group in the National Water Performance report for 2016-17

- Project 13 Wills St WWTP

  This project incurred expenditure within the period to address environmental contamination issues that were identified in the period and led to the EPA imposing a works requirement which has now been met

- Project 5 Rocky Hill Reservoir Replacement

  This project had been part of the 2014 IPART decision but has been delayed into the 2019 IPART determination period due to improved condition assessment practices.

Based on our overall assessment, we consider that Essential Water, with PWA assisting in the delivery of the drought response works, showed agility to effectively deliver a changing program in this time period under challenging circumstances and with an overall expenditure shortfall of 19 per cent compared to the IPART allowance.

In our view, these adjustments were generally prudent investment decisions that addressed issues of importance within the period. The exception to this is the Mica St WTP which incurred an increase in expenditure from 2018-19 (see below).

Forecast 2018-19 capital expenditure

In terms of 2018-19, Essential Water has forecast capital expenditure of $16.2 million, bringing the 2014 to 2019 determination expenditure to $50.2 million. Although just short of the $15.3 million expenditure in 2015-16 this is an increase of 85 per cent when compared with the average expenditure for the previous four years of $8.3 million. With the proposed consequential works being undertaken concurrently, it is a significant challenge for the organisation.

From our review, there was a project that we considered had inefficient expenditure in 2018-19:

- Project 8 Mica St WTP

  Based on our review of information provided, we consider the changes in expenditure for this project to not be efficient as the issues that the expenditure is designed to address should not need to be incurred on a project of this nature at this stage of its life. We therefore recommend that expenditure for the current period (2018-19) be reduced by $1.275 million and a further reduction of $2.175 million in the 2019-23 period (including overheads and contingency). Further to this, we understand that Essential Water is engaging in discussions with its contractors to recover these costs. We consider this to be an appropriate course of action for Essential Water.

Recommendations

From our review of the 2014-15 to 2018-19 period capital expenditure, it is recommended that there be:

- a reduction of $1.275 million in 2018-19 for inefficiencies arising from premature corrosion requiring remedial work at the Mica St WTP.

There are no other recommended reductions for the 2014-2019 IPART determination period.

4.5. Capital project review

The following sections present summary results of the investigations into each of the capital projects reviewed. They draw on more detailed information presented in Appendix A. Following the summary are more detailed discussions on each of the projects that have been deemed to have inefficiencies.

- **Stephens Creek Dam Wall**

  Dam wall works to address safety issues considered prudent and efficient but subject to further work to define the project and long-term expenditure.

- **Rocky Hill Reservoir Replacement**

  Installation of additional smaller water service reservoir to allow relining of existing reservoir to prevent further deterioration leading to asset failure. Proposal considered prudent and efficient.

- **Menindee WTP Major Works**

  Replacement of WTP at the end of its operating life with larger plant to service customers at Sunset Strip and Menindee caravan park. Proposal considered prudent and efficient but subject to separate pipeline project to Sunset Strip and Menindee caravan park proceeding.

- **Broken Hill Water Reticulation Replacement**

  Replacement of 1km of reticulation pipeline annually over each on the next 10 years prioritised by risk assessment. Proposal considered prudent and efficient.

- **Mica St WTP Capital Works Program**

  On-going program to maintain long-term treatment plant performance. Increases proposed above long-term average is to carry out concrete remediation and other activities to address corrosion at the plant. Proposal considered prudent and the works need to proceed, however the costs are not considered efficient as the repair work would have been preventable if corrosion protection was specified at the time of construction. Essential Water are pursuing cost recovery from contractors and consultants however addressing this issue at an earlier date would have improved the chance of cost recovery. Recommend removal of expenditure related to repair of severe concrete corrosion.

- **Replacement of Wills St WWTP**

  Construction of new WWTP to replace existing plant nearing the end of its useful life. The project is considered prudent, however the expenditure proposed for the 2019 determination period is not considered efficient. Recommend reduction in expenditure to allow completion of existing refurbishment work and allow investigatory works to confirm efficient scope and timing of further upgrades.

- **Non-System Capital Expenditure**

  Expenditure to cover furniture, fittings, plant and equipment and contribution to Essential Energy's IT-related capital expenditure. Other than the revised expenditure for the 2017-18 period where more explanation should be sought following IPART's Draft Report, the actual and forecast non-system capital expenditure is considered prudent and efficient.

- **Consequential Works Project – Item 1: Stephens Creek PS, Rocla pipeline section 4 & 5, Stephens Creek off-line storage**

  Refurbishment of two sections of the Stephens Reservoir to Mica St WTP, replacement of the existing pump station with a new pump station and balancing tank at Stephens Creek Reservoir. The project is considered prudent, however not efficient as the expenditure on these proposed works is not sufficiently urgent prior to a more rigorous assessment to define the optimum works required to maintain reliability objectives. Recommend provision be made to complete recommended studies in the current year and for works later in the period on the assumption that some of the pipework needs replacement to maintain service to customers directly connected to the pipelines.

- **Consequential Works Project – Item 2: Pipeline to the caravan park and Sunset Strip**

  Construct a pipeline and pump station to provide a water supply service to caravan park and sunset strip customers. This replaces the lower sections of the current Menindee to Stephens Creek pipeline which are currently used to service these customers but will be decommissioned on completion of the Wentworth to Broken Hill pipeline. Considered prudent and efficient.

- **Consequential Works Project – Item 3: Stephens Creek to Menindee pipeline grazier supply**

  Decommission of existing non-potable water supply service and replacement by construction of a new pipeline that delivers water from the Stephens Creek Reservoir. Assuming there is an obligation to service these customers and given the state of the pipeline the project is considered prudent, however not efficient. Given the relative cost and there are a small number of customers further service solution options should be explored. Recommend reduction in proposed expenditure is based on partial replacement of the northern section of the pipeline and providing bores for customers where access to groundwater appears reasonable in the south.

- **Consequential Works Project – Item 4: Pre-treatment at Mica Street WTP**

  Refurbish a decommissioned part of the Mica Street WTP to manage variations in water quality to raw water customers in the Silverton area. The project is considered prudent, however not efficient as it is the highest cost lowest risk option and quantifying the relative risks of the options needs to occur. Recommend reduction in proposed expenditure to that of the second highest cost option which will address the most problematic and best understood issues at this stage.

- **Consequential Works Project – Brine pond disposal**

  Reinstatement of land occupied by Essential Water as part of the Drought Response Emergency Works and used for activities to support that program. Considered prudent, however inefficient due to concerns regarding the accuracy of the proposed expenditure.

4.5.1. Key findings for capital expenditure (excluding consequential works)

Following the review of forecast capital expenditure other than that proposed for the consequential works program, the review team has recommended several adjustments. It has not determined that any projects should not proceed at all, rather there are some projects that require adjustments involving reductions.

The majority of the reduction applies to the Wills St WWTP where it is recommended that the capital expenditure for the Wills St WWTP be reduced from a total of $34.3 million to a total of $9.3 million – a reduction of 73 per cent, over the upcoming regulatory period. In making this recommendation, we note that although the plant is ageing and has a forecast life of 5 years, the plant continues to operate and meet EPA requirements for effluent quality and management. Essential Water has made a significant recent expenditure ($6 million forecast for the 2014-2019 period) on addressing the most pressing environmental contamination issues at the plant. This has provided Essential Water with an opportunity to undertake monitoring to assess the success of these works and confirm a renewal date and to undertake further reviews to identify opportunities for savings in future works.

The scope of these works, on top of other proposed works for the period (including consolidating the scope for and delivering the consequential works program), represents an unprecedented challenge for Essential Water. Determining a revised efficient start date will depend upon the results of the assessment of existing works and additional planning, we consider that the works that have recently been undertaken allow for construction to commence at the end of the 2019-2023 period.

The majority of the programs not reviewed in detail involve on-going expenditure programs on rehabilitation. A view on the efficiency of the remainder of the program can be developed based on material provided on asset management processes, condition assessment processes, the detailed review of the water main renewals program and the Rocky Hill service reservoir refurbishment and the previous expenditure reviews of Essential Water undertaken for IPART.

The current planning and decision-making processes utilised in the development of the current program appear much improved and closer to alignment with other water authorities of a comparable size and scope. There remain some unexplained variations, and some continuing challenges, and the challenges expressed in Section 4.7 below in relation to delivering the program as a whole. However, on the basis that the recommended reductions in expenditure above will reduce the overall program to a manageable level and that the consequential works are largely delivered with the assistance of external providers the remainder of the works are deemed efficient.

The following provides additional detail on the key findings for projects that have been found to have inefficiencies in the forecast expenditure. Further detail on each of the projects and programs reviewed can be found in Appendix A.

Replacement of Mica Street Water Treatment Plant

The current Mica Street WTP was commissioned in 2010 but is suffering from premature concrete corrosion. A report by CWT Water Treatment specialists in August 2017 identified that water in some of the processes was highly aggressive and that “the consultant responsible for specification of the plant failed to identify that this would occur and did not provide a protective coating.” It is understood that discussions are underway with the consultant and contractors involved to address this issue with a view to recover costs.

On-going expenditure on refurbishment of equipment at a plant this age can be expected to be in the region of $150,000 per year. An on-going program for refurbishment of equipment for the Mica St WTP can be considered prudent.

Additional proposed expenditure associated with the repair of corrosion driven damage cannot be supported as it would have been preventable if corrosion protection had been specified at the time of the plant construction. Given the time since commissioning Essential Water needs to provide evidence that these costs can be recovered from previous works consultants or contractors or that the CWT report is deficient before the proposed remedial expenditure is acceptable. Therefore, at this stage it is recommended the proposed expenditure related to repair of severe concrete corrosion amounting to $1.275 million and $2.175 million in 2018-19 and 2019-20 respectively not be supported.

Replacement of Wills St Waste Water Treatment Plant

Essential Water propose to construct a new Waste Water Treatment Plant (WWTP) at Wills Street to replace the existing WWTP which is approaching the end of its useful life. The proposed project involves $36.6m of expenditure with an allowance of $34.3 million in the 2019 determination period.

This is a large project for Essential Water compared to previous capital programs. The budget estimate for this project is not fully justified and cannot be supported. Nevertheless, the proposed amount is equal to the whole 2014-2018 four-year period capital budget (including the government funded works). The estimated management and support costs alone represent a significant investment in time and effort. Essential Water needs to have time to focus on this project to optimise the preferred solution and manage delivery risks adequately.

Essential Water has actual and forecast expenditure of $6.0 million in the current 2014 determination period on works to address environmental contamination and OH&S issues at the existing plant. The environmental impacts had been assessed as resulting from leaking structures, unlined earth storages and stormwater run-off. Remedial works to address these impacts were required by the EPA and requirements written into the plants EPA Licence. The remedial works are well underway and the EPA in April 2017 has removed one works requirement from the plants licence relating to the construction of concrete sludge cells and stockpile areas. Essential Water in June 2018 has also agreed with the EPA that the works to address the other environmental impacts (stormwater management plans, drains, bunding and ponds and refurbishment of primary tanks, digesters and filter tanks will be complete by July 2019. There are no other requirements written into the licence or expressed by the EPA in correspondence sighted by Aither.

Otherwise the plant is ageing but generally provides robust performance reliably meeting the EPA effluent discharge requirements with the exception of pH requirements in the effluent. Plants of this type commonly have pH issues which can generally be controlled as part of re-use scheme management. The EPA has not expressed a specific concern with the pH issues.

A condition report in 2013 indicated that without further repair work the plant would start to fail. While significant further investment will be required the scope and timing needs to be reviewed, particularly since the significant investment in recent years has addressed some of the major plant issues. It does appear reasonable that the effectiveness of the works undertaken be assessed using the ongoing environmental monitoring program. With this information decisions in consultation with the EPA can be made on the scope and timing of further works.

Given the arguments presented above the current proposal is not considered efficient for the 2019 determination period. Time is needed to assess the success of the recently completed works in reducing environmental contamination and to review the scope and timing of future works. It is recommended that the proposed expenditure of $34.3 million for the 2019-23 period is reduced to $9.3 million. This recommended expenditure allows for completion of existing refurbishment work, investigatory works to confirm efficient scope and timing of further upgrades and to commence work on those upgrades.

4.5.2. Key findings for consequential works projects

As a result of our review, we consider that the consequential works program for the 2019-2023 period should be reduced from the proposed total capital expenditure of $59.1 million to $21.2 million (this represents a 63 per cent reduction). The recommended expenditures for the individual projects all included a pro-rata allowance for the consequential works project management and planning costs. It has been assumed that with the recommended reductions in scope these can be reduced accordingly.

The following provides explanations for each of our recommended changes to the forecast expenditure. More detail on these programs and the others reviewed in detail is contained in Appendix A.

The bulk of the efficiency issues that have been identified with Essential Water's consequential works program relate to methods of analysis that adopt worst case, least-risk approach to proposed works. Recommendations in all these cases have been made to undertake more investigative work to ensure the best approach is taken to address the works. These will take time, and in most cases will mean a delay in expenditure. However, it is not considered that this will expose Essential Water to any unmanageable service risk and will still allow operational costs savings from the early decommissioning of the pumping stations on the Menindee to Stephens Creek pipeline.

Proposed expenditure reductions in all but the Brine Pond Disposal works are based on alternative management approaches to the issues. However, the nature of this review is such that definitive examination of the issues involved is not possible and the recommended further investigations may determine that different scopes or timing is appropriate.

Consequential Works Project - Item 1: Stephens Creek PS, Rocla pipeline section 4 & 5, Stephens Creek off-line storage

Essential Water's proposition is that the Wentworth to Broken Hill pipeline is contracted to deliver 98% reliability of supply. Essential Water proposes expenditure of $33.2 million on refurbishment of two sections of the Stephens Reservoir to Mica St WTP, replacement of the existing pump station with a new pump station and balancing tank at Stephens Creek Reservoir. The works are aimed at maintaining its current bulk water reliability of supply customer level target of 99.9 per cent after the Wentworth to Broken Hill pipeline is commissioned.

Regardless of the proposed use of these assets to supplement future bulk water supply reliability, the assets to be renewed or replaced in this project have other roles involving supply of raw water to customers in the area. Decisions would still need to be made on their renewal as part of 'business-as-usual' in the future, whether or not the Wentworth to Broken Hill pipeline had been constructed or not.

It is not clear how the reliability assessment of 98 per cent for the Wentworth to Broken Hill pipeline has been arrived at by Essential Water. WaterNSW's IPART 2018 pricing submission for the pipeline specifies its "best endeavours" to deliver 100 per cent of flow on any peak day demand. No other documentation relative to an assessment of the reliability of the bulk water service has been provided.

Information presented by Essential Water on the need for these works appears to be based on worst case scenarios. Normally investment of this magnitude based on reliability challenges would require Monte-Carlo type modelling of the probability of failure events based on a comprehensive range of scenarios. There is no evidence that such analysis has been undertaken. Furthermore, in essence there has been, and currently is, a higher reliability based on these assets at present than there will be when the Wentworth to Broken Hill pipeline is commissioned.

As outlined above, expenditure on these proposed works is not sufficiently urgent prior to a more rigorous assessment to define the optimum works required to maintain reliability objectives. Therefore, the proposed expenditure is considered inefficient and it is recommended that it not be supported at this time. However, it is recommended that $4.8 million of provision be made consisting of $200,000 to complete recommended studies in the current year and the remainder for works later in the period on the assumption that the pipework replacement is needed to maintain service.

Consequential Works Project - Item 3 Stephens Creek to Menindee pipeline grazier supply

Essential Water proposed construction of a new pipeline that delivers water from the Stephens Creek Reservoir at an estimated cost of $11.4 million. The pipeline will supply the 11 graziers affected by the decommissioning of the current non-potable supply service.

The assumption that there is an obligation to continue to provide a bulk service to the graziers was not discussed fully in the business case provided by Essential Water. It is likely that the original supply to the graziers was opportunistic and would have involved minimal if any capital expense. However, the long-term supply of water to these customers whether there is a supply or agreement or not (which is not clear) may set an implied obligation to supply which may need to be explored before any decision to cease supply is made.

Analysis of a range of options to serve the existing pipeline customers has recommended the project put forward by Essential Water. The recommended option is the lowest cost option involving either a new pipeline to the customers or retaining the existing pipeline in operation and back-feeding raw water from Stephens Creek. We note that long-term retention of the existing pipeline and back-feeding from Stephens Creek has significant costs associated with maintaining the pipeline in addition to water quality risks. Servicing from groundwater sources and other approaches had been considered but not considered feasible and either not evaluated further because of customer concerns or involved similar or more extensive expenditure to the recommended option.

Given the relatively high cost to supply the small number of customers, further investigations are warranted to search for more innovative approaches. Other possible approaches to supply of these customers that should be explored more fully include a hybrid supply solution involving supply from Stephens Creek for the northerly customers and access to groundwater for the customers in the south, retention of parts of the existing pipeline, more assistance to customers with storage and water quality management and/or partnership arrangements with customers for management of pipeline assets.

In the interim period to allow the pump stations on the Menindee to Stephens Creek reservoir to be decommissioned and operational savings realised it is proposed that the pipeline be temporarily modified to back feed water from Stephens Creek as suggested in one of the options proposed by Essential Water.

Given the possibility of other lower cost options at this stage the current proposal is not considered efficient. If a policy decision is made to continue to provide a service to these customers, it is recommended that the proposed expenditure for the 2019 determination period be reduced from $11.4 million to $5.3 million to allow for additional planning, monitoring of water quality, support for customer-side water quality advice and management and a provision of $5 million in the last two years of the period for works to commence. The recommended reduction in expenditure is based on back-feeding from Stephens Creek, partial replacement of the northern section of the pipeline and providing bores for customers where groundwater access appears reasonable in the southern end.

The allowance for partial replacement of the pipeline only is based upon the proposition that customers at the southern end of the pipeline can be serviced by what appears to be suitable quality groundwater on or near their properties, that current pipe condition issues will be eased by pressure reduction from current levels and through observations by Essential Water personnel on-site that not all the pipeline need be replaced.

Water quality monitoring and customer management measures are a critical component of the program to manage risks. If further exploration for different approaches prove unsuccessful or the results of the water quality monitoring lead to the demonstrable need for earlier or more extensive upgrade of the pipeline than proposed, then cost pass-through mechanisms should be considered.

Consequential Works Project - Item 4 Pre-treatment at Mica Street WTP

Essential Water proposed to refurbish a decommissioned part of the Mica Street WTP at a cost of $2.3 million. This will allow Essential Water to manage variations in the quality of raw water supplied to customers in the Silverton area. Quality variations are a result of the Wentworth to Broken Hill pipeline delivering from a different raw water source to those used currently.

The need for the plant to operate will be intermittent as variations in the raw water quality requiring treatment will not apply every year.

Essential Water has adopted the highest cost option out of several options developed by a technical expert on the basis that it provided the lowest risk to Essential Water and its customers. However, quantification of the relative risk of the lower cost options to customers should be sought before proceeding with this option. Therefore, the proposed option is considered not efficient without better quantifying the relative risks of the options.

It is recommended that a lesser provision equivalent to the second highest cost option be made at this time. This results in a reduction of the proposed $2.3 million expenditure down to $1.0 million.

Consequential Works Project - Brine pond disposal

Essential Water propose to reinstate the land occupied as part of the Drought Response Emergency Works and used for activities to support that program. The proposed cost for the works is $10.5 million to dry and remove a salty residual brine from the short-term treatment process, remove pond liner and remove associated pipework from the land.

Options were reviewed for undertaking major cost elements of the works. There is significant variation around the upper and lower level of the cost estimate and it is unclear how the final proposed budget was selected. However, early trials of techniques (as proposed by Essential Water) are appropriate to better quantify risk levels before confirming a budget.

The proposed expenditure is considered inefficient as there are concerns regarding the accuracy of the proposed budget. Adoption of the lowest estimate plus an allowance for a significantly increased contingency is considered reasonable. It is recommended the proposed expenditure be revised down to $8.5 million. Successful trials may well reduce the expenditure needs further.

4.5.3. Summary of capital project reviews

After conducting the review of past, forecast and proposed capital expenditure for individual projects, the review team makes the following recommendations for adjustments:

- a reduction of $1.275 million in 2018-19 for inefficiencies arising from premature corrosion requiring remedial work at the Mica St WTP. It is considered that more appropriate specification at the construction stage for the asset would have resulted in this corrosion remedial work not being required. Earlier efforts at cost recovery from consultants and contractors would have reduced cost risks for Essential Water.
- Wills St WWTP be reduced from a total of $34.3 million to a total of $9.3 million – a reduction of 73 per cent over the upcoming regulatory period – to allow for Essential Water to monitor the success of the existing measures and confirm and to undertake further reviews to identify opportunities for savings in future works and in management and coordination costs. It is anticipated construction work on a major upgrade will commence in 2022-23 and continue into the next determination period.

- consistent with the review of historical capital expenditure above, we consider there are inefficiencies within the Mica St WTP expenditure relating to premature corrosion and have therefore reduced the proposed expenditure by $2.2 million in 2019-20.

Consequential works program

- a recommendation of $4.8 million (compared to Essential Water's forecast of $33.2 million) to ensure replacement of some works for Stephens Creek pump station to meet service obligation
- recommended expenditure of $5.3 million based on alternative options to provide supply to graziers between Stephens Creek and Menindee (compared to Essential Water's forecast of $11.4 million)
- a reduction from $2.3 million to $1 million has been recommended to proceed with an interim solution for pre-treatment at the Mica Street WTP to better understand the long-term risks, and
- in relation to the brine pond disposal project, it is recommended that adopting the lowest cost alternative with an additional contingency allowance to account for the increased delivery risk it is recommended the proposed expenditure of $10.5 million be reduced by 19 per cent to $8.5 million.

4.6. Recommended capital expenditure

The recommended reduction in capital expenditure for the 2014-2019 determination period is discussed in detail in Section 4.4. The majority of the expenditure was considered efficient with a recommended reduction due to inefficiencies of $1.775 million in 2018-19. The outcome is summarised in Table 13 below.

