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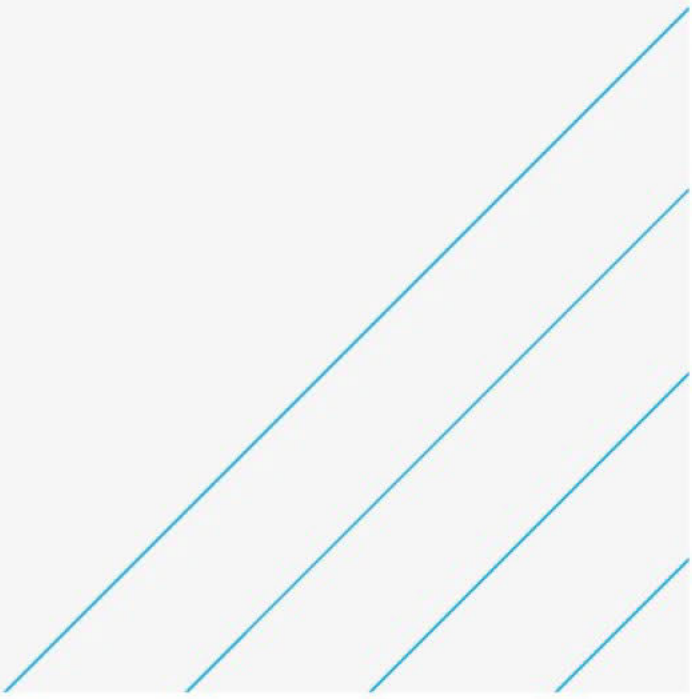
Review of expenditures and demand for the investigation of Seqwater's bulk water prices for 2022–26

Supplementary Report

Queensland Competition Authority

23 March 2022



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This report contains material that has not been verified by Seqwater, given the time permitted. As such, the conclusions and analysis are based on the information made available.

This document has 41 pages including the cover.

Document history

Document title: Supplementary Report
Document reference: 5208669.001

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	Working draft for QCA Review	SJI/JNSJ	SJI	GJ	GJ	28/02/22
2.0	Revised draft for QCA Review	SJI/JNSJ	SJI	GJ	GJ	02/03/22
3.0	Final Draft for QCA	SJI/JNSJ	SJI	GJ	GJ	04/03/22
3.1	Final Draft for QCA – notice update	SJI/JNSJ	SJI	GJ	GJ	23/03/22

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Glossary

Acronym	Definition
AWTP	Advanced Water Treatment Plants
Capex	Capital expenditure
FSL	Full Supply Level
FY	Financial Year ending
GCDP	Gold Coast Desalination Plant
GL	Gigalitres
GST	General Sales Tax
GWh	Gigawatt hours
HV	High Voltage
IDC	Interest During Construction
IT	Information Technology
KBWS	key bulk water storage
KPIs	Key Performance Indicator
kV	Kilovolts
LGA	Local Government Area
LP	Luggage Point
MCS	Monitoring and Control System
Ml/d	Megalitres per day
O&M	Operations and Maintenance
Opex	Operating expenditure
OT	Operational Technology
p.a	per annum
p90	Probability exceedance 90
PRW	Purified Recycled Water
PV	Photovoltaic
QCA	Queensland Competition Authority
QCA Act	Queensland Competition Authority Act 199
QGSO	Queensland Government Statistician's Office
QLD	Queensland
RAB	Regulated Asset Base
RFI	Request for Information
RWPS	Raw Water Pump Station
SEQ	South East Queensland
Seqwater	Queensland Bulk Water Supply Authority
ToR	Terms of Reference
WACC	Weighted Average Cost of Capital

Acronym	Definition
WCRWS	Western Corridor Recycled Water Scheme
WSP	Water Security Program
WTP	Water Treatment Plant

Executive Summary

In August 2021 the QCA appointed Atkins to carry out a detailed review of Seqwater's operating expenditure, capital expenditure and demand forecasts. In February 2022 QCA further requested that Atkins review components of Seqwater's response to its Draft Report, in particular related to expenditure for the Drought Review Event in the current determination period and a proposed hypothetical Drought Allowance for the future determination period. This supplementary report is the output of that review.

Drought review event

Prudency of the decision to recommence Luggage Point Train 1 (LP1)

We conclude that the decision taken in December 2017 to commence recommissioning of the first train plant at Luggage Point well in advance of the Water Security Program trigger was not prudent. This is because:

(i) at that time, reservoir dam storage was 79%, significantly higher than the drought response (60%) and even drought preparedness (70%) triggers;

(ii) demand from industrial customers was uncertain and, as has been subsequently found, is mainly associated with lower storage levels;

(iii) the Water Security Program already takes account of the lead time required to move to full WCRWS production before the operational target level of 40% storage[1];

(iv) because of the variability and uncertainty in demand, the works is operating with large swings in daily production when a reverse osmosis plant requires an even throughput to operate efficiently.