Table 13 Recommended capital expenditure showing corporate overheads ($000s, $2018-19)

Expenditure	2013-14 actual	2014-15 actual	2015-16 actual	2016-17 actual	2017-18 actual	Total 2014-18	2018-19 forecast	Total 2014-19
IPART determination 2014	3,859	8,366	7,646	12,913	13,575	**42,500**	N/A	
Actual Forecast expenditure excluding government funded works	4,491	6,009	4,069	5,690	5,924	**21,692**	16,232	37,924
Actual Direct costs excluding government funded works	3,797.83	5,024	3,440	3,866	5,550	**17,879**	13,999	31,878
Overheads	693	985	629	1,824	374	**3,813**	2,233	6,046
Recommended project adjustments direct cost	0	0	0	0	0	**0**	(1,080)	(1,080)
Total Recommend direct expenditure	**3,798**	**5,024**	**3,440**	**3,866**	**5,550**	**17,879**	**12,919**	**30,798**
Overhead adjustment							(194)	(194)
Total overhead	**693**	**985**	**629**	**1,824**	**374**	**3,813**	**2,039**	**5,852**
Total Recommend capital expenditure	**4,491**	**6,009**	**4,069**	**5,690**	**5,924**	**21,692**	**14,958**	**36,650**

Source: All data sourced from Essential Water's Submission to IPART updated by commercial in confidence document EW September AIRSIR – Final 21 Sept. and consideration by Aither of recommended project adjustments.

Following the review of direct capital expenditure proposed by Essential Water for the next regulatory period, some adjustments are recommended as summarised in the table below (these recommendations are exclusive of corporate overheads).

Table 14 Recommended direct capital expenditure including non-system expenditure ($000s, $2018-19)17

Financial year	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct capital expenditure	**13,305**	**18,218**	**15,882**	**8,871**	**56,276**
Adjustments					
Project 12 Mica St WTP	(1,843)				(1,843)
Project 13 Wills St WWTP		(11,312)	(10,665)	818	(21,159)
Sub-total recommended adjustments	**(1,843)**	**(11,312)**	**(10,665)**	**818**	**(23,002)**
Total recommended direct capital expenditure	**11,462**	**6,906**	**5,217**	**9,689**	**33,274**

Source: All data sourced from Essential Water's Submission to IPART updated by commercial in confidence document EW September AIRSIR – Final 21 Sept. and consideration by AITHER of recommended project adjustments.

In addition to the recommended adjustments in Table 13 and Table 14 above, we have made a number of recommendations to the proposed consequential works program. We note that these recommendations to the consequential works program are only applicable where the government funding is not provided and therefore Essential Water is seeking to pass-through these costs to customers. This is because this expenditure does not form part of the forecast expenditure for Essential Water from which prices are based on. Table 15 provides a breakdown of the recommendations for this expenditure.

The figures in Table 15 are inclusive of Essential Water overheads. The data presented in Essential Water's business case submission for the consequential works program contained a statement that overheads were included however there was no indication of that amount. Essential Water needs to clarify the overhead amount included.

[17] Overheads associated with this direct capital expenditure is considered in section 5.5.

Table 15 Recommended capital expenditure for consequential works program ($000s, $2018-19)

Financial year	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed capital expenditure	**10,010**	**39,203**	**5,268**	**2,285**	**2,285**	**59,050**
Adjustments						
Item 1: Stephens Creek PS, Rocla pipeline section 4 & 5, Stephens Creek off-line storage	(3,620)	(24,788)				(28,408)
Item 3 Stephens Creek to Menindee pipeline grazier supply	(5,589)	(5,639)	100	2,000	3,000	(6,128)
Item 4 Pre-treatment at Mica Street WTP	(100)	(1,200)				(1,300)
Brine pond disposal		(1,018)	(1,018)			(2,035)
Sub-total recommended adjustments	(9,309)	(32,645)	(918)	2,000	3,000	(37,871)
Total recommended capital expenditure	**701**	**6,558**	**4,350**	**4,285**	**5,285**	**21,179**

Source: All data sourced from Essential Water's Submission to IPART updated by commercial in confidence document EW September AIRSIR – Final 21 Sept, Essential Water Spreadsheet 30-year capital plan with consequential water October 2018, Broken Hill Long Term Water Supply – Consequential Works Business Case – Essential Water April 2018 – Final Dated 28 June 2018. and consideration by AITHER of recommended project adjustments

4.7. Contingency allowance

Essential Water did not provide any documentation that prescribes a standard approach to providing contingency allowances for project planning, analysis, budgets or approvals. Cost estimate documentation and Gate 2 capital approval submissions of those projects that were reviewed in detail were examined for evidence of consistency in contingency allowances. From this review, we note that contingencies were clearly identified in the cost estimates and in a number of cases a breakdown of how they had been applied to each stage of the project was provided. Further to this, contingencies were applied as percentages of the direct cost estimates and overhead allocations also applied to contingency allowances.

Based on our review, we identified inconsistencies in the application of contingencies to some projects, however the general contingency applied to recent projects in the planning stage is 30 per cent which aligns generally with that for water industry works. Current practice with larger organisations is to use a risk and opportunity assessment to build a probability-based contingency

amount. We recommend that Essential Water encourage their consultants to adopt similar approaches.

Of the larger programs that were reviewed:

- Wills St WTP upgrade (prepared by PWA), has included a contingency of 20 per cent on the direct costs which results in less than 15 per cent on the project overall.
- The consequential works includes an average contingency of 30 per cent over the works for that program and is consistent with the stage of the projects where very little on-ground investigation other than concept development has been undertaken thus far.
- Ongoing programs adopt average unit rates for budget estimating processes which is appropriate.

Overall, it is considered that contingency allowances adopted by Essential Water are appropriate, and no adjustment is recommended to the program on that basis.

4.8. Deliverability of capital expenditure

In considering the deliverability of Essential Water's capital program, there are three factors to consider:

- The significant increase in Essential Water's forecast capital expenditure
- The magnitude of the consequential works program, and
- Our recommended changes to the forecast capital expenditure.

We note that Essential Water is forecasting a capital program for the four-year period 2019-2023 (excluding the consequential works) that is 190 per cent of the 2014-2018 four-year period.[18] In delivering this larger capital program, Essential Water is proposing project delivery methods that are consistent with those used historically by the business. In terms of the proposed delivery methods, we note that:

- these delivery methods generally consist of conventional approaches that have been selected by management
- are unlikely to attract innovation and highly competitive pressure
- Essential Water's remote location would not normally encourage new entrants, and
- a larger program does provide an opportunity to attract new participants and to take new more progressive approaches, but in-house management experience and capability would present risks for these progressive approaches.

While the consequential works are proposed to be managed through the PWA, we consider that there is still likely to be internal resourcing demands on Essential Water to ensure an efficient process and final handover of the projects. The consequential works add considerably to the already large capital program, thereby further increasing the deliverability risk for the business.

As outlined in Section 4.6, we have recommended a number of changes to Essential Water's proposed capital program (including the consequential works). These recommended changes have a considerable impact on the overall size of the capital program for the upcoming regulatory period and

[18] This increases to 300 per cent when consequential works are also considered.

provide an opportunity to re-profile the capital program and alleviating the concerns that we had in regard to deliverability.

If these recommendations were not adopted, we would have concerns regarding the capacity of Essential Water to deliver its proposed capital program over the upcoming regulatory period.

4.9. Asset lives

The review team were asked to consider the appropriateness of the asset lives used to calculate regulatory depreciation (return of capital) in Essential Water's pricing proposal and recommend adjustments if appropriate.

Essential Water proposed to maintain the asset lives for water and sewerage assets from the 2010 and 2014 determinations. Essential Water proposed a new asset class – Corporate assets – to account for non-system assets such as IT, plant and equipment, motor vehicles and buildings. The proposed asset lives for these assets was set at 25 years.

Table 16 Asset lives proposed by Essential Water

	Corporate assets	Water assets	Sewerage assets
Remaining life	23	50	49
Standard life	25	98	89

Source: Essential Water Pricing Submission, p. 162.

Subsequent to the provision of the pricing submission, Essential Water provided revised information for the Corporate assets which provided a more granular breakdown of the non-system assets:

- ICT – four years
- Fixtures and Fittings/Plant and Equipment – 6.7 years
- Motor vehicles – 15 years
- Buildings – 50 years.

Essential Water stated that these asset lives were the same as those used in the AER's regulatory framework for Essential Energy.

In reviewing this revised information, we note that the ICT assets cover both computing equipment and a share of the enterprise systems that are applied across the broader Essential Energy. It does not cover assets such as SCADA, which is captured within the water network assets.

In considering other similar reviews, we note that for its 2016 review Sydney Water proposed (and was subsequently approved by IPART) a 10-year asset life for new corporate ICT assets. Through the review it was noted that Sydney Water had new systems and ERP assets which had assumed lives of 15 years, while other computer systems had smaller 5-year asset lives. This provided a weighted average of approximately 10 years and was therefore accepted.[19, 20] Given this, Essential Water's application of a 4-year life for ICT corporate assets appears to be conservative and is likely to place

[19] Cardo Atkins, *Sydney Water Corporation – Expenditure Review*, December 2015, p.166.

[20] IPART, Review of prices for Sydney Water Corporation – Final Report, June 2016, p.128.

upward pressure on customer prices. In the absence of further information provided by Essential Water to justify the application of a 4-year life, we recommend adopting a consistent asset life for ICT as IPART's decision for Sydney Water.

In terms of the other asset classes, we do not recommend any changes to the proposed asset lives.

4.10. Performance against output measures

Essential Water has outlined its service standards and performance against them during the current determination period in Table 3-2 of its pricing submission.[21] Many of Essential Water's service standards are based on legislated regulatory requirements, while other standards were developed by Essential Water through consultation with its customer base on their willingness to pay for costs associated with specific service targets.

Essential Water's submission outlines its existing service standards covering:[22]

- Availability of water supply
- Water quality
- Response times
- Sewerage
- Complaints
- Notice periods
- Duration of planned interruptions

In summarising its performance during the current determination period Essential Water stated it has *"met or exceeded its customer service standard obligations"*.[23]

In our assessment of Essential Water's performance against its service targets for the current determination period we found that a number of quantitative targets were not appropriately measured against. In Table 3-2 of its submission, Essential Water has specified feedback received from customer surveys as a measure of performance against quantitative targets.[24] We note service standards covering water quality, sewerage system failures and effluent discharge have appropriate measures in place to ensure compliance with relevant regulatory requirements.

The lack of appropriate measures during the 2014 determination period mostly relate to the recording of response times for water and sewerage system failures. Essential Water has outlined quantitative response time targets but has specified that performance against the targets is not measured on a job by job basis. Essential Water has instead specified that "anecdotal evidence (shows) that service response times are effective" by tying the measure to its customer satisfaction survey.

Further to this, Essential Water has only specified how it has tracked against several of its targets for a single financial year within the current determination period. We requested further information from Essential Water to substantiate performance against specified service standards during the 2014

---

21 *Essential Water IPART Submission*, July 2018, pp 80-85

22 *Essential Water IPART Submission*, July 2018, p.17

23 *Essential Water IPART Submission*, July 2018, p.79

24 *Essential Water IPART Submission*, July 2018, pp 80-85

determination period. The documentation supplied by Essential Water did not provide any further insight regarding actual performance to that outlined in its submission to IPART.

We note that one of Essential Water's service standards specifies that water restrictions should not be applied more than 5 per cent of the time. However, during the 2014 determination period Essential Water has identified non-conformance against this target due to two years of restrictions that were required in response to sustained drought. Essential Water states that the Wentworth to Broken Hill pipeline should improve the reliability of supply.

4.10.1. Proposed service standards for the 2019 determination period

Essential Water is not proposing to change its existing service levels from those it set for the 2014 determination period sighting the balance between addressing customer affordability and ensuring sufficient funding to meet service obligations.

Essential Water has identified the need for appropriate measuring of performance against its specified response time targets and states that will implement a procedure to ensure response times are measured in an appropriate system.[25]

Aither notes that Essential Water's engagement outcomes state customers rated water quality as an area in need of improvement. Essential Water has stated that higher quality raw water is expected to be provided by the Wentworth to Broken Hill pipeline, improving all aspects of its water quality and treatment process.[26] Furthermore, Essential Water identified that changes to the level of service may eventuate because of the connection to the new pipeline.[27]

4.10.2. Recommendations

In assessing the appropriateness of Essential Water's continuation of its existing output measures Aither considered feedback received from Essential Water's customers during its engagement program to inform its pricing submission. Further to this, we believe our recommended changes to Essential Water's proposed operational and capital expenditure will not compromise its ability to continue to meet its required service standards during the 2019 determination period.

It is evident that Essential Water is currently lacking in its measurement against quantified targets. Essential Water's overarching statement that it has *"met or exceeded its customer service standard obligations"* is not able to be verified due to the lack of measures and shortage of information provided by Essential Water to cover the entire 2014 determination period.[28] It is for this reason that Aither is also unable to consider any appropriate changes to non-compulsory service targets for the upcoming 2019 determination period.

We note that Essential Water has identified its inability to measure itself against its response time targets as an issue and specifies it will implement appropriate procedures to capture performance. Aither advises that these procedures should be in place prior to the beginning of the 2019 determination period. In addition to these procedures, we recommend that further improvements are made with regard to collecting data to measure Essential Water's performance against output targets.

---

25 *Essential Water IPART Submission*, July 2018, p.82

26 *Essential Water IPART Submission*, July 2018, p.97

27 *Essential Water IPART Submission*, July 2018, p.89

28 *Essential Water IPART Submission*, July 2018, p.79

This will help with communication with customers regarding the level of service they are receiving and future regulatory reviews.

5. Operating expenditure

This section discusses Essential Water's past and forecast operating expenditure, and more specifically, our opinion as to whether that expenditure should be considered to be prudent and efficient, given Essential Water's objectives, obligations and operating environment.

5.1. An overview of Essential Water's forecasting approach

Essential Water adopts a top-down approach to forecasting expenditure rather than a bottom-up approach.[29] In response to requests, Essential Water states that it does not have the capacity to undertake a bottom-up approach to forecasting. Essential Water notes that it has used the 2018-19 Q3 budget to forecast operating expenditure over the 2019-23 regulatory period

Further to this, Essential Water does not undertake forecasting of operating expenditure by function – that is, the forecasts for each cost function in the AIR increase and decrease each year by the same proportion. This implies that Essential Water simply forecast any changes to functional operating expenditure (reservoirs for example) based on the overall change to operating expenditure for the water network. Given this, any analysis of operating expenditure by function is meaningless.

In developing its forecast operating expenditure, Essential Water notes that it is based on:

- Government support to offset water supply to the bulk water storage 21km from Broken Hill
- a small pipeline supply from Menindee to Sunset Strip
- capital project works to secure the Stephens Creek supply zone, and
- Menindee pipeline customers no longer reliant on the aged Menindee pipeline.

5.2. Approach to assessing forecast operational expenditure

To provide sufficient depth of analysis in support of any findings in relation to prudency and efficiency of operating expenditure, the review team sought to first understand, and then critique, the methodology and underlying assumptions adopted by Essential Water to establish their forecasts. As a result, the review team focused on:

- understanding the factors driving Essential Water's future costs, and
- ascertaining the assumptions and methodologies Essential Water adopted to translate those cost drivers into an operational expenditure forecast.

Having regard to the above, our assessment of the prudency and efficiency of Essential Water's operating expenditure involved, amongst other things:

- reviewing Essential Water's regulatory submission to identify key forecasting issues and assumptions,

[29] A top-down approach is a high-level approach that uses overarching trends and forecasts to apply to expenditure totals to derive forecasts, whereas a bottom-up approach is a more granular approach that develops forecasts based on expected changes to each individual expenditure item.

- meeting with Essential Water staff in Broken Hill to discuss expenditure forecasts, and
- providing Essential Water with multiple information requests related to their operating expenditure forecasts. This step was complicated by the fact that Essential Water provided a number of responses late in the review process.

5.3. Past operating expenditure

In its original submission to IPART, Essential Water stated that:[30]

> *Total operating expenditure (opex) for this current regulatory period to the middle of 2019 is forecast to be $67 million ($2018-19). This is $8 million, or 14 per cent, above IPART's allowance for the current period.*

Table 16 compares the allowed and actual operating expenditure for Essential Water over the 2014 determination period.

Table 17 Comparison of allowed and actual operating expenditure ($2018-19)

	2014-15	2015-16	2016-17	2017-18	TOTAL 2014-18
IPART opex allowance	15,028	14,707	14,842	14,336	**58,913**
Essential Water actual opex	14,388	16,790	17,593	18,105	**66,876**
Difference	-640	2,083	2,751	3,769	**7,963**
Difference %	-4%	14%	19%	26%	14%

Source: Figure 7-2 *Essential Water Pricing Submission*, p.135

In summary, Essential Water overspent the allowance set by IPART's 2014 determination by around $8 million or 14 per cent. While actual spend in 2014-15 is lower than the allowed operating expenditure for that year, the later years of overspend are of a significantly greater magnitude. In its submission, Essential Water states that the key reasons for its higher operating costs are:[31]

> *lower than anticipated capital expenditure over the period. As a result, opex received a larger share of the corporate overheads that are allocated to every dollar spent,*
>
> *an increase in electricity prices for the major pumping stations and an increased need to pump during peak energy tariff periods due to the drought,*
>
> *an increase in the cost of chlorine (which is produced with electricity) and an increased need for chemical treatment as a consequence of minimal water levels in Menindee Lakes and local reservoirs, and*
>
> *consultancy costs for project assessments and business case development associated with the new water supply arrangements, IPART preparation, IWCM strategy and regulatory compliance.*

[30] *Essential Water Pricing Submission*, p.19

[31] *Essential Water Pricing Submission*, p.137

Figure 7-4 of Essential Water's submission shows that the operating expenditure overspend during the 2014 determination period can predominantly be attributed to its water services, with actual sewerage expenditure closely resembling the determination forecast over the period (on average).[32] Essential Water's submission identifies the increases in energy costs and pumping requirements have contributed to:[33]

> *a $0.3 million (368 per cent) increase in its monthly electricity bill between January 2017 and January 2018.*

Aither notes that this justification explains a relatively large portion of the overspend over the later part of the 2014 determination period. Essential Water responded to a request for further information regarding the variation of actual operating expenditure over the current period. The response stated:[34]

> *When overheads are removed from the opex expenditure, the underlying direct costs can be clearly seen and indicate much less variation in expenditure than what appears on the surface*

Actual overhead allocation to operating expenditure for the 2014 period is higher than the amount specified by IPART in its determination, however this does not account for the large portion of higher actual direct operating expenditure. We note that in 2014 SKM found that:[35]

> *Regulatory opex approved by IPART for the current regulatory period has been exceeded in each year, largely due to the "over-expenditure" / "over-allocation" of corporate overheads.*

Our findings for corporate overheads are covered in Section 5.5 of this report. Essential Water has provided little by way of further detail regarding the actual breakdown of the other drivers of overspend during the entire period. Furthermore, Essential Water's higher actual spend has occurred despite the fact that, over the period, water consumption has been lower than forecast. Essential Water's submission states:[36]

> *actual water sales over the current regulatory period (2014-15 to 2016-17) are tracking 12 per cent below IPART's allowed sales. Actual sales have declined by 5.2 per cent per year over the first three years of the 2014 determination period.*

Due to the timing of the pricing submission, Essential Water's expenditure information was based on forecast actuals for 2017-18. This information was subsequently updated by Essential Water through the provision of a revised AIR based on actual expenditure information for 2017-18. Although the information was provided only three months apart, this revised information resulted in a considerable change in the operating expenditure for 2017-18. The key changes were:

- an increase of approximately $2 million for hire services, and
- a decrease of over $0.6 million for sewerage labour expenditure.

---

32 *Essential Water Pricing Submission*, p.135

33 *Essential Water Pricing Submission*, p.135

34 Additional information provided by Essential Water on 18 October 2018

35 SKM, *Essential Energy Expenditure Review – Final Report*, November 2013, p. 105

36 *Essential Water Pricing Submission*, p.102

Table 18 Comparison of actual 2017-18 and forecast 2017-18 in Essential Water's AIR (nominal)

	Water	Sewerage	TOTAL
July Submission	13,885	3,778	**17,663**
September Revision	15,809	2,873	**18,682**

Aither's findings

On face value, the underlying reasons for Essential Water's higher actual operating expenditure than IPART's 2014 determination appear reasonable. However, Aither is unable to verify the prudency and efficiency of Essential Water's actual expenditure over the period due to the limited detail provided by Essential Water in its submission and in response to our questions.

We are concerned that the considerable change in the 2017-18 actual information (provided in September 2018) from the forecast actuals within the pricing submission (provided in July 2018) is reflective of Essential Water's broader forecasting processes. We have taken this into account when considering the efficiency of Essential Water's forecast operating expenditure.

5.4. Future operating expenditure

To meet this objective, the review team have separated out our discussion into the following sub-sections:

- Changes in expenditure resulting from the Consequential Works
- Cost allocation methodology
- Labour costs
- Hire services
- Materials costs
- Electricity costs
- Capitalisation Policy
- Other on-going operational expenditure costs
- On-going productivity and efficiency improvements
- Final recommendations for changes

5.4.1. *Changes in expenditure resulting from the Consequential Works*

As discussed in Section 4.3, Essential Water is proposing a number of consequential works required to ensure the Wentworth to Broken Hill pipeline will provide bulk water supply to Broken Hill. These consequential works will have a subsequent impact on the operational expenditure for the business going forward – both in a positive and negative sense.

Within its pricing submission, Essential Water states:

> *'Operational savings are also forecast due to the planned decommissioning of the Menindee pipeline and associated pumping stations between Menindee and Stephens Creek*
>
> *Further efficiency improvements can be made, but are dependent on the final arrangements for the Wentworth to Broken Hill pipeline'*[37]

Further information provided by Essential Water stated that these operational savings from the decommissioning comprise a reduction of four FTEs and a significant reduction in electricity costs. Essential Water state that these savings have been incorporated within the AIR provided.

Based on the information provided by Essential Water, it is not clear whether any other operational costs (or savings) have been incorporated into the forecast operating expenditure – for example materials expenditure for changes in maintenance requirements. This lack of clarity is demonstrated in the final sentence of the above quote which implies that there are further efficiencies that have not been incorporated as the final arrangements were not known at the time of the submission.

We note that operational savings are identified as part of the business case for the consequential works, however these savings are in reference to the defined base case (i.e. including forecast cost increases if no action were undertaken), rather than the actual cost base. Therefore, it is not possible from the information contained within the business cases to determine specific operational expenditure savings that are to be incorporated within the forecast expenditure.

For the purposes of this report, we have taken on face value Essential Water's comment that forecast operational expenditure incorporates the impact of the consequential works, following IPART's Draft Report we would expect to see more information from Essential Water in regard to how these costs have explicitly been incorporated in the. Our recommendations in relation to the consequential works are unlikely to impact on the subsequent operational expenditure for the business.

5.4.2. Bulk water transportation costs

The bulk water transportation costs will be determined through IPART's assessment of WaterNSW's water transportation services provided through the Wentworth to Broken Hill pipeline and the demand forecasts for Essential Water.

The recovery of these costs will either be through funding provided by the NSW Government, or Essential Water's customers through the IPART-regulated charges. There is no need to undertake a prudency and efficiency assessment of any forecast expenditure.

5.4.3. Labour costs

Labour costs comprise a considerable proportion (approximately 30-40 per cent) of the forecast operating expenditure for the period.[38] This can have a material impact on the overall revenue requirement and customer prices and therefore it is important to ensure that the expenditure allowance is efficient.

---

[37] *Essential Water Pricing Submission*, p.19.

[38] This excludes the labour-related corporate costs as we were not provided a breakdown of this forecast expenditure.

In developing its labour expenditure forecasts, Essential Water noted that:

- its labour costs are closely aligned to FTE numbers[39]
- it does not forecast labour at an individual FTE-level beyond the upcoming year (2018-19), and
- it does not have the resources available to have dedicated staff for individual FTE-level forecasts.

Essential Water also stated that its forecast of labour operating expenditure is impacted by changes in the overall operating and capital programs:

> *This means that if FTE resources are dedicated more to sewer capex projects being undertaken in a year, then more labour cost will be directed to sewer capex and less labour cost will be directed to sewer opex and water projects in that year. Over time though, the amount of labour directed to these components remains reasonably stable and that is how the forecast has been prepared.*[40]

In considering the forecast labour expenditure, there are some key issues that we have considered:

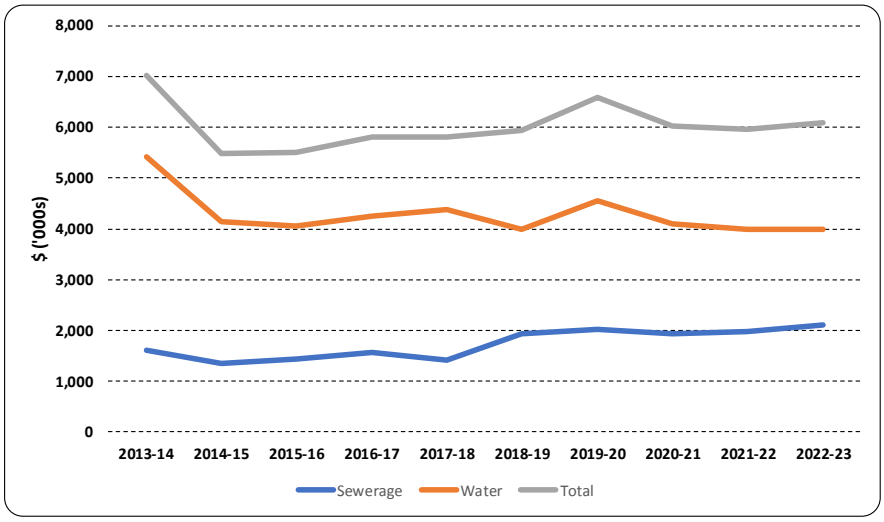
- forecast variations in labour expenditure
- base level of labour expenditure
- escalation rate for forecast labour expenditure
- changes in FTEs over the regulatory period, and
- changes in overtime costs.

Forecast variations in labour expenditure

Figure 3 demonstrates the change in labour costs from one year to the next – both across water and sewerage. In explaining these variations, Essential Water states that '*with limited resources available, each increase in one area is offset by a corresponding decrease in another*'[41]

[39] Additional information provided by Essential Water on 18 October 2018, p.3.
[40] Additional information provided by Essential Water on 18 October 2018, p.3.
[41] Additional information provided by Essential Water on 18 October 2018, p.4

Figure 3 Actual and forecast labour operating expenditure from 2013-14 to 2022-23 ($000's, $2018-19)



We consider the types of variations outlined by Essential Water to be appropriate as there is likely to be movement between water and sewerage and operating and capital depending on the nature of activities for the business. Given this, as a general rule we would expect to see a reduction in operating expenditure labour costs where there are increases in capital expenditure costs (and vice versa) as a larger capital program will generally require more personnel to manage it.

We also note that Essential Water stated in its response to further information that:

> *Outer year labour forecasts are based on historical results. Total labour is closely aligned to FTE numbers. We do not forecast labour at individual FTE level beyond the next outer year (being 2018-19). Furthermore, we do not forecast by water and sewerage categories.*[42]

In considering Essential Water's expenditure forecasts, we note that these variations driven by changes in the capital program are difficult to reconcile. For example, the capital program for the regulatory period is forecast to be over $10 million each year (in one case over $20 million), in our view it is unlikely that there would be a reduction in the capitalisation of labour costs which would lead to an increase in operational labour costs. It is more likely that there would be an increase in the capitalisation of costs to manage the significantly increased capital program, which would place downward pressure on the operational labour costs.

While we have recommended reductions to the proposed capital expenditure, the recommended expenditure still represents a 22 per cent increase over the actual capital expenditure for the previous 4-year regulatory period.[43] Given this, we consider that there is still likely to be downward pressure on the operational labour costs and that our recommendations are therefore appropriate.

Base level of forecast labour expenditure

One of the key aspects of forecasting operating expenditure is to determine an appropriate base case from which to adjust and escalate. As outlined above, Essential Water forecast its operating

---

42 Additional information provided by Essential Water on 18 October 2018, p.3.

43 This excludes both the consequential works and the government-funded drought works.

expenditure for the regulatory period based on the 2018-19 budget, we have therefore sought to use this year to determine the appropriateness of the forecast labour operating expenditure.

Essential Water provided a revised AIR to IPART in September 2018 with actual cost information for 2017-18 (as opposed to forecasted budget information). From this, it can be seen that the sewerage labour costs were reduced by $682,000 (or 32 per cent) for 2017-18. This is a significant reduction in the space of three months and raises questions as to the robustness of Essential Water's forecasting capability for its labour costs. The reasoning provided by Essential Water for this variation was that the forecast was likely 'set too high initially given the stable number of FTEs in this area'. This reduction was also not offset by any changes to labour costs in other areas.

We note that Essential Water also stated that its forecast operating expenditure was based on the 2018-19 budget. This is likely to have been based on the expected level of expenditure for 2017-18 (the original submission) which Essential Water has subsequently acknowledged was set too high. Further to this, there is no forecast increases in FTE numbers for the sewerage sector of the business. We therefore consider that the forecast expenditure should more closely align with the actual labour expenditure for 2017-18 than the previous forecast.

Further to this, we note that Essential Water highlighted the potential for movement of labour between operating and capital expenditure, however the forecast sewerage capital program over the upcoming regulatory period is significantly higher than previous (especially 2017-18) and therefore we would more likely expect to see a shift of labour costs to capital expenditure to manage the increased capital program rather than a reduction in the capitalisation of labour. This would therefore place further downward pressure on the labour operating expenditure.[44]

In relation to the water network labour operating expenditure, we note that the budgeted labour costs for 2018-19 are slightly lower than the average historical labour operating expenditure for the water network. We also note that this reduction coincides with a significant increase in capital expenditure for 2018-19 on the water network. Given this, we consider the 2018-19 forecast labour operating expenditure for water to be a reasonable base year.

Labour escalation rate

Essential Water states that the labour escalation rate is 1.5 per cent (nominal), which would mean a reduction in labour costs over time in real terms. This is less than general inflation forecasts and lower than other utility industry labour escalation rates and is therefore considered appropriate. However, it is not possible from the information provided by Essential Water to determine how this labour escalation rate has been incorporated into the forecast.

Changes in FTEs over the regulatory period

As outlined above, Essential Water states that it has forecast a reduction of one FTE per year (total of four FTEs) at an average cost of $150,000 (including on-costs) as a result of the decommissioning of the Menindee pipeline. While this is demonstrated in the FTE numbers within the AIR provided for the pricing submission, Essential Water has not demonstrated how these reductions have been incorporated within the forecast labour costs.

[44] An increase in capital expenditure does not always align with an increase in labour requirements, however, in general we would expect to see some increase in labour costs to manage considerable increases in a capital expenditure program.

Essential Water also state that $100,000 has been included for redundancies in 2019-20 and 2021-22, however it is not clear from the breakdown of information provided how this has been incorporated.

We note that Essential Water's submission states that the planned capital expenditure in the forecast regulatory period will improve system reliability and reduce long-term operating expenditure through a reduction in field staff requirements and that these reductions will be achieved through natural attrition. It also states that the loss of these staff will be reflected in a reduction in associated plant and material costs.[45] However, apart from the stated reduction of FTEs above, we are not aware of any other changes to FTEs going forward that have been incorporated in Essential Water's forecasts.

Table 19 provides the historical and forecast FTE numbers as provided by Essential Water with its pricing submission. This information demonstrates the reduction of four FTEs over the upcoming regulatory period from the decommissioning of the Menindee pipeline.

Table 19 Essential Water historical and forecast FTE numbers

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Water	63	61	64	63	62	61	60
Sewerage	8	8	8	8	8	8	8
Total	**71**	**69**	**72**	**71**	**70**	**69**	**68**

Essential Water did not initially provide any information within its submission to justify the increase of three FTEs in 2018-19. Additional information was provided later in the review that indicated that the increase was based on three unfilled vacancies in 2017-18. Essential Water did not provide any information that indicated these unfilled vacancies were necessary – such as unable to meet particular service standards in 2017-18 through a lack of resources – therefore we consider that the level of resources for 2017-18 remains appropriate.

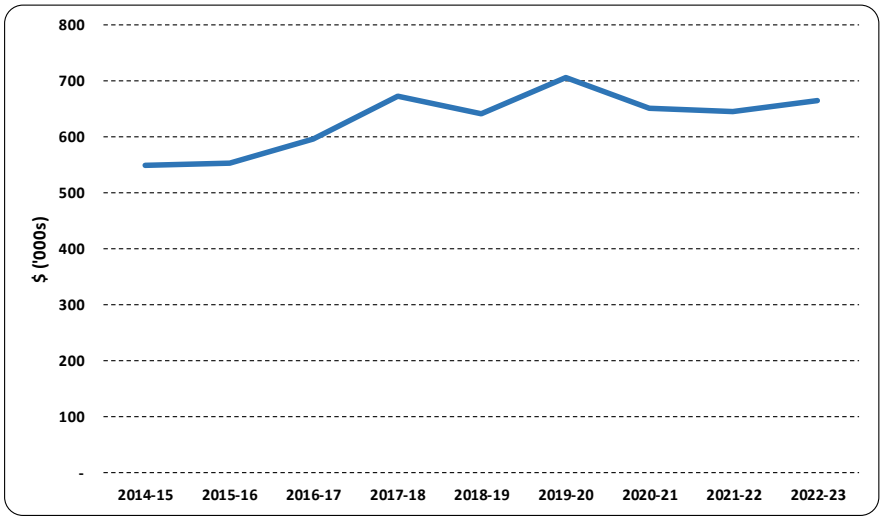
Changes in overtime costs

Essential Water's pricing submission states that it has undertaken a number of efficiency measures in relation to operating expenditure, one of which is a reduction in overtime costs. Essential Water provided a further breakdown of the labour expenditure that showed the overtime costs across water and sewerage. From this, we note that the average annual overtime costs that have been forecast for the upcoming regulatory period are $668k, this is higher than the average annual overtime costs for the current regulatory period of $593k.[46] Furthermore, as can be seen from Figure 4 below, overtime costs increased throughout the current regulatory period.

[45] Essential Water Pricing Submission, p. 147.

[46] $603k when including the forecast 2018-19 overtime costs.

Figure 4 Actual and forecast labour overtime expenditure from 2014-15 to 2022-23 ($000's, $2018-19)



Source: Additional information provided by Essential Water on 2 October 2018.

In explaining the increase in overtime over the previous regulatory period, Essential Water stated that it had primarily been driven by additional work created by the drought, in particular:

- staff being placed on standby and responding to outages to ensure a 3-day emergency supply, and
- increased sewerage chokages caused by tree and shrub root intrusion (chasing water within the aged sewerage pipes as a result of minimal rainfall.[47]

Essential Water went on to state that overtime costs will reduce over the upcoming regulatory period due to the Wentworth to Broken Hill pipeline being connected and therefore a reduction in the number of pumping stations required for critical water supply from six down to two. Further to this, Essential Water noted that the Menindee pipeline was a key source of overtime costs and that this asset will be decommissioned during the period.

However, in reviewing the breakdown of labour costs provided by Essential Water, the forecast overtime costs will be higher in the last year (2023) of the regulatory period than in the year immediately prior to the regulatory period (2019). Further to this, the forecast changes to overtime costs are simply aligned with the forecast changes in the overall labour costs for operating expenditure. There appears to have been no consideration of the potential impact on overtime costs as a result of the change in the future supply of the network (as stated by Essential Water).

Aither's assessment

Based on our review of the information provided by Essential Water for our review, we have a lack of confidence in the robustness of the labour operating expenditure forecasts that have been provided and are therefore unable to consider the forecasts to be efficient. The following are the steps that we have incorporated into our recommendation on labour operating expenditure:

- Adjusted the 2018-19 sewerage labour costs (this is sewerage only).

[47] Additional information provided by Essential Water on 18 October 2018

- Applied a reduction in cost of $150,000 per annum based on the reduction of one FTE each year from the decommissioning of the Menindee pipeline (this is water only).
- Increased the expenditure by $100,000 for 2020-21 and 2022-23 to reflect redundancy costs for the reduction in FTEs (this is water only).
- Applied a reduction to the base year in the overtime allowance for water labour by 5 per cent ($22,000) to reflect the fact that a portion of overtime was due to the Menindee pipeline which will be decommissioned.
- Applied a reduction in labour costs to reflect the escalation rate that is less than inflation (1.5 per cent).

Table 20 provides a breakdown of our proposed adjustments to Essential Water's labour expenditure and our overall recommended labour expenditure for the upcoming regulatory period. These adjustments have been applied to the total labour expenditure which includes expenditure for overtime.

Table 20 Recommended labour expenditure ($000's, $2018-19)

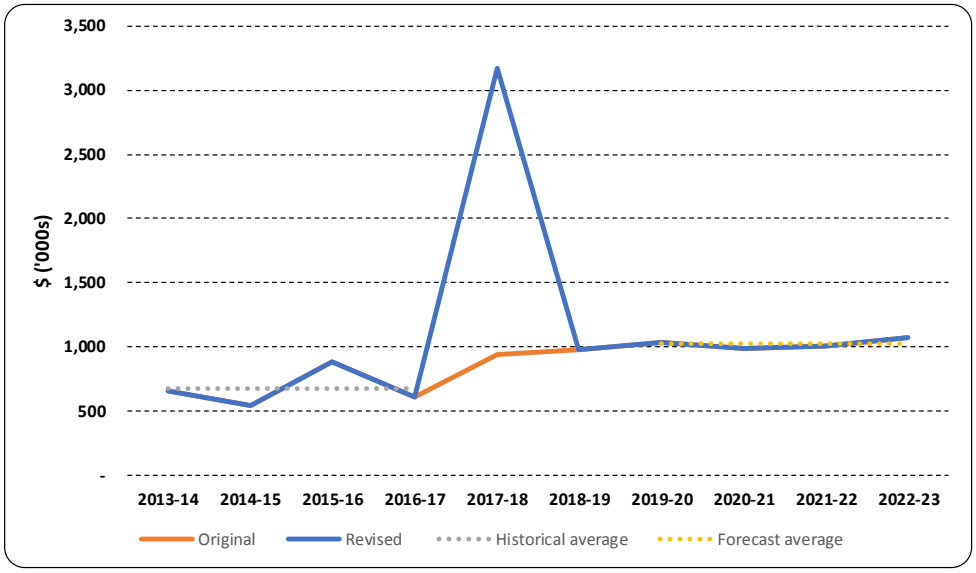
	2018-19	2019-20	2020-21	2021-22	2022-23
Essential Water proposed labour expenditure		6,580	6,033	5,953	6,091
Base Year (Water)	3,993				
Reduction in overtime	(22)				
Revised base year	3,971				
Reduction in FTEs		(150)	(150)	(150)	(150)
Addition of redundancy costs			100		100
Sub-total from changes		**3,821**	**3,771**	**3,621**	**3,571**
Reductions from 1.5% escalation		(37)	(73)	(105)	(137)
Recommended labour expenditure (Water)		**3,784**	**3,698**	**3,516**	**3,434**
Base Year (Sewerage)	1,424				
Reductions from 1.5% escalation		(14)	(28)	(41)	(55)
Recommended labour expenditure (Water)		**1,411**	**1,397**	**1,383**	**1,370**
Total recommended labour expenditure		**5,194**	**5,095**	**4,899**	**4,803**
Difference		**(1,386)**	**(938)**	**(1,053)**	**(1,288)**
Percentage		(21.1%)	(15.6%)	(17.7%)	(21.1%)

5.4.4. Hire services

Separate to labour expenditure, Essential Water also incurs expenditure for hire services (based on information provided, this appears to also include consultant fees).

Essential Water provided a revised AIR following the provision of the pricing submission which increased its actual hire services expenditure for 2017-18 from $0.943 million to $3.167 million (see Figure 5 below). The original $0.943 million represented a 56 per cent increase on the 2016-17 actual expenditure and a 41 per cent increase on the average hire services expenditure of the previous four years ($0.67 million).

Figure 5 Actual and forecast hire services expenditure ($000's, $2018-19)



Source: Essential Water Annual Information Return, provided July 2018; Essential Water Annual Information Return, provided September 2018.

Essential Water stated that the increase in the revised AIR provided in September was based on consultant fees in relation to:

- IPART submission preparation
- consultancy costs for project assessments and business cases with the new supply arrangements, and
- consultancy fees related to integrated water cycle management (IWCM) strategy and regulatory compliance.

It is not clear whether this is because these costs had not been factored in at all in the previous information, or that revised estimates were available for the costs of these activities that resulted in the increase.

Aither's assessment

As shown in Figure 5 above, there is a considerable difference in the revised hire services expenditure and the original expected expenditure. The figure also highlights the considerable increase in the forecast costs for the regulatory period ($1.026 million) when compared to the average costs from 2013-14 to 2016-17 ($0.670 million).

We note that Essential Water's pricing submission stated that it had an efficiency initiative to reduce agency staff within its forecast operating expenditure.[48] However, this is not apparent in the cost information provided. Information was requested of Essential Water regarding its hire services expenditure, however no further information was provided. The forecasts represent a 53 per cent increase on the average hire services expenditure (excluding 2017-18) and in the absence of further

[48] Essential Water Pricing Submission, p.147.

information from Essential Water to justify this increase, we do not consider the forecast expenditure as being efficient.

We note that there is a significant increase in 2017-18 to reflect additional costs associated with specific projects. In considering these projects we do not consider them to be ongoing in nature and therefore would not be reflective of ongoing hire services requirements. We would expect that there would be an uplift in external hire services (given Essential Water classifies consultancy fees as hire services) in the final year of the upcoming regulatory period to reflect preparation costs for the following IPART pricing determination. We have therefore factored in what we consider to be a reasonable increase in expenditure to reflect this expected cost.

We have relied on the actual information from 2013-14 to 2016-17 to form the basis of our recommended starting point for 2019-20 of $0.711 million. This reflects the historical average of $0.67 million and a reasonable increase in price over the period of two per cent per annum. We note that hire services are different to labour and materials and we consider an allowance of two per cent to be reasonable. We have also applied this two per cent escalation factor to the forecast regulatory period. To account for the preparation for the IPART pricing determination, we have allowed an additional $0.2 million in the final year of the upcoming regulatory period.

Table 21 Essential Water proposed, and Aither recommended changes to forecast hire services cost ($000's, $2018-19)

	2019-20	2020-21	2021-22	2022-23
Essential Water forecast	1,035	984	1,009	1,074
Recommended	711	725	740	940
Difference	**(324)**	**(259)**	**(269)**	**(134)**
Percentage change	(31.3%)	(26.3%)	(26.7%)	(12.5%)

5.4.5. Materials expenditure (excluding electricity)

In an initial set of questions, Aither asked Essential Water whether they could provide information on the levels of, and methodologies used for deriving, its proposed materials expenditure. In response to this request, Essential Water stated that these costs have been forecast flat in real terms. No further information was provided by Essential Water regarding how this has been applied, and based on the cost information provided Aither was not able to determine how the flat forecast had been incorporated into the materials cost forecast.

Table 22 outlines the historical and forecast materials cost since 2016-17 and the forecast annual percentage change for the upcoming regulatory period.

Table 22 Essential Water historical and forecast materials cost ($000's, $2018-19)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Materials cost	1,725	1,988	2,058	2,188	2,080	2,132	2,270
Percentage change				6.32%	-4.94%	2.48%	4.04%

Aither's assessment

Based on the information provided, we are unable to determine:

- whether the 2018-19 budget year is a reasonable base year for materials costs, and
- how the forecasts are flat in real terms.

In considering the actual costs for materials for the current regulatory period (including 2018-19), we note that the average expenditure is $1.75 million per annum. Essential Water is forecasting an average annual cost for materials of $2.167 million per annum, this represents an increase of 23.8 per cent.

Given that Essential Water has not provided any information to justify this increase, and also stated in its submission that planned capital expenditure would result in reductions to some materials costs,[49] we are not convinced that the increase of 23.8 per cent is efficient. Further to this, Essential Water state that its forecasts incorporate the impact of the consequential works and the Wentworth to Broken Hill pipeline, however it is not possible to identify how this has occurred for materials expenditure based on the information provided for the review. We would expect Essential Water to provide further information to justify this forecast expenditure in response to IPART's Draft Report.

Given the lack of justification, we therefore recommend an amount equal to the average annual expenditure over the current regulatory period ($1.75 million per annum).

Table 23 Essential Water proposed, and Aither recommended changes to forecast materials cost ($000's, $2018-19)

	2019-20	2020-21	2021-22	2022-23
Essential Water forecast	2,188	2,080	2,132	2,270
Recommended	1,750	1,750	1,750	1,750
Difference	**(438)**	**(330)**	**(382)**	**(520)**
Percentage change	(20.0%)	(15.9%)	(17.9%)	(22.9%)

5.4.6. Electricity costs

Electricity prices have seen considerable volatility in recent years through fundamental shifts in the way that electricity is generated and a lack of clear policy direction for the sector. This has created considerable uncertainty within the industry and makes it difficult to accurately forecast electricity prices going forward.

Essential Water has proposed relatively flat electricity costs for 2019-20 and 2020-21, however it has forecast increases of 11 per cent and 17 per cent for 2021-22 and 2022-23 respectively. Aither requested Essential Water's electricity model, however this was not provided. Rather, Essential Water provided a table of forecast electricity costs for each key site that required electricity (see Table 24). This means that we do not have access to forecast usage or unit prices to determine the efficiency of the forecast electricity costs for Essential Water.