However, we also conclude that, because of the evolution of the drought, the recommissioning would have taken place at a later date anyway. We have therefore **recommended accepting the recommissioning expenditure (albeit at a later date)**.

That said, given that we consider the decision to recommission the plant early was not prudent, we **recommend only accepting the costs of operating the recommissioned plant from the date of drought response**.

Having reviewed the information provided by Seqwater, we have made two adjustments to the recommended expenditure in our draft report. We have accepted that operating expenditure is prudent once the 60% drought response threshold has been met provided trigger, even if levels return, as they did, to the drought preparedness zone (60-70%). We have also adjusted proposed expenditure in FY22 to reflect the significant increase in storage in February 2022 when both WCRWS and GCDP are not required for drought support. The impact is a net reduction of $3.5m to drought response costs.

Prudency of the decision to recommence Luggage Point Trains 2 and 3 (LP2 and 3)

We conclude that the decision taken in March 2021 to **commence recommissioning** of trains 2 and 3 of the plant at Luggage Point **was prudent** at that time. This is because reservoir dam storage was clearly in the drought response phase (56%) and forecast supply and storage depletion scenarios indicated that additional output should be commissioned. The decision was consistent with the Water Security Program 2017 and was expected to provide a total of 70Ml/d commissioned production capacity within 12 months, which is consistent with the drought modelling in the Water Security Program which envisaged the full production capacity of 182Ml/d being achieved within 24 months of entering the drought response phase.

However, given the significant costs and uncertain demand, we conclude that, it **would not have been prudent in March 2021 to commit to significant additional ongoing opex** to operate trains 2 and 3 of the plant at Luggage Point. This decision should be made when the resource position is known towards the end of the commissioning period. Given the recent significant shift in the drought situation, operation of LP2 and LP3 cannot be justified.

[1] See Appendix I of the Water Security Program

Efficiency of WCRWS costs

In operating mode, the plant has not been efficient because of significant variation in demand, plant outages and raw water quality. Our limited benchmarking of unit costs shows that the Luggage Point plant only reached a unit operating cost of a similar order of magnitude to the available benchmark in FY22. Unit costs in previous years were exceptionally high. The cost to maintain the plant in cold standby is greater than other comparators.

Our analysis asks the question whether the WCRWS is an efficient solution to resource substitution when the current demands are so variable, costs are high and resource substitution could be provided by alternative solutions such as GCDP. There is an opportunity to review the current operating strategy to minimise total costs.

Veolia has a contract to operate and maintain the WCRWS. From our high level review, Seqwater needs to clearly demonstrate that outturn costs are efficient through market testing and applying activity-based costing to clearly link costs and activities. Target costs including efficiencies need to be included. [redacted]

Efficiency of GCDP costs

The commercial model within the O&M contract [redacted] because of inconsistent production requirements. [redacted]. Seqwater needs to clearly demonstrate that outturn costs are efficient through market testing and applying activity-based costing to clearly link costs and activities. As with the WCRWS O&M contract, [redacted]

Drought allowance

We have been asked to advise on an appropriate level of potential prudent and efficient costs for a period when Seqwater is below the drought response threshold of 60% water storage. This covers a significant range of drought scenarios for which prudent interventions are also likely to vary significantly.

In its response to QCA's Draft Report, Seqwater provided additional information such as recent WCRWS production and demand data, an analysis of drought exit strategy options and the contracts in place for operation & maintenance of GCDP and WCRWS. Seqwater's response made no change to the drought allowance costs proposed in the August 21 Submission.

We have reviewed the additional information and revised our view of reasonable drought allowance expenditure. We have recommended accepting Seqwater's proposed expenditure related to GCDP opex, WCRWS production opex and WCRWS full recommissioning capex. We have recommended a lower WCRWS recommissioning opex allowance based and have incorporated Luggage Point renewals in the drought allowance rather than fairweather capex.

Exit Strategy

We consider that it is prudent for Seqwater to move the WCRWS to a cold standby (care and maintenance) mode when exiting from the current drought at a cost of $11M/a currently included in base operating expenditure. This is because of the high incremental costs of being in hot standby, the variability of PRW demand, the high storage levels at the time of writing (in excess of 95%) and the 24 month allowance in the Water Security Program to recommission WCRWS.