Essential Water states that its forecast electricity costs are based on 2017 actual costs as this was the last year where continuous pumping during peak periods was not required because of the ongoing drought conditions. It therefore considers this to be an example of a typical average year. Further

[49] Essential Water Pricing Submission, p. 147.

information provided by Essential Water stated that the 2017 actual costs were consistently extrapolated to derive the outer year forecasts, however detailed information to demonstrate this was not provided by Essential Water.

Further to this, Essential Water did not provide any information to justify the forecast increases in electricity costs for 2012-22 and 2022-23. Given that demand is forecast to be flat over the regulatory period, we have assumed that these increases purely relate to forecast price increases.

Essential Water states that its forecast electricity costs include the increase in costs associated with the last 21 kilometres of the Wentworth to Broken Hill pipeline which will be gifted from WaterNSW. We note that we have taken this on face value as it was not possible to determine how these costs had been incorporated into the forecasts from the additional information on electricity costs provided by Essential Water.

Table 24 Essential Water historical and forecast electricity cost by site ($000's, $2018-19)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Menindee Pumping Station	438	1,343	174				
Menindee Booster Station	10	14	13				
Kinalung Pumping Station	565	1,145	1,002				
Kinalung Booster Station	37	140	122				
Stephens Creek Pumping Station	703	778	854	796	811	899	1,050
Mica Street Water Treatment Plant	362	400	439	409	417	462	540
Wills Street Wastewater Treatment Plant	75	82	91	84	86	95	111
Imperial Lake Pumping Station	8	9	9	9	9	10	12
Warren Street Sewer Pumping Station	59	65	71	66	68	75	87
Other Small Sites[1]	155	134	108				
Total	**2,411**	**4,111**	**2,884**	**1,365**	**1,391**	**1,542**	**1,800**

Source: Additional information provided by Essential Water on 18 October 2018, p.2.

Notes: 1) Essential Water noted that it did not include the Other Small Sites in its forecast electricity costs. This was an oversight in the forecast.

Based on a simple analysis of the information provided, it appears that the electricity cost forecasts are undertaken on a top-down approach rather than a bottom-up approach based on each site. This view is based on the fact that the forecast percentage change for each site is exactly the same over the upcoming regulatory period (see Table 25 below).

Table 25 Essential Water percentage change in forecast electricity cost

	2019-20	2020-21	2021-22	2022-23
Consistent percentage change across sites	-7%	2%	11%	17%

Aither's assessment

Ideally, we would base our assessment of the efficiency of forecast electricity costs on the underlying price, volume forecasts and load profiles for key sites. Given the lack of information provided, it is not possible to conclude that the electricity forecasts are efficient. We have therefore sought to develop alternative estimates of electricity costs based on publicly available information and the information provided by Essential Water. Following this report, we will seek to gather more detailed information regarding the forecast electricity usage for each site in the upcoming regulatory period (such as Stephens Creek and SP2 pumping station) to make a more informed decision regarding electricity expenditure.

We note that no information has been provided to demonstrate that 2017 is a typical year, nor has any information been provided to confirm that the forecasts are based on the 2017 actual costs. However, we have taken the comment that 2017 was a typical year on face value and have used this for the basis of our assessment.

To develop our alternative estimate of electricity costs, we firstly assessed whether the initial year of forecast electricity costs were appropriate, and then subsequently developed a forecast in the change in price to apply to the initial year. As noted above, the forecast consumptive demand for Essential Water is essentially flat over the regulatory period. Therefore, any changes to forecast electricity costs are driven by changes in forecast electricity prices (assuming no changes to the load profile that would impact peak and non-peak consumption).

In assessing 2019-20, we note that there is a five per cent increase in demand from the 2016-17 base year that has been identified by Essential Water. For each of the sites that have electricity costs forecast for 2019-20, the forecast electricity costs are 13 per cent higher than 2016-17. Given this change in demand and price is over three years, we do not consider this unreasonable and have therefore adopted the forecast 2019-20 electricity costs for the basis of our alternative forecast.

In terms of the sites that Essential Water has forecast electricity costs for over the regulatory period, we note that Imperial Lake is to be decommissioned in 2020. Given this, we have removed electricity costs from the Imperial Lake Pumping Station from 2020-21 onwards. We note that Essential Water did not include its small sites in its forecast and we have included a forecast for these costs in our recommendations.

To inform our view on forecast price changes, we have relied on 2017 Residential Electricity Price Trends review undertaken by the Australian Energy Market Commission (AEMC) which was published in December 2017. This review considers historical changes to the costs within the electricity supply chain and provides forecasts for the short-term for each of those supply chain components to determine overall trends for each State and Territory in Australia. While it is based on residential customers, the drivers behind the changes in costs within the supply chain are likely to be the same for industrial customers such as Essential Water.

The supply chain components considered by the AEMC include:

- environmental policies
- regulated networks
- wholesale, and
- residual.

For the purposes of this assessment we have focused on the wholesale and regulated networks supply chain components as these are the most significant elements. In terms of the regulated networks, Essential Water's regulated electricity network service providers are Essential Energy (distribution) and Transgrid (transmission). We note that:

- Transgrid's recent Final Decision from the Australian Energy Regulator (AER) results in a minor reduction in real terms (2.8 per cent) for revenue over the 2018-23 regulatory period compared to the 2014-18 regulatory period, and
- Essential Energy has proposed a slight reduction (1.5 per cent) in network revenue requirements in real terms over the upcoming 2019-23 regulatory period – this is subject to review from the AER.[50]

From this, we note that there will be downward pressure (in real terms) on electricity costs as a result of the regulated electricity networks. Based on information published by the AEMC, the regulated networks component makes up approximately 45-55 per cent of the total bill for NSW electricity customers.[51, 52]

The AEMC review forecast material decreases in the wholesale electricity cost for New South Wales across both 2018-19 (17.5 per cent) and 2019-20 (23.8 per cent). The report states that these forecast decreases are driven by expected new generation (approximately 4,100 MW across the NEM) and the return to service of the Swanbank E generator (385 MW in Queensland). Given this is a fundamental shift in the profile of electricity generation, we would expect that these decreases would at least be maintained throughout the regulatory period for Essential Water.

We also note that through the recent price review in Victoria that six out of the 15 Victorian water businesses proposed either zero or negligible increases (in real terms) over the base level of electricity costs for the upcoming regulatory period.[53]

Based on this assessment, we recommend that the forecast electricity costs are not efficient. Our recommendation is that there is no real increase in the electricity costs for Essential Water above the opening year of 2019. As shown in Table 26, this results in an overall reduction in the electricity costs for the period of $232,545.

---

50 Australian Energy Regulator, *Ausgrid, Endeavour Energy and Essential Energy distribution determinations 2019-24 – Issues Paper*, p.43.

51 Australian Energy Market Commission, *Residential electricity price trends report 2017 – New South Wales Information Sheet*, December 2017, p.2.

52 The AEMC report indicates that it is forecasting a slight increase in regulated networks charges, however this is based in nominal terms and also did not incorporate the recent pricing submission from Essential Energy.

53 Deloitte Access Economics, Barwon Water – Expenditure Review for 2018 Water Price Review, February 2018, p.17.

Table 26 Essential Water proposed, and Aither recommended electricity expenditure ($000's, $2018-19)

	2019-20	2020-21	2021-22	2022-23
Essential Energy proposed	1,365	1,391	1,542	1,800
Recommended	1,473	1,464	1,464	1,464
Difference	**108**	**73**	**(78)**	**(336)**
Percentage change	8%	5%	(5%)	(19%)

Note: Our recommended adjustment to electricity forecast includes an annual allowance for electricity costs for Other Small Sites equivalent to Essential Water's forecast for 2018-19 of $108,000. As noted in Table 23 Essential Water did not include the Other Small Sites in its forecast electricity costs. This was an oversight in the forecast.

5.4.7. Capitalisation Policy

The capitalisation policy is particularly important in influencing the revenue requirement in the upcoming regulatory period, with operating expenditure being recovered directly when incurred, and capital expenditure being recovered over the life of the asset.

In response to queries regarding its capitalisation policy, Essential Water provided its Asset Capitalisation Policy. This policy sets out what types of expenditure should be considered operating expenditure and what expenditure should be capital. It also highlights that there are costs that require judgement to determine how it should be treated.

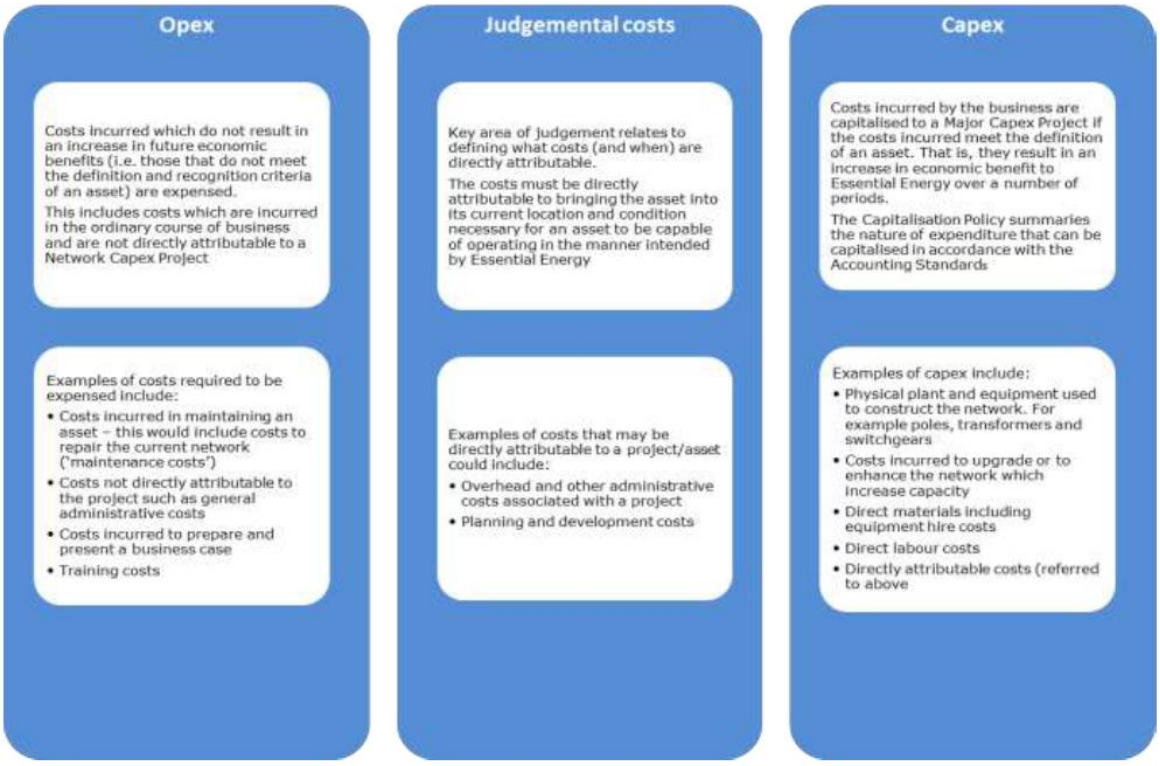
This policy applies to all aspects of Essential Energy and is designed to ensure a consistent approach to the capitalisation of expenditure. The following is the overarching principle that is adopted in terms of capitalisation:

> *Expenditure on assets can only be classified as capital expenditure where at least one of the following criteria applies:*
>
> - *The expenditure relates to the purchase, replacement, development or construction of an asset; and*
> - *It is subsequent enhancement expenditure that will increase the service capacity of the asset or extend the service life of the asset beyond that expected when the asset was originally installed.*[54]

Figure 6 outlines the guidance provided by Essential Energy in how it determines whether costs should be capitalised with regard to constructed assets. This highlights where judgement is required to determine whether it is appropriate to capitalise the cost or not.

[54] *Essential Energy CECP2416 Asset Capitalisation Policy*, p.3.

Figure 6 Capitalisation Policy guidance regarding self-constructed physical assets



Source: Essential Energy, CECP2416 Asset Capitalisation Policy, p.10.

This approach to capitalisation of overheads is consistent with accounting principles and is accepted in a number of jurisdictions (e.g. Victoria) where economic regulation is applied.

We note that while Essential Water has in the past capitalised some of its corporate overheads, we understand that some other water service providers recovers corporate overheads through operating expenditure rather than capitalising the expenditure. For that reason, we have sought to assess corporate overheads separately from direct capital and operating expenditure. This allows IPART to decide how corporate overheads should be recovered through customer prices.

5.4.8. Other on-going operational expenditure costs

Essential Water's operational expenditure forecasts comprise other less material operational expenditure costs items, such as:

- licence fees, and
- fleet.

Forecast licence fees are reasonably constant and consistent with the actual 2017-18 licence fee costs. Given this, we consider this to be a reasonable forecast and do not recommend any changes to the forecast.

Fleet costs are forecast to decline in the upcoming regulatory period relative to the previous regulatory period. In response to a request for information, Essential Water did not provide further information to outline the reasons for the reduction in forecast expenditure, however it would appear to be based on an increase in the capitalisation of fleet costs associated with an increasing capital

program. We consider that the need for fleet costs to be appropriate and do not recommend any further changes to the forecast expenditure.

5.4.9. On-going (broad based) efficiency savings

The adjustments that we have made above have sought to re-align the forecast of operating expenditure with historical operating expenditure. Other than the specific FTE and electricity reductions arising from the decommissioning of the Menindee pipeline, the recommended adjustments did not seek to explicitly capture future efficiencies. Given this, we have sought to consider whether further efficiencies should be applied to the recommended forecasts of operating expenditure.

In considering whether further efficiencies should be applied, Aither notes that:

- forecast labour escalation rate is 1.5 per cent which is less than the forecast inflation, thereby resulting in reductions in labour costs over the forecast period, and
- it is not apparent that other efficiencies from the Wentworth to Broken Hill and the consequential works have been factored into the forecast operating expenditure.

Based on this, we recommend a one per cent efficiency adjustment per annum (applied cumulatively) to non-labour direct expenditure for the upcoming regulatory period. The following table provides the breakdown for the calculation whereby the recommended labour expenditure has been removed from the recommended direct operating expenditure to determine the non-labour operating expenditure to apply the efficiency factor.

Table 27 Recommended ongoing efficiency adjustment for operating expenditure ($000s, $2017/18)

	2019-20	2020-21	2021-22	2022-23	Total
Aither's recommended direct operating expenditure	**10,264**	**10,128**	**9,986**	**10,157**	**40,535**
Recommended direct labour expenditure	5,194	5,095	4,899	4,803	19,992
Sub-total recommended non-labour operating expenditure	**5,069**	**5,034**	**5,087**	**5,353**	**20,543**
Efficiency adjustment (1% cumulative per annum)	(51)	(101)	(154)	(217)	(523)
Total recommended direct operating expenditure	**10,213**	**10,027**	**9,832**	**9,939**	**40,011**

5.4.10. Final recommendations for direct operating expenditure

Subject to the following adjustments, the review team consider Essential Water's direct operational expenditure forecasts to be consistent with a prudent and efficient service provider, faced with similar circumstances to those which Essential Water currently faces.[55] Those adjustments include:

- reductions in labour to more accurately reflect historical labour costs, FTE savings and redundancy costs from the decommissioning of the Menindee pipeline and labour cost escalation factor
- reductions in materials to reflect the historical average of materials cost over the previous regulatory period
- reductions in electricity to broadly reflect a zero-price increase over the upcoming regulatory period, and
- reductions to hire services to reflect the historical average of hire services cost over the previous regulatory period.

The following table provides our recommended direct operating expenditure for the upcoming regulatory period and a breakdown of the recommended adjustments. Recommended changes to the corporate overheads are considered in Section 5.5.

[55] Direct operating expenditure reflects the total operating expenditure less corporate overheads.

Table 28 Recommended direct operating expenditure ($000s, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct operating expenditure	**12,411**	**11,690**	**11,876**	**12,543**	**48,520**
Adjustments					
Changes to labour	(1,386)	(938)	(1,053)	(1,288)	(4,665)
Changes to materials	(438)	(330)	(382)	(520)	(1,670)
Changes to electricity	108	73	(78)	(336)	(233)
Changes to hire services	(324)	(259)	(269)	(134)	(986)
Sub-total recommended adjustments	**(2,040)**	**(1,454)**	**(1,782)**	**(2,278)**	**(7,554)**
Sub-total recommended direct operating expenditure	**10,372**	**10,236**	**10,094**	**10,265**	**40,966**
Efficiency adjustment (1% to non-labour direct expenditure)	(52)	(103)	(157)	(222)	(534)
Total recommended direct operating expenditure	**10,320**	**10,133**	**9,936**	**10,043**	**40,432**
Percentage change	(17%)	(13%)	(16%)	(20%)	(17%)

5.5. Forecast corporate overheads

5.5.1. An overview of Essential Water's allocation approach for corporate overheads

As outlined earlier, Essential Water is a subsidiary of Essential Energy and receives a number of corporate functions from Essential Energy. Essential Water's corporate overheads are therefore

based on costs allocated by Essential Energy on the basis of its cost allocation methodology (CAM). Essential Water specifies that the main components that form corporate overheads relate to:[56]

> *information technology*
>
> *property*
>
> *billing*
>
> *finance, and*
>
> *safety.*

In relation to the CAM itself, Essential Water's submission states that it uses a direct expenditure approach whereby overheads are allocated based on direct expenditure and applies the following principles:[57]

> *costs are directly attributed to, or allocated between, categories of distribution services, based on the substance of the underlying transaction or event, rather than its legal form,*
>
> *the same costs are not allocated more than once,*
>
> *costs will not be re-allocated between service lines during a regulatory control period,*
>
> *direct costs can only be attributed once to a single category of distribution services and shared costs are only allocated once between categories of distribution services,*
>
> *shared costs are collated into a pool and allocated across standard control services, alternative control services, unclassified distribution services and unregulated business activities, including water and sewerage services for Essential Water, and*
>
> *detailed principles, policies and the approach used to attribute costs directly to categories of distribution services are consistent with the AER's Ring-Fencing Guideline. That is, only costs associated with distribution services are attributed or allocated to distribution services and using the principles set out in the CAM.*

Our understanding of Essential Water's approach

The CAM process that allocates costs across segments appears to be appropriate, however it is not clear how it has been applied in determining the forecast corporate overheads for Essential Water. There is a lack of quantifiable information in Essential Water's submission regarding the underlying corporate overhead expenditure and whether the level of overheads that are being allocated across the business segments to be recovered is efficient.

In its pricing submission, Essential Water states:[58]

> *Essential Water has developed its expenditure forecasts using the AER-approved CAM. In some cases, we have reduced the amount of overheads allocated to the water and sewerage services undertaken by Essential Water if we considered the*

---

56 *Essential Water IPART Submission*, July 2018, p.145.

57 Ibid. p.145.

58 Ibid. p.146.

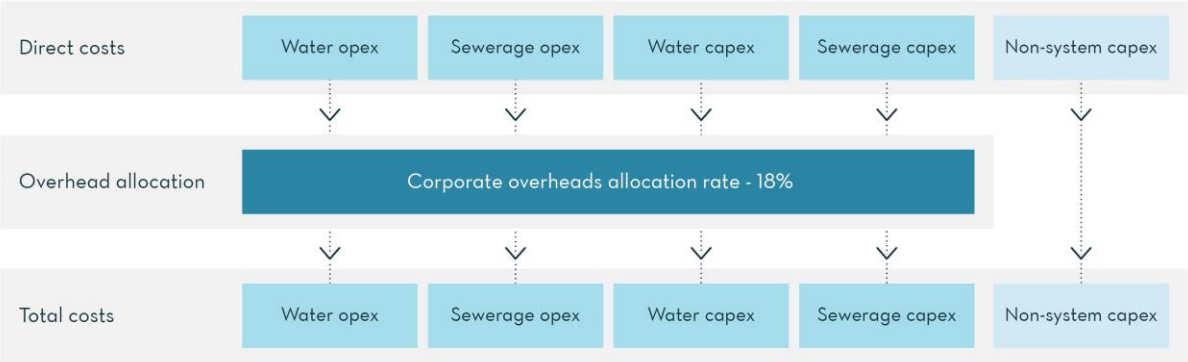
allocated amounts were not proportional to the size of the business. This has served to reduce the total operating expenditures proposed by Essential Water and has correspondingly reduced the revenues and prices proposed in this submission.

Based on additional information provided by Essential Water, this process appeared to focus on ICT costs that are recovered through non-system capital expenditure. Through this process, ICT programs that did not impact on Essential Water were excluded from the corporate overheads to be recovered. In its regulatory submission, Essential Water stated that:[59]

We propose that IPART accepts the use of the AER-approved [cost allocation methodology] CAM, adjusted for specific reductions as noted above, as the basis for the allocation of corporate overhead costs to the Essential Water business. We note that there is a practical constraint of implementing changes to the CAM that would result in lower costs being allocated to Essential Water, as we would not be able to re-allocate these costs to the electricity business. In this scenario, these re-allocated costs would become stranded and borne by Essential Water and its shareholder.

Figure 7 illustrates Aither's understanding of how the corporate overheads have been forecast for the upcoming regulatory period. The pre-determined allocation rate (Essential Water is proposing 18 per cent) is applied to the direct operating and capital expenditure for both water and sewerage to determine a total expenditure. Capital expenditure relating to non-system assets does not have the corporate overhead allocation rate applied to the expenditure.

Figure 7 Aither interpretation of how corporate overheads have been applied to forecasts



Source: Aither analysis.

5.5.2. Actual and forecast corporate overheads

Essential Water has proposed a corporate overhead allocation rate of 18 per cent to be applied to direct expenditure over the next regulatory period for both capital expenditure and operating expenditure. As part of its 2014 final report, IPART adopted SKM's recommendation that:[60]

"further reduction of the corporate overhead costs and allocation be adopted to deliver 18% by the end of this regulatory period (in equal increments). A more comprehensive and detailed analysis of reasonable costs should be undertaken before the next regulatory review, to establish a sounder basis for justifying the

[59] *Essential Water IPART Submission*, July 2018, p.146.

[60] SKM, *Essential Energy Expenditure Review – Final Report*, November 2013, p. 105.

appropriate level of corporate costs and what further potential for their reduction might be"

Essential Water has stated it strived to achieve a 20 per cent corporate allocation rate over the current period which was approved by IPART. Aither notes that IPART required Essential Water to reduce its corporate overhead rate from 20 to 18 per cent by the end of the period (as stated above).

5.5.3. Forecasting using a blanket percentage applied to direct costs

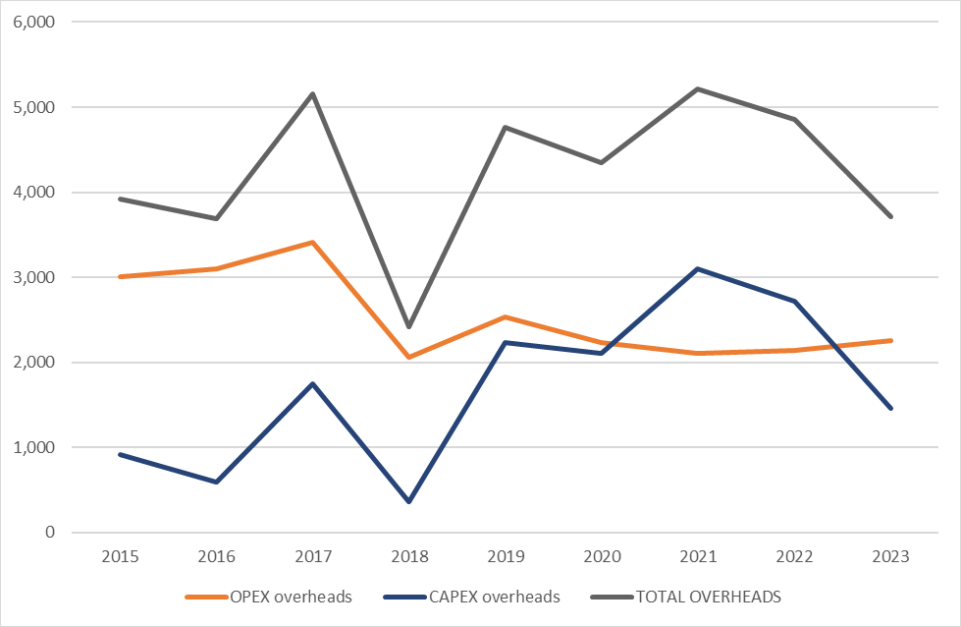
Aither agrees with SKM's position from the 2014 review that Essential Water needs to adopt a more comprehensive way of justifying forecast corporate overheads. Future corporate overhead requirements should not be simply based on a blanket application of a pre-determined allocation rate to be applied to forecast direct costs. A pre-determined allocation rate has no relationship with the actual corporate overhead costs and therefore the forecast corporate overheads is purely dependent on the forecast direct expenditure for the business.

Figure 8 shows the impact of using Essential Water's overhead forecasting methodology in 2018-19 when compared to the actual overhead figure applied in 2017-18. The forecast overheads for 2018-19 is almost double the actual overheads from 2017-18 through the blanket forecasting approach of 18% on direct cost. Essential Water has provided no justification for the forecast increased allocation for 2018-19 other than to state that is applying an 18 per cent allocation rate.

Furthermore, Figure 8 also shows how Essential Water's actual corporate overhead allocation to operating and capital expenditure has fluctuated year to year over the current regulatory period. It is evident that actual allocation of overheads from the current determination period in no way reflects a simple percentage of the direct spend for the relevant year. For example, 2016-17 and 2017-18 have similar levels of direct capital spend yet vastly different allocation of corporate overheads. We also note the significant capital spend in 2015-16 relative to other years but very low quantum of allocated overhead. We reiterate the concerns raised by SKM in the 2014 review of the overly simplistic forecasting of operating and capital expenditure attracting the same overall corporate cost loading.[61]

[61] SKM, *Essential Energy Expenditure Review – Final Report*, November 2013, p. 105

Figure 8 Actual and forecast overhead allocation from 2014-15 to 2022-23 ($000's, $2018-19)



Source: Essential Water Annual Information Return September 2018.

5.5.4. Efficiency initiatives

As outlined above, Essential Water has essentially maintained the 18 per cent recommended by SKM and adopted by IPART (for the end of the current period) for the forecast regulatory period. We note that SKM was of the view that the corporate overheads were high when compared to those of large water authorities. SKM considered that Essential Energy's overheads should be reduced further and Essential Water should benefit from those reductions.[62]

Essential Water has not justified how the continuation of the allocation rate is appropriate despite stating it represents an efficient and equitable share of overall corporate support costs. Furthermore, Essential Water's submission states that efficiency gains made by Essential Energy over the past few years has enabled it to reduce overall costs, however on average Essential Water is forecast to receive a higher quantum of overhead costs compared to the current period. We would expect Essential Water would benefit from any efficiencies achieved or forecast by Essential Energy.

5.5.5. Appropriate approach to forecasting overheads

In determining an estimated overhead ratio, we would expect that the overheads that need to be recovered are first identified before any ratio on direct costs is considered. Essentially, the allocation ratio is back-solved from the estimated direct costs and the pool of corporate overheads to determine how it is then apportioned between water and sewerage. This does not appear to have been undertaken by Essential Water, rather it has simply adopted the estimate from the previous expenditure review and applied it to the forecast expenditure for the upcoming regulatory period.

[62] SKM, *Essential Energy Expenditure Review – Final Report*, November 2013, p. 104

A breakdown of the forecast corporate overheads allowance was sought from Essential Water; however, it was not provided.[63] Without this information Aither is unable to establish if Essential Water's proposed allocation of forecast overheads is appropriate. Table 29 provides a high-level view of the historical and forecast corporate overheads proposed by Essential Water.

[63] A breakdown of three years of historical corporate overheads was provided.

Table 29 Essential Water's historical and forecast corporate overheads ($000's)

	2013-14 (actual)	2014-15 (actual)	2015-16 (actual)	2016-17 (actual)	2017-18 (actual)	2018-19 (forecast)	2019-20 ($2018-19)	2020-21 ($2018-19)	2021-22 ($2018-19)	2022-23 ($2018-19)
Operating Expenditure										
Direct expenditure	13,458	10,323	12,612	13,368	16,629	14,056	12,411	11,690	11,876	12,543
Overheads	1,194	3,009	3,102	3,411	2,053	2,530	2,234	2,104	2,138	2,258
Allocation rate	9%	29%	25%	26%	12%	18%	18%	18%	18%	18%
Capital Expenditure										
Direct expenditure[64]	3,471	5,388	13,841	3,935	3,484	12,407	11,711	17,244	15,121	8,101
Overheads	634	914	590	1,743	365	2,233	2,108	3,104	2,722	1,458
Allocation rate	18%	17%	4%	44%	10%	18%	18%	18%	18%	18%
TOTAL OVERHEADS	**1,828**	**3,923**	**3,692**	**5,154**	**2,418**	**4,763**	**4,342**	**5,208**	**4,859**	**3,716**

Source: Aither analysis.

[64] Direct capital expenditure excludes non-system capital expenditure.

Corporate overhead allocation and the relationship with non-system capital expenditure

In the AIR the 'Corporate Expenditure' item allocated to the water and sewerage programs includes both the non-system capital expenditure and a corporate overhead allocation. Corporate overheads of an average of 18 per cent have been applied for the 2014-2019 period and for each forecast year for the 2019-2023 period. This is consistent with the 2014 IPART target of achieving 18 per cent corporate expenditure allocation by 2018-19.

Corporate overheads that are capitalised are designed to cover corporate operational costs relevant to Essential Water's water & sewer capital programs. Essential Water provided a breakdown of its 2015-16, 2016-17 and 2017-18 corporate overheads with the annual split between operating and capital generally reflecting the variations in size of the capital program for each year. The forecast non-system capital expenditure is separate to corporate overheads; however, it appears that this is a relatively new expenditure that has not been considered in the past.

Potential for double-counting of corporate overheads

In using a simple allocation rate, there is a potential that overhead costs are double-counted – either through the incorporation of direct expenditure estimates or non-system asset expenditure forecasts.

Based on the information provided, we are confident that the system in place has allocated costs sufficiently to result in no double-counting of corporate overheads. This is not to say that it will not result in an over (or under) recovery of corporate overheads as changes in direct expenditure will alter the level of corporate overheads allocated to Essential Water, but that the process is not designed in a way that will result in certain costs being recovered twice.

Relationship with Essential Energy

Essential Water's corporate services are provided by Essential Energy, with the proportion of costs based on the CAM (as outlined above). While not stated by Essential Water, we would expect that some of the fluctuation in the actual corporate overheads is a result of changes in expenditure for Essential Energy.

Based on the information provided, it is therefore not possible to know whether reductions in corporate overheads (such as in 2017-18) are based on efficiencies generated by the business, or simply changes in the level of direct expenditure by Essential Energy. Given the size of Essential Energy compared to Essential Water, changes in the direct expenditure for Essential Energy are likely to have a much larger impact on the allocation of corporate overheads through its CAM.

5.5.6. Aither's assessment

The CAM process that allocates costs across segments appears to be reasonable, however it is not clear how it has been applied in determining the forecast corporate overheads for Essential Water. The use of 18 per cent is based on IPART's previous determination, not a bottom-up assessment of Essential Water and Essential Energy activities to determine what allocation rate should be applied to ensure full-cost recovery of corporate overheads across the combined business.

This means that we consider the forecasting approach of simply applying 18 per cent allocation rate is not an appropriate method to forecast corporate overheads for the business. We have concerns regarding the magnitude of the corporate overheads proposed to be recovered by Essential Water. This process ignores the overall level of corporate overheads that would be attributed to Essential Water and whether it is an efficient level of corporate overheads. Based on the information provided by Essential Water, it appears that there is a disconnect between the application of the CAM and the forecast 18 per cent that has been applied to Essential Water's direct expenditure.

Use of direct expenditure as an allocator

The use of direct expenditure as a corporate overhead allocator results in considerable variability in the amount of corporate overheads to be recovered from Essential Water customers. Essential Water is especially susceptible to these variations due to the magnitude of its direct expenditure in comparison to Essential Energy.

We note that there are alternative allocators that would mitigate the variance from year to year, these include labour (FTE) allocators, office space or using a rolling average of direct expenditure. Further analysis would be required to determine how appropriate these indicators are to allocate corporate overheads.

Impact of expenditure recommendations

Based on our review of capital and operating expenditure, we have recommended a number of changes to Essential Water's proposed expenditure. This has resulted in a reduction in the overall direct expenditure for the upcoming regulatory period. If Essential Water's current approach of applying an 18 per cent allocation rate to direct expenditure were to be applied, this would result in a reduction in the corporate overheads to be recovered by Essential Water (see Table 30).

Table 30 Corporate overheads forecast based on Essential Water allocation rate and recommended expenditure from this review ($000's, $2018-19)

	2018-19	2019-20	2020-21	2021-22	2022-23
Essential Water proposed	4,763	4,342	5,208	4,860	3,716
Revised expenditure	4,569	3,634	2,892	2,591	3,413
Difference	(194)	(708)	(2,316)	(2,269)	(303)

Note: We did not make any explicit recommendations for operating expenditure in 2018-19, the difference is based on the recommendations to capital expenditure.

The recommended reductions in capital and operating expenditure result in a reduction in the average annual corporate overhead expenditure from $4.5 million per annum down to $2.9 million per annum. This average annual expenditure on corporate overheads is less than the actual corporate overheads annual average for the previous IPART determination period of $3.8 million.

While we consider a reduction to the overall level of corporate overheads appropriate, we consider that a more appropriate forecast of corporate overheads expenditure would be based on a bottom up assessment of corporate-related functions for the business. The complicating factor for Essential Water is that it receives its corporate services from Essential Energy and therefore the allocation of corporate overheads to Essential Water is impacted by the level of expenditure for Essential Energy.

In the absence of more detailed information to adopt an alternative, we have maintained the approach that Essential Water applies in allocating of corporate overheads between operating and capital expenditure on direct expenditure. This means that the profile of our recommended corporate overheads reflects the profiles for the recommended direct operating and capital expenditure, however we note that IPART may seek to smooth out the impact of annual variations by adopting a smoothed value of corporate overheads over the regulatory period.

Going forward, we expect a more robust approach to forecasting of corporate overheads going forward. We also echo SKM's recommendation from 2014 that a comprehensive and detailed review of Essential Water's share of corporate costs should be undertaken before the next pricing submission.

In generating the recommended corporate overheads, Aither has based its recommendations on Essential Water's allocation to direct expenditure based on our recommended direct expenditure and further efficiency gains for corporate overheads throughout the regulatory period.

Table 31 Essential Water proposed, and Aither recommended changes to forecast corporate overhead cost ($000's, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total
Capital expenditure					
Essential Water forecast	2,108	3,104	2,722	1,458	9,392
Recommended Water Corporate Overheads	1,343	658	292	555	2,848
Recommended Sewerage Corporate Overheads	384	351	443	872	2,050
Total Recommended Corporate Overheads	**1,727**	**1,008**	**735**	**1,427**	**4,898**
Difference	(381)	(2,096)	(1,987)	(31)	(4,494)
Percentage change	(18%)	(68%)	(73%)	(2%)	(48%)
Operating expenditure					
Essential Water forecast	2,234	2,104	2,138	2,258	8,734
Recommended Water Corporate Overheads	1,416	1,349	1,279	1,251	5,295
Recommended Sewerage Corporate Overheads	390	374	360	356	1,480
Total Recommended Corporate Overheads	**1,806**	**1,723**	**1,640**	**1,607**	**6,775**
Difference	(428)	(381)	(498)	(651)	(1,959)
Percentage change	(19%)	(18%)	(23%)	(29%)	(22%)

6. Conclusions and recommendations

This section sets out the basis for our recommendations for previous and forecast capital expenditure and forecast operating expenditure.

6.1. Recommendations for past and forecast capital expenditure for the current regulatory period

From our review of the 2014-15 to 2018-19 period capital expenditure, Aither considered that the majority of the expenditure was prudent and efficient. The current regulatory period was affected by drought relief programs and the decision by the government to construct the Wentworth to Broken Hill pipeline. This resulted in a number of adjustments to the Essential Water capital program within the period. In our view, these adjustments were generally prudent investment decisions that addressed issues of importance within the period.

Aither has recommended a reduction in relation to forecast capital expenditure for 2018-19:

- a reduction of $1.3 million in 2018-19 for inefficiencies arising from premature corrosion requiring remedial work at the Mica St WTP. Although the project should proceed it is considered that more appropriate specification at the time of construction for the asset would have resulted in this corrosion remedial work not being required. Given the time since commissioning (2010) earlier attention to this issue would possibly have reduced costs and enhanced cost recovery opportunities.

There are no other recommended reductions for the 2014-2019 IPART determination period.

Table 32 Recommended capital expenditure showing corporate overheads ($000s)

Expenditure	2013-14 actual	2014-15 actual	2015-16 actual	2016-17 actual	2017-18 actual	Total 2014-18	2018-19 forecast	Total 2014-19
IPART determination 2014	3,859	8,366	7,646	12,913	13,575	**42,500**	N/A	
Actual Forecast expenditure excluding government funded works	4,491	6,009	4,069	5,690	5,924	**21,692**	16,232	**37,924**
Actual Direct costs excluding government funded works	**3,798**	**5,024**	**3,440**	**3,866**	**5,550**	**17,879**	**13,999**	**31,878**
Overheads	693	985	629	1,824	374	3,813	2,233	**6,046**
Recommended project adjustments direct cost	0	0	0	0	0	**0**	(1,080)	**(1,080)**
Total Recommend direct expenditure	**3,798**	**5,024**	**3,440**	**3,866**	**5,550**	**17,879**	**12,919**	**30,798**
Overhead adjustment							(194)	**(194)**
Total overhead	**693**	**985**	**629**	**1,824**	**374**	**3,813**	**2,039**	**5,852**
Total Recommend capital expenditure	**4,491**	**6,009**	**4,069**	**5,690**	**5,924**	**21,692**	**14,958**	**36,650**
Recommended Water capital expenditure	3,392	3,179	2,349	2,166	3,974	11,668	10,675	22,343
Recommended Sewerage capital expenditure	1,099	2,830	1,720	3,524	1,950	10,024	4,283	14,307

Source: All data sourced from Essential Water's Submission to IPART updated by commercial in confidence document EW September AIRSIR – Final 21 Sept. and consideration by Aither of recommended project adjustments.

6.2. Recommendations for future capital expenditure

In reviewing the capital expenditure proposed by Essential Water, it is important to note the two different capital programs:

- Essential Water's proposed capital expenditure, and
- The consequential works program.

The following outlines the recommendations from our review of each of these two programs separately.

6.2.1. Essential Water's proposed capital expenditure

Our review identified that the majority of the capital projects proposed by Essential Water were both prudent and efficient, with sufficient documentation to justify the need for the project. There were two projects that were deemed to be inefficient and we have made recommendations to reduce the expenditure for these projects:

- Wills St WWTP be reduced from a total of $34.3 million to a total of $9.3 million including overheads (from $29.1 million to $7.9 million in direct expenditure) – a reduction of 73 per cent over the upcoming regulatory period – to allow for Essential Water to monitor the success of the existing measures and confirm and to undertake further reviews to identify opportunities for savings in future works and in management and coordination costs. It is anticipated construction work on a major upgrade will commence in 2022-23 and continue into the next determination period.
- Consistent with the review of historical capital expenditure above, we consider there are inefficiencies within the Mica St WTP expenditure relating to premature corrosion and have therefore reduced the proposed expenditure by $2.2 million including overheads ($1.8 million direct expenditure) in 2019-20.

The following table summarises the outcome of our review of the proposed capital expenditure.

Table 33 Recommended direct water capital expenditure ($000s, $2018-19)[65]

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct capital expenditure	**9,518**	**3,870**	**1,771**	**3,468**	**18,626**
Adjustments					
Project 12 Mica St WTP	(1,843)				(1,843)
Total recommended direct capital expenditure	**7,675**	**3,870**	**1,771**	**3,468**	**16,783**

Source: All data sourced from Essential Water's Submission to IPART updated by commercial in confidence document EW September AIRSIR – Final 21 Sept. and consideration by Aither of recommended project adjustments.

[65] Overheads associated with this direct capital expenditure is considered in Section 5.5.

Table 34 Recommended direct sewerage capital expenditure ($000s, $2018-19)[66]

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct capital expenditure	**2,193**	**13,375**	**13,350**	**4,633**	**33,550**
Adjustments					
Project 13 Wills St WWTP		(11,312)	(10,665)	818	(21,159)
Total recommended direct capital expenditure	**2,193**	**2,063**	**2,685**	**5,451**	**12,391**

Source: All data sourced from Essential Water's Submission to IPART updated by commercial in confidence document EW September AIRSIR – Final 21 Sept. and consideration by Aither of recommended project adjustments.

6.2.2. Consequential works program

As a result of our review, we consider that the consequential works program for the 2019-2023 period should be reduced from the proposed total capital expenditure of $59.1 million to $21.2 million (this represents a 64 per cent reduction). This recommended reduction in expenditure is based on:

- Item 1: Stephens Creek PS, Rocla pipeline section 4 and 5 – reduction from $33.1 million to $4.8 million
- Item 3 Stephens Creek to Menindee pipeline grazier supply – reduction from $11.4 million to $5.3 million
- Item 4 Pre-treatment at Mica Street WTP – reduction from $2.3 million to $1 million
- Brine pond disposal – reduction from $10.5 million to $8.5 million

6.3. Recommendations for forecast operating expenditure

Our review has recommended the following adjustments to Essential Water's forecast operating expenditure for the upcoming regulatory period:

- Reductions in labour to more accurately reflect historical labour costs, FTE savings and redundancy costs from the decommissioning of the Menindee pipeline and labour cost escalation factor
- Reductions in materials to reflect the historical average of materials cost over the previous regulatory period
- Reductions in electricity to reflect a zero-price increase over the upcoming regulatory period, and
- Reductions to hire services to reflect the historical average of hire services cost over the previous regulatory period.

[66] Overheads associated with this direct capital expenditure is considered in Section 5.5.

The following tables provide our recommended direct operating expenditure for the upcoming regulatory period and a breakdown of the recommended adjustments. Recommended changes to the corporate overheads are considered further below.

Table 35 Water recommended direct operating expenditure ($000s, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct water operating expenditure	**9,478**	**8,898**	**9,009**	**9,485**	**36,870**
Adjustments					
Changes to labour	(769)	(410)	(465)	(560)	(2,204)
Changes to materials	(371)	(280)	(324)	(441)	(1,416)
Changes to electricity	42	9	(133)	(377)	(459)
Changes to hire services	(245)	(196)	(203)	(102)	(746)
Sub-total recommended adjustments	**(1,343)**	**(876)**	**(1,125)**	**(1,480)**	**(4,825)**
Sub-total recommended direct operating expenditure	**8,135**	**8,022**	**7,884**	**8,005**	**32,045**
Efficiency adjustment (1% to non-labour direct expenditure)	(44)	(87)	(132)	(186)	(448)
Total recommended direct water operating expenditure	**8,091**	**7,935**	**7,751**	**7,819**	**31,597**

Table 36 Sewerage recommended direct operating expenditure ($000s, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct sewerage operating expenditure	**2,933**	**2,792**	**2,866**	**3,058**	**11,649**
Adjustments					
Changes to labour	(617)	(529)	(588)	(728)	(2,462)
Changes to materials	(67)	(50)	(58)	(79)	(254)
Changes to electricity	66	64	55	42	226
Changes to hire services	(79)	(63)	(65)	(33)	(240)
Sub-total recommended adjustments	**(697)**	**(578)**	**(657)**	**(798)**	**(2,729)**
Sub-total recommended direct sewerage operating expenditure	**2,236**	**2,214**	**2,209**	**2,260**	**8,920**
Efficiency adjustment (1% to non-labour direct expenditure)	(8)	(16)	(25)	(36)	(86)
Total recommended direct sewerage operating expenditure	**2,228**	**2,198**	**2,185**	**2,223**	**8,834**

6.3.1. Recommendations for corporate overheads

Based on our review, we have recommended a reduction in the amount of corporate overheads to be recovered by Essential Water.

In generating the recommended corporate overheads, Aither has based its recommendations on Essential Water's allocation to direct expenditure based on our recommended direct expenditure and further efficiency gains for corporate overheads throughout the regulatory period.