The proposed step change of $7.2M/a for a 'flushing mode' is not justified. Output to industrial customers is considered unlikely given it relates to flushing only. This means that the beneficial use of the water produce is likely to be limited. It is therefore only likely to be prudent to incur the additional cost if the "expected savings"[2] of restarting from this mode compared to restarting from care and maintenance mode exceed $8.5M p.a. We consider all care and maintenance activities can be carried out within the existing base operating allowance.

[2] Cost saving multiplied by probability of restart. As a hypothetical example, if restart cost savings as a result of being in flushing mode rather than care and maintenance are $20M with a 10% probability of needing a restart (per annum), this would give an equivalent expected cost saving of $2.0M p.a.

Other observations

Throughout the course of the review we have identified a number of broader observations that may be useful to assist any ex-post review of a drought allowance; improve the approach to drought allowance cost allocation and plant operating rules; and opine on Seqwater's proposed drought exit strategies.

Preparing for ex-post review

We understand that drought response review event expenditure is likely to be subject to ex-post review. To improve the clarity and effectiveness of the future review we have provided some suggestions on demonstrating cost efficiency, beneficial use and the governance processes to provide evidence of robust justification and cost challenge. Examples include enforcement of the contractual requirements to source multiple supplier quotes in order to demonstrate efficiency, benchmarking of all significant costs and explanation of any significant variances and demonstration of efficiencies from target costs derived from the Veolia contract

Operating modes and rules

We found that terminology is loosely applied and sometimes inconsistent, particularly when moving between operating modes. A good example is recommissioning which is sometimes confused with operating activities. We suggest clear definitions of and justification for operating modes of each plant: cold or hot standby, transition, operating and shutdown. There should be clear operating rules for changing modes, linked to milestones in the Water Security Program. We consider that, given the significant costs involved, the rules (both to commence and exit operating model) should be grounded in robust hydro-economic modelling and likelihood of beneficial use (see below).

Cost allocation:

There should be clear and defined activity-based cost allocation with definition of different plants and networks. Rules for capitalisation of costs using established definitions, particularly for membranes. Costs should be allocated to the operating modes using codes to be established in the general ledger.

1 Introduction

1.1 Background

The Queensland Competition Authority is the independent economic regulator in Queensland and was established under the QCA Act 1997. The QCA acts as the pricing regulator for the Queensland Bulk Water Supply Authority (known as Seqwater).

In August 2021 the QCA appointed Atkins to carry out a detailed review of Seqwater's operating expenditure, capital expenditure and demand forecasts. The purpose of this review was to inform the QCA's Determination on prices for the upcoming price control period which applies from 1 July 2023 to 30 June 2026 and a further two years out to 30 June 2028 as per our Terms of Reference (ToR). In November 2021 we issued a draft report to QCA to inform their draft determination which QCA issued in December 2021; at that time dam storage levels were around 63%.

Seqwater responded to QCA's draft report in early February 2022 at that time dam storage levels were around 70%.

QCA requested that Atkins review components of Seqwater's response in particular related to expenditure for the Drought Review Event in the current determination period and a proposed hypothetical Drought Allowance for the future determination period. This supplementary report is the output of that review. In the concluding stages of writing this supplementary report between 24 and 28 February 2022 dam storage levels increased to over 95% with dams spilling, controlled releases occurring and utilisation of flooding storage compartments of Wivenhoe and Somerset.

1.2 Terms of reference

This report has been prepared in accordance with further advice QCA sought from Atkins document.

1.3 Terminology in this report

A number of terms are used within this report which have specific meaning relating to the regulatory process. These terms are detailed in Table 2-1 below.

Table 2-1 - Determination period terminology

Term	Usage
2015 Determination	The determination made by QCA which set prices for Seqwater's bulk water for the period 1 July 2015 to 30 June 2018
2015 Determination period or Previous Determination period	The period from 1 July 2015 to 30 June 2018 which was the subject of the 2015 Determination
2018 Determination	The determination made by QCA which set prices for Seqwater's bulk water for the period 1 July 2018 to 30 June 2021 and then extended to 30 June 2022
2018 Determination period or Current Determination period	The period from 1 July 2018 to 30 June 2022 which was the subject of the 2018 Determination
2022 Determination period or Future Determination period	This period covers either the period from 1 July 2022 up to 30 June 2026
2021 pricing submission or proposal	Seqwater's Bulk Water Price Submission that summarise its expenditure, demand and revenue requirements that they propose for the 2022 determination period
Pricing or regulatory model	The spreadsheet model submitted by Seqwater to QCA in June 2021 and resubmitted in August 2021 contains the capital expenditure

Term	Usage
	proposals and high level operating expenditure proposals in support of its pricing submission
Drought submission	The submission by Seqwater to QCA in August 2021 specifically in support of it proposed expenditure for the Drought Allowance
Atkins or our draft report	Atkins expenditure and efficiency review published in December 2021
QCA Draft Report	QCA's draft pricing determination report published in December 2021
Supplementary submission	Seqwater's supplementary submission in response to QCA's draft report published in early February 2022

1.4 Price base and cost data

The financial and expenditure information for this review is based on Seqwater's pricing submission and supplementary submissions to QCA.