Table 37 Essential Water proposed, and Aither recommended changes to forecast corporate overhead cost ($000's, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total
Capital expenditure					
Essential Water forecast	2,108	3,104	2,722	1,458	9,392
Recommended Water Corporate Overheads	1,343	658	292	555	2,848
Recommended Sewerage Corporate Overheads	384	351	443	872	2,050
Total Recommended Corporate Overheads	**1,727**	**1,008**	**735**	**1,427**	**4,898**
Difference	(381)	(2,096)	(1,987)	(31)	(4,494)
Percentage change	(18%)	(68%)	(73%)	(2%)	(48%)
Operating expenditure					
Essential Water forecast	2,234	2,104	2,138	2,258	8,734
Recommended Water Corporate Overheads	1,416	1,349	1,279	1,251	5,295
Recommended Sewerage Corporate Overheads	390	374	360	356	1,480
Total Recommended Corporate Overheads	**1,806**	**1,723**	**1,640**	**1,607**	**6,775**
Difference	(428)	(381)	(498)	(651)	(1,959)
Percentage change	(19%)	(18%)	(23%)	(29%)	(22%)

Table 38 Total recommended direct operating expenditure ($000s, $2018-19)

	2019-20	2020-21	2021-22	2022-23	Total
Essential Water proposed direct operating expenditure	**12,411**	**11,690**	**11,876**	**12,543**	**48,520**
Recommended adjustments	(2,198)	(1,663)	(2,044)	(2,603)	(8,509)
Total recommended direct operating expenditure	**10,372**	**10,236**	**10,094**	**10,265**	**40,966**

Appendix A: Capital projects detailed review

A.1. Capital project 2 Stephens Creek Dam Wall

A.1.1. Project description

The Reservoir was originally constructed in the late 1800s and although modified over the years it does not meet current dam safety guidelines. In December 2012, EW was issued with a directive by the NSW Dams Safety Committee (DSC) to undertake rehabilitation work to meet current risk management standards – namely to address the risk of it failing a 1:10,000-year storm event.

This proposal is to undertake works to address these safety issues with $1.3 million proposed for the 2019-2023 determination period and a further $11 million in the following years.

A.1.2. Documentation provided

A number of documents were provided and reviewed for this project, as summarised in the table below. In addition, this project was discussed at a site visit and Essential Water's Broken Hill office in September 2018.

Table 39 Documentation provided for Stephens Creek Dam Wall Rehabilitation

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
Essential Water Correspondence with Dam Safety Committee Representatives May & June 2017 & December 2012.
Stephens Creek Dam Safety Assessment 7 Upgrade Options Study Part A & B June 2018

A.1.3. Project need

The project driver is categorised by Essential Water as meeting existing mandatory standards.

The reservoir currently performs a critical role in maintaining bulk water supply to Broken Hill by collection and storage of the vast majority of raw water delivered to Broken Hill.

Consideration of the on-going uses of the reservoir after the Wentworth to Broken Hill pipeline commissioning in late 2018 are as follows:

- The reservoir can play a role in off-setting bulk water charges form the Murray pipeline however these savings alone are unlikely to be significant enough to justify retaining the reservoir.
- There remains a need to provide balancing storage to supply raw water supply to local customers. Conceptually there are alternative supply arrangements that can be put in place to avoid if the reservoir was not retained. A high-level review of these alternatives, without taking into account the cost of reservoir safety works supported the continuing use of the reservoir for this purpose.

- The critical argument for retaining the reservoir – maintenance of the water supply reliability customer service level – has been reviewed under Item 1 of the consequential works review.[67] There are strong arguments that expenditure on all these works are not warranted at this stage without further analysis.

Following assessments of the risks associated with the Stephens Creek Dam the NSW Dams Safety Committee (DSC) has issued a directive to Essential Water to prepare a plan by August 2017 for carrying out works to address Dam safety issues in order to reduce the risk of dam failure with potential risk of loss of life and assets.

The dam currently has a 'High C' consequence risk category to a 'Sunny Day Failure' which will be reduced to a 'Low' category on completion of the Wentworth to Broken Hill pipeline project, and a 'Significant' flood consequence category corresponding to a safe discharge capacity requirement of a 1:10,000 Annual Exceedance Probability (AEP) from a storm event.

If Essential Water does not comply with DSC requirements, it may be reported to the Minister as being non-compliant and risk a fine or recovery of costs which could cost Essential Water over $10 million depending on works undertaken by the DSC. If Essential Water fails to comply with DSC directives and the dam fails resulting in loss of life or property, it is likely that significant company fines and litigation would follow.

Given the current condition of the dam and the DSC directive, regardless of the outcome of further reviews of the need for and method of providing standby storage to meet the 99.9 per cent reliability target, expenditure will be required to either upgrade the dam wall to DSC safety standards or decommission the reservoir and construct alternative measures to supply local raw water customers.

A.1.4. Options investigated

An option study of the alternative dam safety measures has been undertaken in June 2018 and the proposed works are the most appropriate action if the reservoir remains in service.

If the reservoir does not remain in service**,** it will need to be decommissioned. Given recent estimates by Essential Water for decommissioning of the Imperial Lake Reservoir Dam Wall, expenditure for decommissioning can be expected to be consistent with that proposed by Essential Water for the current period but require more funds in following years. Total expenditure will be less than that required for the dam safety works.

A.1.5. Procurement

Works proposed would be undertaken by separate consultant detail design and construction contracts. This is appropriate for works of this nature.

A.1.6. Costs and delivery

An allowance of $363k has been made in 2021-22 and $938k for 2022-23. A further $11 million is planned for expenditure in the following period.

[67] Aside from the cost of dam safety works as part of the consequential works Essential Water proposes expenditure of $35 million to maintain the 99.9 per cent customer service level.

A.1.7. Assessment of prudence and efficiency

Prudence

It is clear that action needs to be taken to address the DSC concerns on the safety of the Stephens Creek Dam Wall. The reservoir without the proposed works cannot remain in service to carry out its necessary functions. **It is considered prudent** that in the 2019-2023 submission period the dam wall safety issues need to be addressed by works at the reservoir site.

Efficiency

The proposed action is not necessarily the most efficient solution. Given the significant long-term expenditure some further work needs to be undertaken prior to committing to the current proposed project action as appropriate to address the underlying issues.

Nevertheless, the proposed expenditure is sufficiently late in the period to complete further analysis before a decision is needed to proceed. The funds proposed for the 2019-2023 submission period are also consistent with those required for alternative approaches (such as the proposed safety works or decommissioning).

The funds allowed for this project in the 2022-23 period are efficient but further work is required to define the project and the long-term expenditure beyond**.**

A.1.8. Recommended expenditure

It is recommended that the funds proposed by Essential Water for this project be supported by IPART.

A.2. Capital project 5 Rocky Hill Reservoir Replacement

A.2.1. Project description

Essential Water is proposing to install an additional smaller water service reservoir at Rocky Hill to allow the existing service reservoir to be taken off-line and re-lined during low demand periods. The existing reservoir needs to be re-lined in order to prevent it from further deterioration and eventual failure of the asset. A study carried out in 2011 indicated that the size of the additional service reservoir could be 2.5ML.

Once the Rocky Hill Proposed No 2-service reservoir is installed and commissioned the existing 4.6ML Rocky Hill service reservoir can be taken off-line for maintenance and re-lining of the internal surface as well as refurbishment of the structural roof support

A.2.2. Documentation provided

A number of documents were provided and reviewed for this project, as summarised in the table below. In addition, this project was discussed at a site visit and Essential Water's Broken Hill office in September 2018.

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
Essential Water Business Case (Draft): Gate 2 Preliminary Project Approval: Refurbishment of the Rocky Hill Service Reservoir – June 2018
Essential Water written response to Aither questions October 2018.

A.2.3. Project need

The project driver is categorised by Essential Water as meeting existing mandatory standards.

The current tank at Rocky Hill is a critical part of the drinking water distribution system. It is located at the highest point in the reticulation system. Treated water from the Mica Street Water Treatment Plant is pumped to the tank and distributed to a significant supply area by gravity. It is the only source of water for those customers and cannot be taken off-line for any significant maintenance without losing supply to customers.

The tank was constructed in the 1970 and lined in 1980 to protect the internal steel structure of the tank. The lining had an expected life of 15 years. Significant corrosion of the lining has occurred. The roofing is also showing signs of significant corrosion. The condition of the tank has been assessed as exhibiting a risk of drinking water quality contamination, significant leakage and risk to tank foundation.

Repairs and refurbishment require the tank to be taken off-line for an approximate three-month period, while preparation, repair and the internal repainting is carried out. To avoid loss of supply to customers served by the tank it is proposed to construct an additional smaller tank to provide supply to the area during the maintenance period and to provide long term standby for regular maintenance in the future.

A new tank will also increase the total standby storage in the event of bulk supply or WTP failure and improve water pressure to the area.

Essential Water submitted this project as part of its 2014 pricing determination review and was subsequently supported by IPART and its consultants who assessed the works as having a medium level priority at that time. It was included in the budget for construction principally in the 2017-18 financial year.

Through the current pricing period, Essential Water introduced more extensive corrosion inspection processes for their service tanks and as a result, it was able to make the decision that these works could be delayed. Subsequent inspection of the current tank has revealed that the tank lining has deteriorated further and requires re-lining within 3 years.

A.2.4. Options investigated

Options reports prior to the previous determination review looked at four options including Do Nothing, install a smaller temporary tank and pumping system, the preferred option of a 2.5ML permanent tank, or construction of a full size 7.5ML replacement tank and decommissioning of the current tank.

The proposed project was the lowest cost option that met the minimum risk associated with re-lining the existing tank. The critical issues have not altered in that time period.

Further investigation is to be undertaken into the use of different materials for the tank walls prior to tendering – the estimate is based on a conventional steel tank construction. This is unlikely to provide significant capital cost savings but may provide service and maintenance advantages.

A.2.5. Procurement

The new tank will be delivered through a design-construct contract. This is the standard approach for procurement of tanks of this size and there is a competitive range of specialist suppliers and contractors available in the industry.

A.2.6. Costs and delivery

The project involves expenditure (including 18% corporate overheads) of $239,000 in 2018-19 in the current period on design and document preparation and $4.384 million over the 2019-20 and 2020-21 period on construction.

A.2.7. Assessment of prudence and efficiency

Prudence

This project is considered prudent. Recent detailed investigations have confirmed that the tank is corroding and increasing the risk of water quality issues, leakage and eventually foundation failure. The specialist corrosion inspection process has indicated that the internal lining has failed, corrosion on the internal services of the steel tank is progressing and effecting water quality. It has been assessed as needing to be addressed in the coming period. Essential Water has a clear obligation to maintain drinking water quality standards and service reliability to its customers.

Efficiency

Options studies confirm that this is the appropriate project to address the need to refurbish the existing tank. The decision to delay the works from the last period was made on the basis of findings from improvements to inspection processes that bring those processes up to industry standard. Therefore, **this project can be considered efficient for both assessment of the current 2014-2019 period expenditure and proposed 2020-2023 period expenditures**.

A.2.8. Recommended expenditure

It is recommended that IPART support the **2020-2023** proposed funding for this project.

A.3. Capital project 7 Menindee WTP Major Works

A.3.1. Project description

This project involves replacing the current 14.5 litre per second Menindee WTP, which is at the end of its operating life. This current plant supplies the township of Menindee by treating water from the Darling River. Approval for these works was provided by Essential Water in October 2017 and works commenced in 2017-18.

The new replacement plant will have a larger capacity (25 litre per second) than the current 14.5 litre per second plant. The larger plant has sufficient capacity to supply water that meets Australian Drinking Water Guidelines to Essential Water customers at Sunset Strip and the Menindee caravan park. The provision of treated water to these customers relies on construction of a new pipeline which is a separate project proposed by Essential Water under the consequential works program (Item 2).

A.3.2. Documentation provided

A number of documents were provided and reviewed for this project, as summarised in the table below. In addition, this project was discussed at a site visit and Essential Water's Broken Hill office in September 2018.

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
Essential Water Business Case – Preliminary Project Approval Menindee Water Treatment Plant Replacement 17 October 2017.
Extract from Essential Water maintenance management report detailing plant failure records – August 2018

A.3.3. Project need

The project driver is categorised by Essential Water as meeting existing mandatory standards.

The current plant was established in 1985 to provide treated water to the township of Menindee which is adjacent to the Darling River from which it currently draws raw water. The last major upgrade at the time of a process train failure was in 2003. The current plant is suffering from significant corrosion and frequent breakdown and was assessed in a 2013 condition report as nearing the end of its life. A review of the plant against the current Australian Drinking Water Guidelines (ADWG) also indicated that there are some significant gaps in plant facilities that need to be addressed.

Although these works were not considered as part of the 2014 IPART determination they were brought forward from the next period and commenced in 2017-18 due to increasingly frequent breakdowns and avoid water quality risks for Menindee and continuing expenditure on maintenance and equipment replacement.

Replacement of the plant will address these risk issues and maintain ADWG quality standards for the Menindee township.

It is proposed that the plant be sized to serve Essential Water customers at Sunset Strip and Menindee caravan park as well as Menindee. Currently these customers receive water that does not meet ADWG standards. The current small plant at Sunset Strip has always struggled to treat the bulk water quality from the Darling River and operation is labour intensive when compared with current plant standards. The current plant is due to have a major overhaul with replacement of its filters and replacement with a treated water supply from the Menindee plant will avoid this expenditure.

As discussed above, improved water supply quality from the plant to Sunset Strip and the caravan park will rely on provision of pumps and a small pipeline at a cost of $1.5 million. This project is reviewed as part of the consequential works and is considered prudent and efficient. Essential Water is applying to the Government for separate funding and the cost of the pipeline is not included in the IPART determination submission. If the pipeline is not constructed the proposed Menindee WTP is oversized.

A.3.4. Options investigated

The business case included a robust assessment of risk, on-going operations and maintenance expenditure and replacement options. Six options were considered including delaying replacement for five years to the next determination period, sizing the plant for servicing Menindee only and continuing to provide unreliable water supply with the current plant at Sunset Strip and part augmentation of the existing plant.

The proposed option was the lowest net present cost option to meet Essential Water's continuing obligations to provide ADWG quality water to Menindee and is considered the best option.

A.3.5. Procurement

The project is to be tendered as a design and construct contract. This approach is standard for works of this type with many organisations able to offer acceptable solutions including the provision of package plants

A.3.6. Costs and delivery

Development of concept design and go to market for tender in 2017-18 with construction in 2018-19 and 2019-20 respectively. Forecast expenditure for the 2014-2019 period is $4.7 million. This includes equipment replacement of $320k in early years of the 2014-2019 period and is consistent with IPART 2014 expenditure forecast for this treatment plant for this period.

Forecast expenditure in the 2019-2023 determination period is $1.8 million.

A.3.7. Assessment of prudence and efficiency

Prudence

Continued supply of drinking water quality to Menindee township customers is a clear obligation for Essential Water and has significant penalties for not meeting ADWG. The condition assessment report from 2013 is a clear indication that the plant is at the end of its life and **it is considered prudent** to proceed with the project.

Efficiency

Essential Water conducted a series of robust options for replacing the plant and the proposed project has the lowest overall cost. The budget provision includes contingency amounts consistent with project stage and is considered appropriate. The equipment failure rate data provided for review is a clear indication of the risks and costs of failure of the current plant and supports the decision to have brought forward the plant upgrade into the 2014-2019 IPART determination period**.**

Although the cost of the pipeline to deliver improved water quality to Sunset Strip and caravan customers has not been included in the business case analysis the pipeline is also considered prudent and efficient. Therefore, **subject to the pipeline proceeding, this project is considered efficient**.

A.3.8. Recommended expenditure

Subject to the works proposed in Item 2 of consequential works proceeding it is recommended that IPART support the 2019-20 to 2022-23 proposed funding for this project.

A.4. Capital project 8 Broken Hill Water Reticulation Replacement

A.4.1. Project description

The water reticulation network in Broken Hill and surrounding communities consists of networks of pipes of different sizes, materials and ages. In total there are approximately 225km of water reticulation pipelines owned and managed by Essential Water. Pipes fail due to age or condition periodically and need to be repaired or replaced.

The program is reviewed annually and is based on replacing approximately 1km of pipeline per annum over each of the next 10 years. The annual program mains replacement program is prioritised internally and includes not only mains but valves and hydrants and system flowmeters. The major expenditure item involves replacement of mains in the Broken Hill township.

The proposed program also includes, for 2018-19 only, an allowance for replacement of customer meters.

A.4.2. Documentation provided

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
Bureau of Meteorology - 2016-17 National Performance Report – Urban Water Utilities
Internal Essential Water Report – Water Main Replacement Program

A.4.3. Project Need

The project driver is categorised by Essential Water as meeting Existing Mandatory Standards.

Broken Hill township's water reticulation system was built in the 1950s and it is common in rural and metropolitan areas at that time that asbestos cement (AC) pipework was used. The quality of pipework supplied at that time varied and across the nation AC pipework of that age is exhibiting relatively high failure rates.

Water reticulation main performance is fundamental to any urban water authority's commitment to provide a reliable water supply to its customers. For this reason, water reticulation failure rates are a key measure in national reporting of water utility performance.

Essential Water undertakes a replacement program that is prioritised on the basis of a risk assessment involving failure and maintenance records, controlling repeat customer outages and community impact risks.

Approach to prioritisation involves a record system, relevant parameter analysis and a formal application of a priority system (including staff training) which is appropriate for the asset cohort and an organisation of its size.

The 2016-17 National Performance Report Annual mains failure rates by Essential Water over the past period leading up to 2016-17 are generally within expectations for small urban utilities. Failure rates have reduced further in the last 2 years, but rainfall variation has a strong influence on soil

behaviour and pipeline failures inevitably reduce under such conditions. Expenditure levels during the period up to 2016-17 were around $800k per annum ($2018-19) therefore currently appear to be consistent with maintaining effective mains performance.

The annual expenditure in the current 2014-15 to 2018-19 determination period is consistent with that supported by the 2014 IPART determination with the exception of an increase in expenditure planned for the current year (from an average of $800k to $1.35 million). This increase allows for replacement of customer meters. Essential Water has a policy to replace water meters every 15 years which is generally consistent with other Australian authorities which have programs for meter replacement that vary from 10 years to more than 20 years.

With the last meter replacement program completed in 2005 and based on their current policy Essential Water proposes bringing forward replacement by some 2 years on the basis of the large capital program proposed for 2019 to 2024 period.

Expenditure proposed for the upcoming 2019-20 to 2022-2023 period which is focused on the long-term mains and fittings renewal program, averages out at approximately $800k and based on current maintaining the current level of outages appears reasonable.

However, the annual reticulation mains failure performance should be monitored and failure rate remains comparatively low (particularly repeat failures) consideration should be given to reducing expenditure on this program.

A.4.4. Options investigated

Essential Water has reviewed the 'Do Nothing' option involving long term reactive maintenance program as an alternative to the proposed program of planned priority replacement of mains with a history of failure. No NPV analysis was presented out on this analysis but the decision to continue with the annual replacement rate was based on a projected increase in maintenance cost over ten years. Nevertheless, maintenance of a steady rate of mains bursts indicates that expenditure level remains appropriate.

They have also reviewed using alternative mains replacement technologies.

Essential Water undertakes water main renewals using excavate, remove and replace technologies. Broken Hill has old AC mains which can be replaced using significantly lower cost pipe bursting renewal technologies. However, there are increasingly wide spread concerns in communities regarding health and safety and environmental concerns about the risks involved with these technologies and some water authorities that have used these techniques in the past are discontinuing their use.

Another alternative involving trenchless construction using boring techniques is also inappropriate because of the significant rocky ground conditions in Broken Hill.

Essential Water's approach to mains replacement remains appropriate although improvements in boring technologies should be monitored and explored in softer ground condition areas.

With regard to the meter replacement program there has not been any review undertaken of Essential Water's current policy. Many authorities now use statistical sampling programs to better understand the efficiency of their meter fleet and have increased the period between replacements. The introduction of WSAA codes of practice for meter management and production has also improved the quality of meter management as well. In future, Essential Water should approach other authorities that use these methods and leverage from their programs.

A.4.5. Procurement

Essential Water undertakes this work using the same in-house labour team as that of sewer renewals and deployment on maintenance peaks as required. This is not a usual arrangement for organisations similar to Essential Water. In future periods Essential Water should plan to transition to more contractor-based arrangements as the scope of the program changes.

A.4.6. Costs and delivery

Expenditure in the current 2014-15 to 2018-19 determination period is forecast at $4.3million. Annual expenditure is consistent with that supported by the 2014 IPART determination with the exception of the customer meter replacement program driven increase in expenditure planned for the current year ($1.35 million).

Target outcome for the mains replacement program – maintenance of long-term failure rates at a manageable rate comparable with other organisations – is being achieved.

The timing of the water meter renewal program is based upon avoiding the large capital expenditure program proposed for the 2019-2023 submission period. This report makes recommendations to delay some other parts of this program and if they are accepted, consideration could be given to also delay the water renewals component ($500K) as well. However, the combined program (including supported components of the consequential works program) still represents significant challenges for Essential Water to focus on and it is considered current proposed timing remains appropriate.

Expenditure proposed for the upcoming 2019-20 to 2022-2023 period averages out at approximately $800k and is based on the current planned mains renewal rate of 1km per year.

A.4.7. Assessment of prudence and efficiency

Prudence

An appropriate timely ongoing renewal program for minor assets (water and sewer reticulation, minor pumping station equipment, local service reservoirs and associated assets – valves, meters and access chambers) in urban water and sewerage systems with an age profile similar to that of Broken Hill is important to maintain customer service levels and funding challenges. **It is considered prudent to proceed with the water reticulation replacement program.**

Efficiency

Failure rates are maintained near industry averages and renewals are prioritised on the basis of appropriate criteria. Construction methods appear appropriate for the current work load and local community requirements. The one-off increase in expenditure planned for 2018-19 for meter replacement, based on current knowledge, is generally consistent with long-term management of the meter fleet. **The level of expenditure in the current period and proposed 2019-20 to 2022-23 period appears efficient**.

A.4.8. Recommended expenditure

The water reticulation replacement program is prudent and planned at an efficient level. It is recommended that funding as proposed by Essential Water for the 2019 to 2023 determination period be supported. The expenditure for 2014-15 to 2018-19 appears efficient.

Table 40 Water Reticulation Program proposed and recommended capital expenditure ($000s, $2018-19)

	Current reg period 2018-19	Next reg period 2019-20	Next reg period 2020-21	Next reg period 2021-22	Next reg period 2022-23	Next Period Total
Essential Water proposed expenditure	1,377	859	714	726	915	3,214
Recommended expenditure	1,377	859	714	726	915	3,214
Variance	Nil	Nil	Nil	Nil	Nil	Nil
Variance (%)	Nil	Nil	Nil	Nil	Nil	Nil

Source: Data sourced from Commercial in Confidence Documents – Attachment 4 – Essential Water Strategic Plan to the Essential Water IPART Submission July 2014

A.5. Capital project 12 Mica St WTP Capital Works Program

A.5.1. Project description

The project entails an on-going program of replacing pumps, pipework, electrical components and plant upgrades as required to maintain the long-term treatment plant performance meeting the Australian Water Quality Guidelines requirements.

The major expenditure in this program is proposed for the 2018-2019 and 2019-2020 financial years. This proposed increase which is significantly above the long-term average is to carry out works: concrete remediation and other activities associated with addressing corrosion that has occurred at the plant in the eight years since the plant was commissioned.

A.5.2. Documentation provided

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
IPART Essential Water – 30 Yr Capital Plan to 2046 with consequential works – Spreadsheet provided by Essential Water August 2018.
Mica St WTP Concrete Degradation Summary – CWT 15 August 2017
Mica Street Maintenance Records - Spreadsheet provided by Essential Water August 2018

A.5.3. Project need

The project driver is categorised by Essential Water as meeting existing mandatory standards.

The current Mica Street WTP was commissioned in 2010 but is suffering from premature concrete corrosion. Corrosion at the plant was noticed at an early stage and short-term maintenance approaches have been used where feasible to address issues as they arise. We note that Essential Water is proceeding with works to permanently address the concrete corrosion.

Essential Water has provided an estimate for reinstatement of concrete works damaged by corrosion of $2.5 million ($3.5 million including overhead allocation). There is little other information provided in the documentation regarding other specific expenditure related to addressing corrosion related replacement of refurbishment of equipment and structures. Presumably some of the repair work underway provides a coating to prevent further corrosion and can be considered as enhancing asset value. However, no details have been provided in this regard.

A report by CWT Water Treatment specialists in August 2017 identified that water in some of the processes was highly aggressive and that “the consultant responsible for specification of the plant failed to identify that this would occur and did not provide a protective coating.” It is understood that discussions are underway with the consultant and contractors involved to address this issue with a view to recover costs. However over eight years have passed and cost recovery should have been resolved by this time.

A plant that is eight years old would be expected to have an on-going equipment refurbishment program and maintenance and repair records support this assertion. From the pattern of annual

expenditure proposed this appears to vary around $140k to $180k per annum and given the size and nature of the plant this appears reasonable.

A.5.4. Options investigated

The decision to address the concrete corrosion works was made on the basis of continuing costs of maintenance and progressive structural deterioration.

Ongoing renewal program is based upon condition assessment analysis which if implemented efficiently should optimise equipment replacement/maintenance costs. However, this specific program has not been reviewed in any specific detail.

A.5.5. Procurement

Concrete repair specialist contractor will be engaged directly by Essential Water to undertake the works.

A.5.6. Costs and delivery

To undertake this program $4.2 million and $2.4 million has been spent or forecast for the current 2014-2019 and the proposed 2019-2023 determination periods respectively. Of this expenditure Essential Water has estimated $3.5 million is forecast for concrete corrosion correction work. The bulk of the remainder of the expenditure (averaging $175K per annum) is on-going expenditure on mechanical, electrical and control system replacement at the plant.

A.5.7. Assessment of prudence and efficiency

Prudence

Significant evidence exists that there is a need for on-going refurbishment and to undertake significant corrosion repair works at the plant in a timely manner. Timely correction works will prevent further deterioration and additional maintenance and refurbishment works in the future. **Expenditure on this program is considered prudent.**

Efficiency

On-going expenditure on refurbishment of equipment at a plant this age can be expected to be in the region of $150k.

Repair work associated with the corrosion driven damage is now undoubtedly required urgently. However the work has been identified as preventable if appropriate corrosion protection had been applied at the time of construction. Provision of a concrete coating is necessary to maintain the life of the plant is also considered efficient. Although it is not clear how much of the repair cost is related to the provision of a coating the vast majority of the proposed costs would be driven by the need to undertake the remedial work and retrofit a coating.

These costs appear to be in excess of $2.5 million (or $3.5 million including overhead and contingency). Although efforts are underway to recover these costs and given the time elapsed in pursuing this cost recovery, they cannot be considered efficient. Unless evidence can be presented that these costs can be recovered from previous works consultants or contractors and the **cost associated with this repair activity cannot be considered efficient.**

A.5.8. Recommended expenditure

An on-going program for refurbishment of equipment for the Mica St WTP can be considered prudent and efficient. However, at this stage it is recommended the expenditure related to repair of severe concrete corrosion amounting to **$1,275K and $2,175K are forecast in 2018-19 and 2019-20 respectively not be supported**.

Table 41 Mica St WTP Program proposed and recommended capital expenditure ($000s, $2018-19)

	Current reg period 2018-19	Next reg period 2019-20	Next reg period 2020-21	Next reg period 2021-22	Next reg period 2022-23	Total next reg period 2019-2023
Essential Water proposed expenditure	3,247	2,383	136	138	180	2,837
Recommended expenditure	1,972	208	136	138	180	662
Variance	1,275	2,175	Nil	Nil	Nil	2,175
Variance (%)	39%	91%	Nil	Nil	Nil	77%

Source: Data sourced from Commercial in Confidence Documents – Attachment 4 – Essential Water Strategic Plan to the Essential Water IPART Submission July 2014 and IPART Essential Water – 30 Yr Capital Plan to 2046 with consequential works – Spreadsheet provided by Essential Water August 2018.

A.6. Capital project 13 Replacement of Wills St Waste Water Treatment Plant

A.6.1. Project description

Essential Water propose to construct a new Waste Water Treatment Plant (WWTP) at Wills Street in order to replace the existing WWTP which is approaching the end of its useful life. Expenditure of $34.2 million is planned for 2018-19 and 2019-2023 period respectively. The newly constructed plant will have sufficient capacity to divert flows in a future determination period from the BH South treatment plant and decommission that plant.

Essential Water has actual and forecast expenditure of $6.0 million in the current 2014-2019 on works to address environmental contamination and OH&S issues at the existing plant. These works consisted of storm water management works, concrete sludge drying beds, concrete biosolids drying beds, new channel works in the plant, repair of leaking joints and cracks in tank structures and a new EPA regulatory flow meter. All these works were to address EPA requirements.

A.6.2. Documentation provided

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
Broken Hill Sewerage Scheme - Assessment of costs for the replacement of the Wills Street and Southern STP – PWA Nov 2017s
Wills Street wastewater treatment plant – Remedial Works and costings – GHD May 2013
Correspondence with Essential Water Management October 2018
Copies of correspondence between EPA and Essential Water April 2017 & June 2018

A.6.3. Project need

The project driver is categorised by Essential Water as meeting Existing Mandatory Standards.

The plant has been identified as causing groundwater contaminations and other adverse environmental impacts. The EPA operation licence for the plant includes a requirement for a pollution reduction program (PRP). Failure to proceed with the project would almost certainly result in the EPA taking action against Essential Water. The plant also has OH&S issues of concern to the Worksafe Authority associated with trips, slips and spill hazards.

The environmental impacts have been assessed as resulting from leaking structures, unlined earth storages and stormwater run-off. Otherwise the plant is ageing but generally provides robust performance reliably meeting the EPA effluent discharge requirements with the exception of pH requirements in the effluent. The EPA has not expressed a specific concern with the pH issues. It is a common performance issue with this type of plant across the country.

Works done in the current 2014-2019 period

Since positive identification of the contamination issues and the EPA imposing a PRP, Essential Water progressed as a matter of urgency with a series of works to address the highest risk sources of

contamination and OH&S issues. Construction of these works drove expenditures in the current 2014-2018 determination period above IPART allowances of approximately $2 million to $6 million.

A future plant will utilise the all the works constructed to address the EPA PRP except for the channel diversion and relining and the work on the tank structures.

Possible sources of groundwater contamination that have not been addressed to-date include digestion and clarification tanks. These are relatively more focussed sources of contamination than the others. However, from correspondence between Essential Water and the EPA in June 2018 we understand that Essential Water has given assurance that works are advancing and will be in place in June 2019.

Assessment of Future Expenditure Proposals

The plant is a trickling filter type plant which was typical of the plants established in regional areas at the time Broken Hill was sewered. These plants are known for their robust and reliable performance. However, many of the issues outlined by Essential Water over the coming years – ageing equipment, spare and replacement parts becoming increasingly difficult to source and continual need to manage ageing structures are valid concerns.

A 2013 detailed condition review made an assessment of what remedial repairs were required at that time and their estimated costs. Although definitive information has not been provided, presumably those repair works identified as urgent and needing to be addressed within 5 years have been part of the prioritised works undertaken. This report does indicate that without further work the plant will start to fail beyond that time.

Although significant further investment will be required the scope and timing needs to be reviewed – particularly since the significant investment in the recent years has provided time to undertake further work.

The recent investment has for a time potentially addressed the major plant issues. The EPA earlier in 2018 partially removed the PRP they had placed on the Wills St WWTP operating Licence and it is understood the remaining works underway for 2018-19 will address their other concerns. It does appear reasonable that the effectiveness of the works undertaken be assessed using the ongoing environmental monitoring program. Given the nature of the contamination (groundwater contamination in particular) it will take some years to show improvement. With this information decisions in consultation with the EPA can be made on the scope and timing of further works.

A.6.4. Options investigated

The original options assessment work was done in 2011 prior to investment in current refurbishment being planned and is adequate to the extent it provides a review of the system wide strategy. A 2013 report provides costing of a variety of remedial work options. No other options report has been provided.

However, this a large investment for Essential Water and given the recent works option study work is needed which examines the most appropriate plant type, how best to use current assets and phasing options to optimise expenditure as part of business case for any new work before the upgrade project as proposed can be supported.

A.6.5. Procurement

No proposal has been provided with regard to procurement path. In the past large plant projects have been delivered by design and construct contracts. With a plant this size, depending upon the final scope and phasing a review should include look at the full suite of options including opportunities to lever the project for operational efficiencies in other areas.

A.6.6. Costs and delivery

The proposed project involves $36.6 million with an allowance of $34.2 million in the 2019-23 determination period. The project will be completed by 2022-23.

The proposed budget consists of:

Direct project cost estimate (refer note)	$22.7m
Essential Water management and support costs	$8.3m
Total Direct Costs	**$31.0M**
Corporate OH 18%	$5.6M
Total Project Cost	**$36.6M**

Note: Direct project cost estimate by PWA includes design, project management, construction (including remote area provision) and contingency of 20%.

With the recommended review all of these cost components should be reviewed closely for optimisation and savings. The allowance for Essential Water management and support costs at 27% of the total budget appears high. Given the scope of the PWA developed direct project estimate the Essential Water management and support costs cannot be supported.

This is a large project for Essential Water to undertake at the same time as other historically large capital program. With a $36.6 million budget this project is equal to the whole 2014-2018 four-year period capital budget (including the government funded works). Essential Water needs to have time to focus on this project to optimise the preferred solution and manage delivery risks adequately.

A.6.7. Assessment of prudence and efficiency

Prudence

The EPA pollution reduction programme required EW to address the immediately identifiable principle causes of groundwater contamination and therefor **expenditure incurred in the 2014-2019 determination period can be considered prudent**.

The plant is near the end of its life. It is considered a plant upgrade of the scope and timing proposed is not yet justified there is a need to make provision for further monitoring, review and commencement of works later in the period when optimum options and scope are clearer. However, given the age of the plant, making provision for future upgrade of the Wills St WWTP is considered **prudent in the 2019-2023 determination period**.

Efficiency

The works undertaken to address the EPA requirement have been concentrated on those most required to address the EPA PRP and the OH&S issues and the PRP requirement has been removed. The bulk of the investment can be used as part of future upgrades and the **expenditure in the 2014-2019 determination period is considered efficient.**

Given the arguments presented earlier the current proposal **is not considered efficient for the 2019-2023 determination period.** The timing nor the level of expenditure proposed is consistent with the substantiated need or cost estimates provided. Further time is needed to assess the success of the recently completed works in reducing environmental contamination. Depending upon the results of this monitoring the timing, scope, phasing and delivery approach of further upgrade work can be determined. Extra time can be expected to optimise expenditure needs and reduce the significant risks associated with a project of this size and nature for Essential Water.

Preparing for an extensive upgrade activity on a new plant will likely need to commence in the 2019-2023 period. However, it seems reasonable and necessary that subject to confirmation in the next 2 to 3 years that the majority of investment in the new plant be allowed for in commencing 2022-23 and into the next determination period.

For the purposes of this recommendation, an allowance for the future plant has been based upon construction commencing in 2022-23 and continuing into the following determination period. Upgrade costs post 2021-22 have been based on the PWA supplied estimate.

A.6.8. Recommended expenditure

Based on discussion set out earlier it is recommended that the proposed expenditure of $34.2 million for the 2019-23 period is reduced $9.3 million as set out in the following table. This recommended expenditure allows for completion of existing refurbishment work, investigatory works to confirm efficient scope and timing of further upgrades and to commence work on those upgrades.

Table 42 Project 13 – Replacement of Wills St Waste Treatment Plant proposed and recommended capital expenditure ($000s, $2018-19)

	Current reg period 2018-19	Next reg period 2019-20	Next reg period 2020-21	Next reg period 2021-22	Next reg period 2022-23	Total Next reg period 2019-2023
Essential Water proposed expenditure	2,412	1,286	14,348	14,585	4,035	34,254
Recommended expenditure	2,412	1,286	1,000	2,000	5,000	9,286
Variance	Nil	Nil	(13,348)	(12,585)	965	(24,968)
Variance (%)	Nil	Nil				

Source: Data sourced from Commercial in Confidence Documents – Attachment 4 – Essential Water Strategic Plan to the Essential Water IPART Submission July 2014.

A.7. Non-System Capital Expenditure

A.7.1. Project description

Essential Water have proposed in their IPART determination submission for the 2019-2013 period capital expenditure amount for Furniture, fittings, plant and equipment and to make an appropriate contribution to Essential Energy's broader IT-related capital expenditure.

A.7.2. Documentation provided

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
Water Non-System Capex – Essential Water Spreadsheet August 2018
Corporate Cost Breakdown - Essential Water Spreadsheet – October 2018
Essential Energy Water 2017-18 AIR – September 2018
Copy of Water ICT Capex - Essential Water Spreadsheet – October 2018

A.7.3. Project need

The project driver is categorised by Essential Water as meeting existing mandatory standards except for 2017-18 expenditure which is corporate related business efficiency.

Since 2017-18 Essential Water has been operating a non-system capital expenditure budget covering its contribution to Essential Energy's corporate capital costs associated with IT, furniture, motor vehicles and buildings. Non-system expenditure in accordance with Essential Water Strategic Plan for 2017-18 and 2018-19 was $1,143 and $1,592 ('000s, $2018-19) respectively.

For the 2019-23 period their proposed expenditure is based upon a bottom-up assessment of actual use by the water business. The approach used the CAM approved by the AER to proportion those Essential Energy investments that were only directly relevant to the water business. The amounts proposed are set out in Table 43 below.

Table 43 Proposed non-system capital expenditure ('000s, $2018-19)

Non-System Capex Item	2019-20	2020-21	2021-22	2022-23	Total
FY20-23					
IT	1,289	710	465	380	2,844
Furniture, fittings, plant and equipment	77	77	77	77	308
Motor Vehicles	178	136	169	263	746
Buildings	50	50	50	50	200
Total	**1,594**	**973**	**761**	**770**	**4098**

Some detail was provided on the IT investments (almost 70 per cent of the non-system program). The IT programs identified are generally relevant to the water business. The main investments are in Billing and Meter Data replacement, HR & Payroll and updating and replacement of workplace equipment. There is unlikely to be any specific efficiency spin-off to Essential Water other than through corporate operating cost flow through to overheads; Essential Energy ICT operational budget is forecast to reduce from $60 million in 2019-2020 to $35 million in 2022-23.

Capital overhead allocation and the relationship with non-system capital expenditure

In the AIR the 'Corporate Expenditure' item allocated to the water and sewerage programs includes both the non-system capital expenditure and a corporate overhead allocation. Corporate overheads of an average of 18 per cent have been applied for the 2014-2019 period and for each forecast year for the 2019-2023 period. This is consistent with the 2014 IPART target of achieving 18 per cent corporate expenditure allocation by 2018-19.

Corporate overheads that are capitalised are designed to cover corporate operational costs relevant to Essential Water's water & sewer capital programs. Essential Water provided a breakdown of its 2015-16, 2016-17 and 2017-18 corporate overheads with the annual split between operating and capital generally reflecting the variations in size of the capital program for each year.

With the introduction of a separate category of non-system capital expenditure, the total average of corporate costs allocated to the water and sewer capex increase to 24 per cent for 2014-15 to 2018-19 and 26 per cent for 2019-20 to 2022-23.

A.7.4. Options investigated

Process is driven by the broader Essential Energy corporate purchasing area and no alternative options were presented in the IPART submission. However, given economies of scale there is no practical alternative other than to rely on Essential Energy services for the material parts of this program.

A.7.5. Procurement

These services are provided by Essential Energy and there is no practical alternative approach for the material parts of this program for Essential Water's.

A.7.6. Costs and delivery

Non-system expenditure in accordance with Essential Water Strategic Plan for 2017-18 and 2018-19 was $1,143 and $1,592 ('000s, $2018-19) respectively. No detail of the make of these expenditures other than the ICT program has been provided. The ICT program allocation does appear reasonable for these years.

There also appears to be some uncertainty on the 2017-18 expenditure as the September AIR appears to indicate that non-system costs had a significant increase to $1.93 million from the $1.1 million set out in June 2018 in the pricing submission. This uncertainty combined with the relatively small ICT program contribution makes further explanation by Essential Water of expenditure breakdown necessary before a decision on efficiency can be made.

.

Although the full details of expenditure breakdown for 2018-19 is unavailable the ICT component is the majority of expenditure and the remainder appears consistent with the expenditure profile for coming years. With proposed expenditure of 2018-19 as $1.6 million the total expenditure proposed for the period 2018-2023 is $4.1 million with a peak expenditure in 2019-20 of $1.6 million. Non-system capital expenditure in 2018-19 and 2019-20 is driven by IT program investment.

The non-system expenditure is included as 'Corporate' capital expenditure along with corporate operating overhead allocation in the AIR and allocated to the water and sewer expenditure for analysis.

A.7.7. Assessment of prudence and efficiency

Prudence

Capital expenditure on non-systems support for Essential Water is important for on-going maintenance of services and therefore deemed to be **prudent**.

Efficiency

For the reasons set out earlier in Section A.7.6 further explanation is required before the 2017-18 expenditure can be supported as efficient.

Based on our review of the information available and the declining nature of the expense over the period, we consider that the proposed capital expenditure for non-system assets for 2018-19 and 2019 to 2023 **is efficient**. We note that this project is separate to the corporate overheads that are capitalised within the 'Corporate' capital expenditure item which is considered in detail in Section 5.5.

A.7.8. Recommended expenditure

It is recommended that IPART support the expenditure proposed for the non-system capital expenditure for the 2018-19 and the 2019-2023 determination period.

A.8. Consequential Works Project - Item 1: Stephens Creek PS, Rocla pipeline section 4 & 5, Stephens Creek off-line storage

A.8.1. Project description

Essential Water propose to carry out works to maintain its current bulk water reliability of supply customer level target of 99.9 per cent after the Wentworth to Broken Hill pipeline is commissioned in late 2018. The works proposed involve expenditure of $35 million (including share of overheads and management) on refurbishment of two sections of the Stephens Reservoir to Mica St WTP, replacement of the existing pump station with a new pump station and balancing tank at Stephens Creek Reservoir.

A.8.2. Documentation provided

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
Broken Hill Long Term Water Supply – Consequential Works Business Case – Essential Water April 2018 – Final Dated 28 June 2018
Murray River O&M Contract
Failure Data for pipelines and pump stations
Broken Hill LTWS – Consequential Works Preliminary Procurement Strategy – Essential Water July 2018
IPART Essential Water – 30 Yr Capital Plan to 2046 with consequential works – Spreadsheet provided by Essential Water August 2018.

A.8.3. Project need

Essential Water's proposition is that the Wentworth to Broken Hill pipeline is contracted to deliver 98 per cent reliability of supply to Essential Water. Customer surveys do strongly support maintaining current service levels in general and maintain service levels to their drinking water customers in Broken Hill. Essential Water currently has a 99.9 per cent reliability target for bulk water supply to their water treatment plant at Mica Street to meet current service levels to their customers.

WaterNSW's IPART 2018 Pricing Proposal for the Wentworth to Broken Hill Pipeline and the contract documentation for the pipeline have been reviewed and do not specifically list reliability levels other than "best endeavours" to deliver 100 per cent of flow on any peak day demand. To this end features have been designed into the project to achieve this:

- Emergency storage dedicated to managing downtime in the pipeline system equivalent to 3 days peak day demand prior to delivery point
- Standby pumping capacity, and
- Emergency power generation with capacity to support 5 days of water delivery at 50% of maximum day delivery.

No other documentation relative to an assessment of the reliability of the bulk water service has been provided. It is therefore not clear how the reliability assessment of 98 per cent for the Murray pipeline has been arrived at by Essential Water.

Essential Water plan to deliver this level of reliability by using parts of their current system to provide standby storage capacity. These assets include Stephens Creek pump station, Rocla pipeline section 4 & 5 and a Stephens Creek off-line storage. These system components also include Stephens Creek reservoir which requires dam safety works costing $12 million. This reservoir project expenditure is not included in this consequential works project and is considered separately in the 2019-2023 pricing submission. However, as recommended in that project review, its role as part of the standby capacity is relevant to the long-term future of that asset.

This project proposes works that are required to refurbish or replace ageing equipment and pipelines on the basis that they could fail at the same time as the Wentworth to Broken Hill pipeline fails and at the same time as critical demand conditions (peak day demand) exist. Rectification time of either the Murray system or the effected supporting assets exceeds the standby storage (3 days) that exists in the Murray supply system. The system then fails to meet the target bulk supply service level.

Information presented by Essential Water on the need for these works appears to be based on worst case scenarios. Normally investment of this magnitude on reliability challenges would require Monte-Carlo type modelling of the probability of failure events based on a comprehensive range of scenarios. There is no evidence that such analysis has been undertaken.

There are strong arguments that expenditure of this magnitude on these works are not warranted at this stage without further analysis, such as:

- Further substantiation of the 98 per cent reliability target for the Wentworth to Broken Hill pipeline system, and
- A scenario probability assessment (that takes account of likely Murray system failure modes as well as critical Broken Hill system assets) needs to be undertaken to confirm which assets do need remedial work to provide an appropriate reliability standard.

The system components providing the desired level of reliability all currently are part of operating systems providing the current level of standby for bulk water reliability. In essence there has been, and currently is, heavier reliability on these assets at present than there will be when the Wentworth to Broken Hill pipeline is commissioned. There is no over-riding need to urgently proceed with investment until the appropriate detailed probabilistic review of reliability has been undertaken. Decisions can then be made on what components are highest risk and whether or not refurbishment or replacement is warranted.