Within the pricing model forecast capital expenditure is provided on a nominal basis both on an incurred basis and on an as capitalised basis which includes financing costs. For capital expenditure within this report, we have presented all costs on a nominal basis.

For our analysis of operating expenditure, we have sought to present costs on a normalised FY20 price base as this provides better opportunity for comparisons of the underlying trends and drivers for costs by activity over time. To achieve a consistent price base, we have used the inflation indices set out in Table 8.2 of Seqwater's Price Submission for FY18 and FY19. We have then used Seqwater's weighted opex escalation factor from the opex forecast model[3] for future years.

1.5 Report structure

The structure of this report is as follows:

- Section 2. opines on the drought review event costs for the current determination period.
- Section 3 opines on the drought allowance for the future determination period.
- Section 4 provides a number of other observations based on the information provided for this review.

[3] Seqwater spreadsheet "OPEX Forecast Summary as per sub + LP 2021-06-20 sent to QCA"

2 Drought response review event costs

2.1 Background

We have been asked by QCA to review and report on:

- the prudency of decisions to recommission the first train at Luggage Point AWTP;
- the prudency of the decision to recommission two additional trains at Luggage Point AWTP;
- the efficiency of costs associated with the WCRWS and GCDP;
- cost savings from requiring less water from conventional sources during drought events.

Seqwater provided a report with supplementary information and further information was provided following information requests.

In reviewing the drought response review event, it is useful to understand the definition of a review event. The definition of a drought response review event is linked to the Water Security Program. We therefore discuss both terms below.

Review events

Droughts are not readily predictable and therefore prudent and efficient drought response costs in a pricing period are inherently difficult to determine in advance. Recognising this, in its 2018 report, QCA recommended that:

> *Where Seqwater can demonstrate a change in prudent and efficient costs as a result of taking drought response measures in accordance with the Water Security Program, Seqwater should be able to recover these drought response costs as follows:*
>
> *(a) Where the impact is material, drought response costs should be recouped through a price adjustment during the three-year regulatory period.*
>
> *(b) Where the impact is not material, drought response costs should be recouped through an end-of-period adjustment*

Water Security Program

The Water Security Program 2016-2046 sets out a series of triggers for actions which should be taken at different storage levels of Key Bulk Water Storage (KBWS) capacities. The document specifies that the approach is adaptive i.e.:

> *"Our drought response approach is adaptive to allow actions and triggers to adjust to demand, climate, severity of drought and other external factors. This flexibility is critical to a resilient region. Nevertheless, triggers should not be significantly delayed, or the benefit of the actions will be diminished. In a severe drought, delays could result in a serious risk to water security. Some actions may be brought forward if the drought is more severe than the supporting modelling has anticipated."*

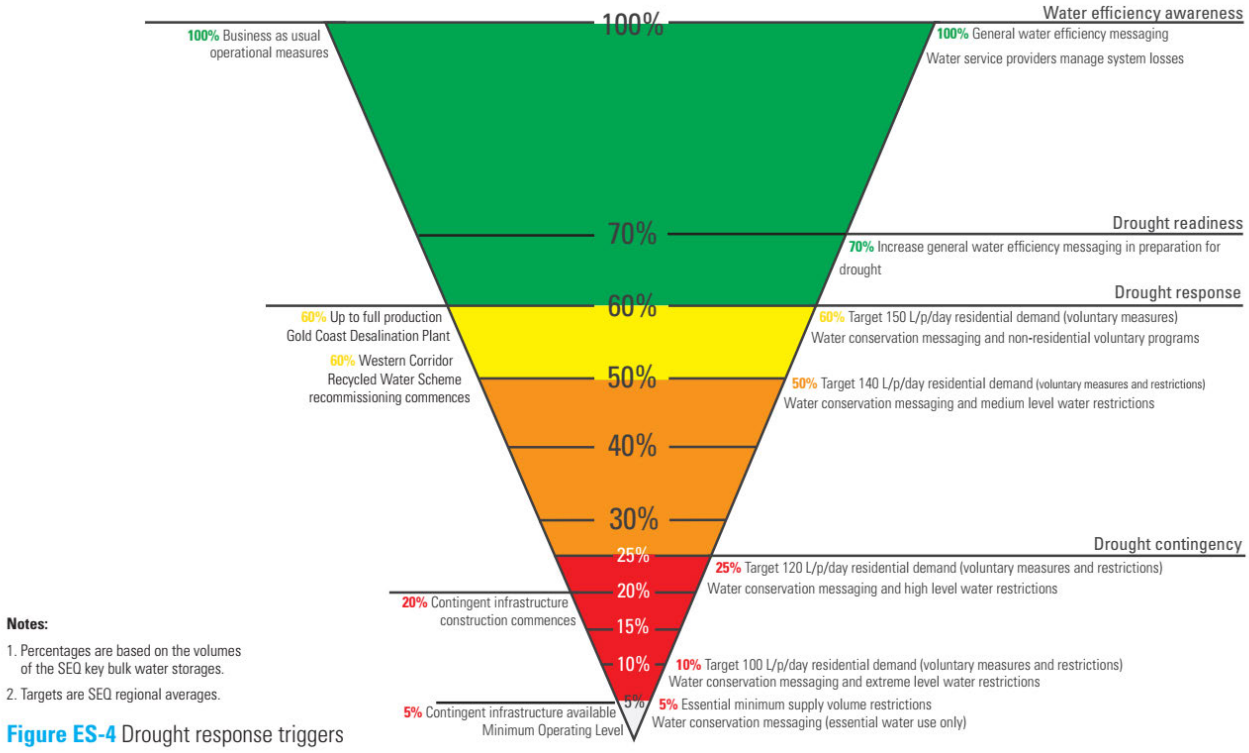
However, it also highlights that the triggers are the result of extensive modelling and gives a list of "actions that will be taken at each KWBS trigger level" indicating confidence in the appropriateness of the trigger levels.

Key triggers in the plan relevant to this review are

- the GCDP is transitioned to full output when storage reduces to 60%;
- a start to commissioning of the WCRWS is also triggered with an assumed completion within 24 months of entering the drought response phase (commissioning period).

There are no defined triggers to cease production when storage increases.

Figure 2-1 - Water Security Program Drought Response Triggers



Source: South East Queensland's Water Security Program 2016-2046

2.2 Operating modes

To clarify our review and analysis of the GCDP and WCRWS plants we have used the following terms.

- Cold standby mode: where a plant is shut down and basic maintenance to the pumps, membranes and other equipment is carried out.
- Hot standby mode: where a plant is maintained and operated at a low level of output. Production can be ramped up to full output over a short period; e.g. 72hrs in the case of GCDP. The justification or otherwise for keeping a plant in hot standby is linked to the incremental costs of doing so, lead times, cost and frequency of moving to operating mode and beneficial use of the water. Because the incremental costs of water production using reverse osmosis can be high, this mode is not always justified.
- Transition mode: where the plant is commissioned from cold or hot standby to full or part operating mode
- Operating mode: where a plant is delivering treated water to meet operational needs at varying output
- Shutdown mode: where a plant has completed its operational requirements and is transitioned to a hot or cold standby mode

In assessing prudence of decisions and efficiency of costs, now and in the future, it is important to link decisions and allocate costs to these modes. To assess efficiency, it is useful to allocate costs accurately against these modes.

2.3 Prudence of review event actions

2.3.1 Decision to recommission Luggage Point AWTP train 1

We are asked by the QCA to comment on:

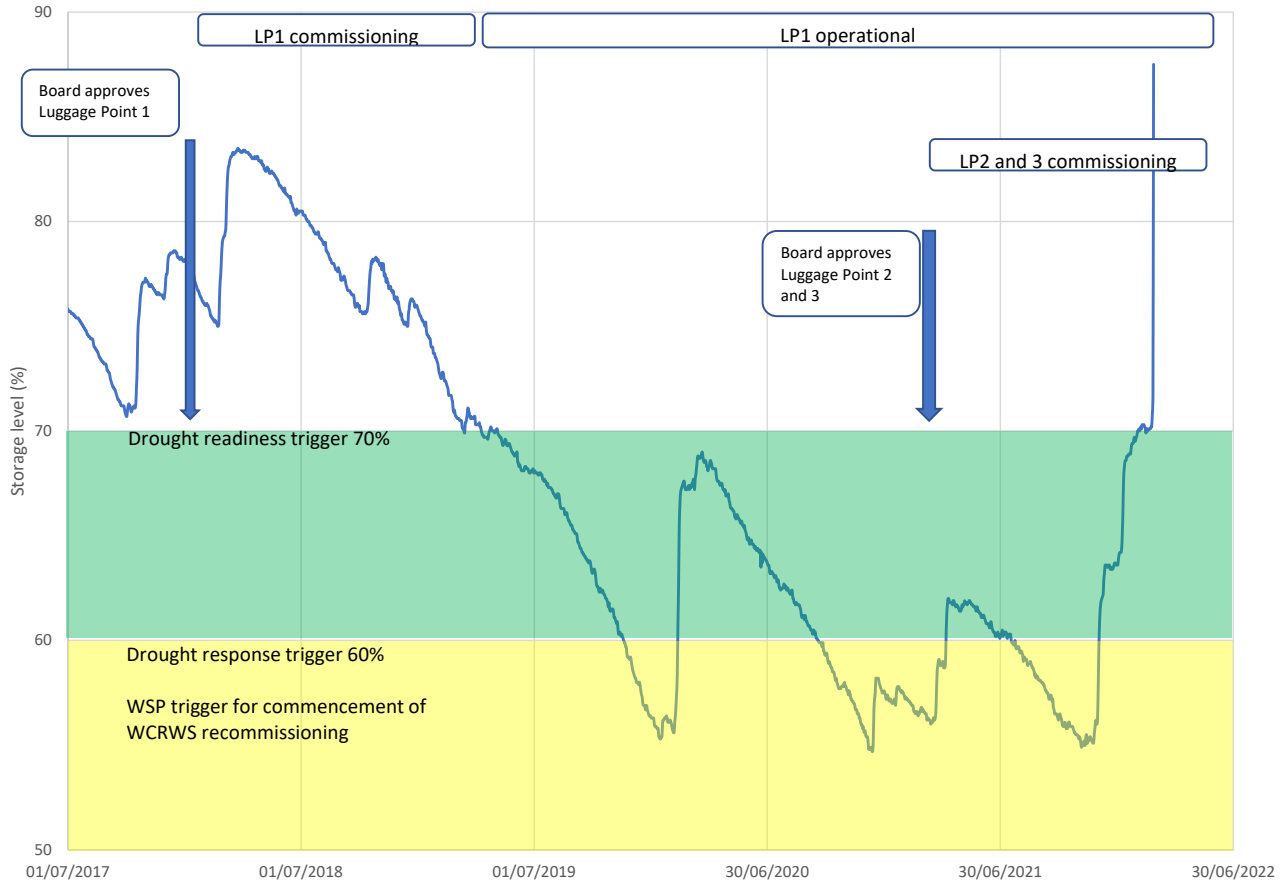
> '*The prudency of decisions to recommence the first train of the Luggage Point AWTP*'

The QCA defines prudency in the Terms of Reference[4] *as*

> *For the purposes of this review opex and capex is considered prudent if it can be justified by reference to an identified need or cost driver - e.g. to meet legal or regulatory obligations, or an increase in the reliability or quality of supply explicitly endorsed or desired by customers*

In reviewing the prudency of decisions to recommission the Luggage Point train 1 plant and the subsequent trains 2 and 3, we take into account the total reservoir storage over time, shown for recent years in Figure 2-2.

Figure 2-2 – Dam storage levels and Luggage Point recommissioning decision timing



[1] WCRWS Remobilisation of single train at Luggage Point, Seqwater board paper, December 2017
4 Review of expenditures and demand for the investigation of Seqwater's bulk water prices for 2022–26, QCA December 2021

The decision to recommission a single train at the Luggage Point Advanced Water Treatment Plant (AWTP) was made in December 2017.[1] Seqwater decided to remobilise the first train when dam levels were well above the drought response trigger at around 76 per cent. Seqwater explained that *inter alia*:

- it could improve operational understanding of the infrastructure (which had been dormant for some time) and recommissioning process. Identify potential issues and minimise risks before the full recommissioning of the scheme;
- the recycled water could be supplied to industrial customers, which would reduce demand on drinking water supplies; and
- partial recommissioning would improve public confidence and support stakeholder and community education.

The December 2017 board report approved an expenditure of $1.5M opex to recommission the plant and $1.4M capital expenditure. Future costs for operating the plant at 6 Ml/d were estimated as $3M/a operating and $0.5M/a capital. Veolia were engaged to recommission the plant '*under existing contract arrangements'*.

In our report[5], we recommended excluding costs associated with actions taken ahead of the drought response trigger *unless* the action would have been taken when the trigger was eventually met. We recommended shifting these costs from the year the cost was incurred to the year it should have been incurred, but also qualified this recommendation:

> *This should not be interpreted as support for the prudency of carrying out activities ahead of the WSP triggers. Had the drought broken and/or the trigger for the activity not subsequently been met, we would not have recommended allowing this expenditure in the drought review event.*

Seqwater further explained[6] that there were advantages in recommissioning the first train from December 2017 through increasing infrastructure reliability above the ongoing care and maintenance activities, increasing certainty on remobilising the WCRWS and having a validation program and recycled water management plan in place which would assist with scheme restart.