There is evidence presented that within the 10-year planning period there will need to be expenditure to replace or reconfigure some of these assets to maintain a continuous service to local customers that currently use the pipeline. It is difficult to see how this is not part of Essential Water's business as usual refurbishment and replacement programs.

A.8.4. Options investigated

A high-level review of three alternatives to providing standby storage to Stephens Creek reservoir for providing the target reliability was presented. Although there are some significant arguments offered that alternative sites were deemed unsuitable because of heritage issues, extra infrastructure required and/or less independence from the Wentworth to Broken Hill pipeline. However, no financial analysis of the alternatives (and at least two of them appear viable) has been carried out to provide context and should be undertaken as part of any revised business case.

However the most significant issue as outlined above, given that reliability is driving the need for these works, a probabilistic analysis should also be pursued to identify the actual probabilistic risk of retaining or delaying the renewal of the various system components.

A.8.5. Procurement

A procurement strategy has been developed for the delivery of the consequential works. It involved a review of all generic alternatives for the works and for each component separately. This seems a reasonable approach given the diverse nature of the works. However, exercises of this type usually involve a scoring process of a group of informed independent and directly affected water authority personnel who can consider all the risk issues involved. There is no evidence that this has occurred on this occasion.

Nevertheless, the recommended approaches – separate detail design and construction contract for replacement of the pipeline components and design and construct contract appear reasonable for the nature of the proposed works.

A.8.6. Costs and delivery

The Consequential Works Project – Item 1 Stephens Creek PS, Rocla pipeline section 4 and 5, Stephens Creek off-line storage expenditure is shown in Table 44.

Table 44 Consequential works project – Item 1 Stephens Creek PS, Rocla pipeline section 4 and 5, Stephens Creek off-line storage expenditure ('000s, $2018-19)

Essential Water proposed expenditure	Current reg period 2018-19	Next reg period 2019-20	Next reg period 2020-21	Next reg period 2021-22	Next reg period 2022-23	Total
Stephens Creek Off line Storage & Pump Station	3,630	23,181				26,811
Rocla Pipeline Renewal	190	1600		2,290	2,290	6,370
Total	**3,820**	**24,781**		**2,290**	**2,290**	**33,181**

Source: All data sourced from Essential Water's Submission to IPART updated by commercial in confidence documents and pro-rata reconciliation of Essential Water Spreadsheet 30-year capital plan with consequential water October 2018 with information provided in Broken Hill Long Term Water Supply – Consequential Works Business Case – Essential Water April 2018 – Final Dated 28 June 2018. and consideration by Aither of recommended project adjustments

These are significant projects for Essential Water and given the lack of urgency for the works outlined earlier regardless of the final decision on works required it is reasonable to spread the expenditure on the more complex pump station related activities items over a 3-year period.

A.8.7. Assessment of prudence and efficiency

Prudence

The high-level objective of this project – to maintain current bulk supply reliability for Broken Hill drinking water supply – is reflected as essential in customer surveys and is considered reasonable. Nevertheless, it is not clear at this stage whether there is a gap in reliability between Broken Hill's

target reliability of 99.9 per cent and that of the Wentworth to Broken Hill pipeline and given the significant size of the investment a more definitive explanation should be provided.

However, there are strong arguments that these assets will be required as part of continuing service obligations to customers in the vicinity of Stephens Creek Reservoir and renewal or replacement should be considered in the longer term and the project is **considered prudent**.

Efficiency

The works as proposed are based on worst case combination of circumstances and an unclear level of reliability for the Wentworth to Broken Hill pipeline. To make an efficient decision the probability of these circumstances simultaneously occurring needs to be robustly defined and compared against reliability targets and investment directed appropriately.

The system components that are part of this upgrade proposal are all part of operating systems providing the current level of standby for bulk water reliability. In essence there has been, and currently is, heavier reliability on these assets than there will be when the Wentworth to Broken Hill pipeline is commissioned. There is no over-riding need to urgently proceed with investment until the appropriate detailed probabilistic review of reliability has been undertaken. Decisions can then be made on what components are highest risk and whether or not refurbishment or replacement is warranted.

Expenditure on these proposed works is therefore not sufficiently urgent prior to a more rigorous assessment to define the optimum works required to maintain reliability objectives. **The currently proposed expenditure is not efficient.**

A.8.8. Recommended expenditure

Until further work is undertaken to substantiate the need for these works and that the expenditure proposed is appropriate for the intended purpose it is recommended that the proposed expenditure for this item not be supported at this time. However, it is recommended that provision be made to complete recommended studies in the current year and for works later in the period on the assumption that targeted lengths of the pipework and pumping system need replacement to maintain service.

Table 45 Consequential Works Project – Item 1 Stephens Creek PS, Rocla pipeline section 4 & 5, Stephens Creek off-line storage expenditure proposed and recommended capital expenditure (‘000s, $2018-19)

	Current reg period 2018-19	Next reg period 2019-20	Next reg period 2020-21	Next reg period 2021-22	Next reg period 2022-23	Total 2019-2023
Essential Water proposed expenditure	**3,820**	**24,788**		**2,290**	**2,290**	**33,188**
Recommended expenditure	200			2,290	2,290	4,780
Variance	(3,620)	(24,788)		Nil	Nil	(28,408)
Variance (%)	(95%)	(100%)		Nil	Nil	(86%)

A.9. Consequential Works Project - Item 2 Pipeline to the caravan park and Sunset Strip

A.9.1. Project description

To construct a pipeline and pump station to provide a water supply service to caravan park and sunset strip customers to replace the lower sections of the current Menindee to Stephens Creek pipeline at a cost of $1.6 million (including Essential Water overheads and allocation of project management and planning costs).

A.9.2. Documentation provided

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
Broken Hill Long Term Water Supply – Consequential Works Business Case – Essential Water April 2018 – Final Dated 28 June 2018
Failure Data for pipelines and pump stations
Broken Hill LTWS – Consequential Works Preliminary Procurement Strategy – Essential Water July 2018

A.9.3. Project need

The commissioning of the Wentworth to Broken Hill pipeline allows Essential Water to decommission the lower lengths of Menindee to Stephens Creek pipeline which currently also serves local residents & business customers. If the pipeline was retained water quality risks and pump station pipeline costs would be significant.

Essential Water has commenced construction of a new water treatment plant at Menindee that has sufficient capacity to service the caravan park and Sunset Strip (refer to Project 7). A new pipeline will allow existing customers to be serviced with water meeting ADWQ Guidelines and reduce health risks.

The option chosen is a result of the Government decision on the Wentworth to Broken Hill pipeline and is necessary for some of the cost savings resulting from the pipeline commissioning to be realised.

A.9.4. Options investigated

Three alternative options and several technical sub options to maintain supply to customers including retaining the current system have been developed and the proposed project is optimum lowest cost option.

A.9.5. Procurement

The recommended approach – separate detail design and a construction contract for replacement of the pipeline components and design and construct contract for pump station provision – appear reasonable for the nature of the proposed works.

A.9.6. Costs and delivery

Expenditure of $1.6 million consisting of approximately $200k in 2018-19 and $1.4 million in 2019-20 to allow early decommissioning of the current pipeline.

A.9.7. Assessment of prudence and efficiency

Prudence

This project involves maintaining water supply to well-established residential and business customers and is therefore **is considered prudent**

Efficiency

Proposal is lowest cost of robust set of options and realises operational and maintenance savings from the establishment of the Murray Pipeline and therefor **expenditure proposed is considered prudent**.

A.9.8. Recommended expenditure

It is recommended that IPART support the expenditure proposed for the Consequential Works Project - Item 2 Pipeline to the caravan park and Sunset Strip.

A.10. Consequential Works Project - Item 3 Stephens Creek to Menindee pipeline grazier supply

A.10.1. Project description

The current non-potable water supply service involving a pump station and series of pipelines to 11 grazier customers is to be decommissioned and replaced by construction of a new pipeline that delivers water from the Stephens Creek Reservoir at an estimated cost of $11.4 million (including Essential Water overheads and allocation of project management and planning costs).

A.10.2. Documentation provided

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
Broken Hill Long Term Water Supply – Consequential Works Business Case – Essential Water April 2018 – Final Dated 28 June 2018

A.10.3. Project need

The 11 graziers effected take flow directly from the Menindee to Stephens Creek Reservoir pipeline that currently is the major supply source for Broken Hill. Commissioning of the Wentworth to Broken Hill pipeline will present a number of different options for the future of the pipeline.

The preferred and optimal option is to decommission the supply from Menindee to Broken Hill to achieve significant maintenance savings on pump stations and the pipeline and to remove the high risk of poor water quality to customers served by the pipeline. Alternative arrangements need to be made to continue if Essential Water is to continue to supply the grazier customers.

The assumption that there is an obligation to continue to provide a bulk service to the graziers was not discussed fully in the business case. It is likely that the original supply to the graziers was opportunistic and would have involved minimal if any capital expense. However, the long-term supply of water to these customers whether there is a supply or agreement or not (which is not clear) may set an implied obligation to supply which may need to be explored before any decision to cease supply is made.

The Wentworth to Broken Hill pipeline provision has, because of the consequential reduced flows in the Menindee to Stephens Creek Reservoir pipeline impacting water quality, provided a servicing challenge to the graziers. It has also enabled Essential Water to realise significant operational and maintenance savings through decommissioning of pump stations on the pipeline and the opportunity to decommission the pipeline.

A.10.4. Options investigated

Analysis of a range of options to serve the existing pipeline customers has recommended the project set out in this proposal. The recommended option is the lowest cost option involving either a new pipeline to the customers or retaining the existing pipeline in operation and back-feeding raw water

from Stephens Creek. We note that long-term retention of the existing pipeline and back-feeding from Stephens Creek has significant costs associated with maintaining the pipeline and water quality risks.

Nevertheless, discussions during the Broken Hill site visit led to an understanding that not all of the pipe necessarily needed to be replaced because of its condition and that further consideration would be given to optimising the replacement lengths.

Alternative options to a pipeline were restricted to a review of potential for aquifer supply to all graziers or delivery of bulk water by tanker and were dismissed on the basis of feasibility of achieving an adequate service level. Given the expenditure required and the small number of customers involved more innovative options – such as involving hybrid aquifer supply to southern customers and pipeline supply to others, phasing the pipeline replacement and/or incentives for graziers to find alternative solutions before committing the funding should be explored.

Whilst further investigations are being undertaken, supply to customers could be maintained by using temporary modifications to back-feed from Stephens Creek allowing decommissioning of the pumping plant from the Darling System and associated significant operational cost savings to be realised. This arrangement was one of the permanent options reviewed by Essential Water. *"By changing the arrangement at Stephens Creek, it would be possible to backflow through the existing DN600 pipe to the last offtake near Sunset Strip with a few modifications implemented along the route."* It is unclear what these "few modifications" involve or their cost. This option was not considered any further by Essential Water as a permanent provision because of costs of long-term management of water quality and pipe maintenance.

Additional monitoring of water quality and assisting customer side management activities in this period will assist in managing interim supply from the old pipe network. With the current proposal the planned construction period would have required these interim measures and there is little further increase in customer risk to delay embarking on this project.

A.10.5. Procurement

The recommended procurement approach – design and construct contract – appears reasonable given the nature of the proposed works.

A.10.6. Costs and delivery

The cost of the works proposed consist of $11.4 million with $5.8 million to be spent in the 2018-19 year and the remainder in the following year.

A.10.7. Assessment of prudence and efficiency

Prudence

Once the Wentworth to Broken Hill pipeline is commissioned the proposal to decommission the supply pipeline from Menindee on the Darling River to Broken Hill will realise significant operational and maintenance savings and address poor water quality risks from an intermittently operated pipeline. With the decommissioning of the pipeline and dependent upon a policy decision to continue supply to the graziers provision of alternative supply arrangements to the graziers **the project is considered prudent.**

Efficiency

Given the relative cost of the preferred option and the small number of customers, further investigations are warranted to search for more innovative approaches. At this stage **the current proposal is not considered efficient**.

However, an allowance should be made for the additional planning, monitoring of water quality, support for customer-side water quality advice and management and a provision at the end of the period for works to commence. An efficient solution could involve servicing solutions for southern customers involving aquifer supply and progressive replacement of the pipeline sections in the worst condition to the extent that water quality issues are addressed.

A.10.8. Recommended expenditure

If a policy decision is made to continue to provide a service, it is recommended that the proposed expenditure for the 2019-2023 be reduced from $11.4 million to $5.25 million as set out in the following table.

Table 46 Consequential Works Project - Item 3 Stephens Creek to Menindee pipeline grazier supply proposed and recommended capital expenditure ('000s, $2018-19)

	Current reg period 2018-19	Next reg period 2019-20	Next reg period 2020-21	Next reg period 2021-22	Next reg period 2022-23	Total
Essential Water proposed expenditure	5,689	5,689				11,378
Recommended expenditure	100	50	100	2,000	3,000	5,250
Variance	(5,589)	(5,639)	100	2,000	3,000	(6,128)
Variance (%)						(54%)

Source: Data sourced from Commercial in Confidence Documents – Attachment 4 – Essential Water Strategic Plan to the Essential Water IPART Submission July 2014

A.11. Consequential Works Project - Item 4 Pre-treatment at Mica Street WTP

A.11.1. Project description

It is proposed to refurbish a decommissioned part of the Mica Street WTP to manage variations in water quality to raw water customers in the Silverton area as a result of the Murray pipeline delivering from a different raw water source to those used currently at a proposed cost of $2.3 million (including Essential Water overheads and allocation of project management and planning costs). The plant will be operated intermittently when the water quality conditions require it.

A.11.2. Documentation provided

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
Broken Hill Long Term Water Supply – Consequential Works Business Case – Essential Water April 2018 – Final Dated 28 June 2018
Murray River Pipeline – Consequential Works Mica St Water Treatment Plant Augmentation, NSW PWA, 29 May 2018

A.11.3. Project need

A study by NSW PWA water quality experts have provided evidence that the new source of water delivered through the Wentworth to Broken Hill pipeline with the current proposed arrangement of works will present an unsatisfactory risk, at times, to well-established current non-potable customers in Silverton. The potable water customers in Broken Hill will be protected by the current processes at the Mica St WTP.

The Murray River water quality conditions that require treatment for non-potable customers, after transfer through the Wentworth to Broken Hill pipeline are corrosiveness, algal toxins and dead algae carryover from pre-treatment processes in the pipeline system.

Other than the corrosiveness of the Murray River water quality, conditions that drive these issues do not apply every year and the frequency of these conditions is not clarified other than that they have 'historically occurred'. The need for the plant to operate to address the algal-related issues will therefore be intermittent.

The PWA report also is uncertain about what the consequences are when the algal is present in the Murray River water. The algae will die in the Murray pipeline and release toxins. The pre-treatment processes included in the pipeline system is thought to remove most of the algae by settlement and chemical dosing can address the toxins before water arrives into the non-potable distribution system. It is postulated that there may be carry-over of some dead algae and some of the chemicals used to treat the algal toxins,

The risk profile for the Silverton customers from the current supply is not as significant and the proposed works would not be required if the Wentworth to Broken Hill pipeline source was not introduced.

A.11.4. Options investigated

Several options developed by a technical expert in this subject were reviewed by Essential Water and the highest cost option (by 100 per cent) has been adopted on the basis that it is the lowest risk to customers and Essential Water.

Quantification of the relative risk of the lower cost options to customers given the lack of clarity on frequency of poor water quality events and the uncertainty regarding carry-over of dead algae should be sought before proceeding with this option. Alternatively, the second highest risk option at approximately $1 million will address the highest risk issues – algal toxin production and corrosiveness of the untreated water. This option could be installed and its performance monitored. Management plans for customers could be prepared to be enacted if the measures to manage chemical and dead algae carry-over are ineffective and the additional works can be undertaken at a later date with limited additional costs.

A.11.5. Procurement

A design and construct contract is proposed for delivery of the works and is an appropriate approach.

A.11.6. Costs and delivery

The project involves expenditure of $300k in 2018-19 and $2 million in 2019-20.

A.11.7. Assessment of prudence and efficiency

Prudence

Expert opinion has supported that the water quality from the Wentworth to Broken Hill Pipeline will at times provide an unacceptable risk to a well-established customer segment and needs to be addressed. The project therefore is supported as **prudent.**

Efficiency

The proposed option is the highest cost and lowest risk option. Alternative lower cost options could be retrofitted and monitored for performance prior to installing the proposed option if they should prove to be inadequate. The current proposed option is therefore considered **not efficient** without better quantifying the relative risks of the options.

A.11.8. Recommended expenditure

Given then that a maximum risk-averse option has been chosen to address perceived water quality issues with the new source of water it is recommended that a lesser provision equivalent to the second highest cost option be made at this time. It is recommended that the proposed expenditure of $2.3 million be reduced to $1.0 million for the period.

Table 47 Consequential Works Project - Item 4 Pre-treatment at Mica Street WTP proposed and recommended capital expenditure ('000s, $2018-19)

	Current reg period 2018-19	Next reg period 2019-20	Next reg period 2020-21	Next reg period 2021-22	Next reg period 2022-23	Total
Essential Water proposed expenditure	300	2,044				2,344
Recommended expenditure	200	844				1,044
Variance	(100)	(1,200)				(1,300)
Variance (%)	(33%)	(60%)				(56%)

Source: Data sourced from Commercial in Confidence Documents – Attachment 4 – Essential Water Strategic Plan to the Essential Water IPART Submission July 2014.

A.12. Consequential Works Project - Brine pond disposal

A.12.1. Project description

This project involves reinstatement of land occupied by Essential Water as part of the Drought Response Emergency Works and used for activities to support that program. The land was leased under a Crown Land Licence and is scheduled to be returned to the owner in late 2020. The works involved drying and removing to a prescribed landfill, a salty residual brine from the short-term treatment process and removal of pond liner and associated pipework from the land. It is proposed that $10.5 million (including Essential Water overheads and allocation of project management and planning costs) as part of the consequential works be allowed for these reinstatement works.

A.12.2. Documentation provided

Document title
Attachment 4 – Essential Water Strategic Plan (Confidential Document attached to Essential Water IPART submission July 2018
Broken Hill Long Term Water Supply – Consequential Works Business Case – Essential Water April 2018 – Final Dated 28 June 2018
Broken Hill LTWS – Consequential Works Preliminary Procurement Strategy – Essential Water July 2018

A.12.3. Project need

The brine storage facility was constructed as part of the drought relief works to treat high saline bulk water that was used as the quality of bulk water available in the drought period deteriorated. There does not appear to be any funds allocated for the decommissioning on this facility in that program. The completion of the Wentworth to Broken Hill pipeline removes the need for this facility. It is being retained for possible use until April 2019

The Land Licence expires in late 2020. Reinstatement requires removal of waste and much of the infrastructure, but the earthworks constructed by Essential Water may remain as the land owner plans to use the site for a tailings dam in the future.

Given the landowner, at the time the licence expires, sees the land as improved from that at the start of the licence potentially there is an opportunity for Essential Water to recover costs for these improvements. However, there may not be any particular legal or commercial argument that Essential Water can use (particularly as this arrangement also offsets some of Essential Water's costs). Advice should nevertheless be sought on approaches such as publishing contributions by the company as community goodwill.

A.12.4. Options investigated

Options were reviewed for undertaking major cost elements of the works. The critical unknown with option development was the method of drying and disposing of the brine with different approaches offering significant savings but also weather and equipment performance risks in terms of meeting timeframe for completion. As a result of this, and market uncertainty, there is significant variation

around the cost estimate with an upper level of $17 million and lower level of $4 million (including 30 per cent contingency). However early trials of techniques (as proposed by Essential Water) are appropriate to better quantify risk levels before confirming a budget.

A.12.5. Procurement

The proposed approach is to use an incentive-based contract which would ensure the contractor is focussed on completion timelines.

A.12.6. Costs and delivery

A proposed budget of $10.5 million (including Essential Water overheads and allocation of project management and planning costs) has been proposed in 2019-20 and 2020-21 for these works. Essential Water's proposed budget split between 2018-19 and 2019-20 reflects the project handover date of August 2020.

It is unclear how the final proposed budget was selected as it appears to be the mid-point between the upper and lower estimate.

A.12.7. Assessment of prudence and efficiency

Prudence

There is a clear legal obligation to undertake the works and therefore **the project is considered prudent.**

Efficiency

Current proposed application for funds has much uncertainty and until approaches to landowner for support have been clarified and trial-based data utilised for a probabilistic determination of funding requirements there are concerns regarding the accuracy of the expenditure proposed. There is also uncertainty regarding the basis on which the budget was established. Perhaps the major uncertainty is the date that the Wentworth to Broken Hill pipeline is commissioned and possibility of brine production ceases. However, given the pipeline installation is now well advanced, significant delays that would result in late commencement of brine production have been reduced. Therefore, the risk of having to embark on the more costly approach to brine drying has reduced.

For comparison based upon the lowest estimate and allowing for a significantly increased contingency to manage the still significant uncertainties an estimated cost of $8.5 million (including Essential Water overheads and allocation of project management and planning costs) is considered a reasonably conservative allowance. Therefore, the current proposal is therefore **considered inefficient**.

A.12.8. Recommended expenditure

It is recommended that subject to the completion of drying trials as proposed by Essential Water in its submission, the proposed funding for this project be supported. For reasons outlined earlier, the proposed expenditure does not include any allowance in the event of cost recovery from the land owner. The budget timing proposed by Essential Water remains appropriate.

Table 48 Consequential Works Project – Brine pond disposal proposed and recommended capital expenditure ('000s, $2018-19)

	Current reg period 2018-19	Next reg period 2019-20	Next reg period 2020-21	Next reg period 2021-22	Next reg period 2022-23	Total
Essential Water proposed expenditure		5,268	5,268			10,535
Recommended expenditure		4,250	4,250			8,500
Variance		(1,018)	(1,018)			(2,035)
Variance (%)		(19%)	(19%)			(19%)

Source: Data sourced from Commercial in Confidence Documents – Attachment 4 – Essential Water Strategic Plan to the Essential Water IPART Submission July 2014

Document history

Revision:

Revision no.	8
Author/s	Tim Ryan; Chris Plunkett; Rex Dusting
Checked	Tim Ryan
Approved	Chris Olszak

Distribution:

Issue date	Friday 25 January 2019
Issued to	IPART
Description	Essential Water Expenditure Review

Citation:

Aither 2018, *Essential Water Expenditure Review*, Aither Pty Ltd.

Acknowledgements:

We acknowledge the assistance of a range of IPART and Essential Water staff in providing information which has informed our review.

For information on this report:

Please contact: Tim Ryan

Mobile: 0418 140 857

Email: tim.ryan@aither.com.au

AITHER