Recommissioning the first train (transition mode)

Veolia commenced commissioning work, including membrane replacement, in February 2018. The first train with a 23 Ml/d capacity was commissioned in November 2018. We consider that the commissioning period of nine months is reasonable for an experienced contractor given the extent of works required. This compared with an eight-month period required for transition from cold standby to operation for the Sydney Desalination Plant. The outturn commissioning costs from Veolia are reported as $1.5M.[7]

Operating the first train (Operating mode)

Output data available from April 2019 showed that the plant was operating less than 50% of days with an average output of 3.4 Ml/d. In FY20 the plant was operational for 138 days with an average 3 Ml/d output. In FY21 there were 232 days in operation with an average output of 7.9 Ml/d with the plant operating at full output for some days. There were clearly operational shortfall due to outages, out of limits feedwater quality or limited take up of demand.

The Water Security Program (2017) requires a start to commissioning the WCRWS plant when reservoir levels fall below 60% and be fully operational at 182 Ml/d two years after the recommissioning trigger.[8] While not explicit, this would assume some commissioning over time between the storage trigger and full output of the plant.

5 SEW Expenditure and demand review, Atkins, December 2021
6 Supplementary report on the Western Corridor Water recycling Scheme, Seqwater, February 2022
7 Luggage Point RO train recommissioning project close out report, Veolia, September 2019
8 WCRWS Remobilisation of single train at Luggage Point, Seqwater board paper, December 2017

The trigger for industrial demand for manufactured water is unclear and presumably outside of the direct control of Seqwater. It appears likely (as supported empirically, as discussed below) that industrial customers only take water from Seqwater if their own sources are in danger of being depleted or there is an outage in their supply.

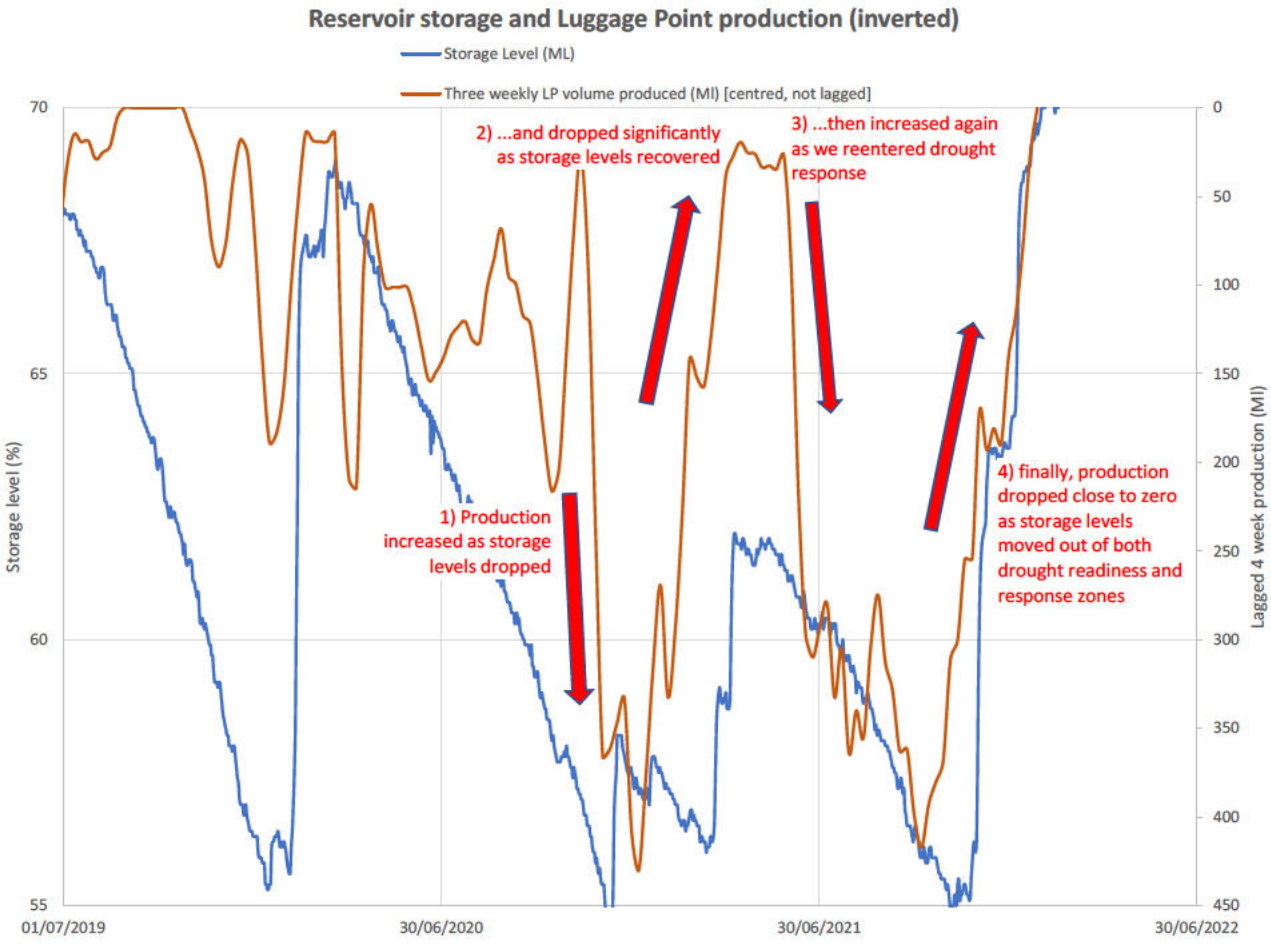
Our high level analysis of demand from the industrial customers for the last three years in Table 2-1 shows that the supply to Swanbank is heavily dependent on the season and availability of water. For example, demand in FY20 occurred in January and February 2020 and intermittingly to June 2020. Demand in FY21 was from July to October 2020 and January to March 2021; in the first half of FY22, demand was in July to October. Comparing these periods with the total storage levels, these demand periods generally occur when total reservoir storage reduces to around 60% shown in Figure 2.3 below.

Table 2-1 - Luggage Point first train output and demand

FY ending June	Production Ml/d	Other Ml/d	Swanbank Ml/d	Tarong Ml/d	Incitec Ml/d	Comment
FY19	3.4	0.5	2.9	0.0	0.0	Full year
FY20	3.0	0.6	2.5	0.0	0.0	Full year
FY21	8.0	1.0	2.9	4.1	0.0	Full year
FY22	7.1	0.0	0.7	5.1	1.3	To December 2021
Capacity of train 1 is 23 Ml/d						

We also looked at the variability of industrial demand compared with reservoir storage levels as shown in Figure 2-3. Note that industrial demand is plotted with an inverted scale to show the relationship between the two data sets in the same direction.

Figure 2-3 – Relationship between total reservoir storage and Luggage Point production



Note that the Luggage Point production is to an inverted scale as Ml/ 28days rolling; 100 Ml/ month is equivalent to 3.6 Ml/d

The analysis suggests that significant demand has only been placed on the Luggage Point plant when storage levels are around the drought response trigger of 60% total reservoir storage. Dependence on a small number of customers having high and fluctuating demands leads to inefficient operation and higher average costs than a constant output.

We conclude that the **decision taken to commence recommissioning of the first train plant at Luggage Point in advance of the WSP trigger was not prudent at that time**. This is because:

(i) at that time, reservoir dam storage was 79%, significantly higher than the drought response (60%) and even drought preparedness (70%) triggers;

(ii) demand from industrial customers was uncertain and, as has been subsequently found, is mainly associated with lower storage levels as can be seen in Figure 2-3;

(iii) the Water Security Program already takes account of the lead time required to move to full WCRWS production before the operational target level of 40% storage[9];

(iv) because of the variability and uncertainty in demand, the works is operating with large swings in daily production when a reverse osmosis plant requires an even throughput to operate efficiently.

[9] See Appendix I of the Water Security Program

This conclusion is unchanged since our draft report.

However, having reviewed the information provided by Seqwater, we have made two adjustments to the recommended expenditure in our draft report. We have accepted that operating expenditure is prudent once the 60% drought response threshold has been met provided trigger , even if levels return, as they did, to the drought preparedness zone (60-70%). These costs are summarised in Section 2.4.4.below.

2.3.2 Decision to recommission Luggage Point AWTP trains 2 & 3

In March 2021 the Seqwater board approved funding of $20.0m related to operating and capital expenditure for the restarting of two additional production trains at Luggage Point AWTP.[10] This was envisaged to provide an additional 46 Ml/d maximum output. At this time total reservoir storage was 56%. The report stated that:

> *The WCRWS is already partially operational, with one train in production at Luggage Point Advanced Water Treatment Plant (Luggage Point) at a capacity of 23ML/day. The decision to restart this initial capacity was within Board authority and did not require responsible Minister approval. This capacity is used to offset demand from Wivenhoe Dam from power stations. However total power station use exceeds this capacity, and from mid-2021 additional demand for recycled water will emerge from Incitec Pivot, which is currently using drinking water supplies.*

At the time of writing we are not aware that a decision to fully recommission the entire WCRWS has been made and 'recommissioning' refers to Luggage Point trains 2 and 3 in this context.

The decision to recommission (transition mode)

Seqwater proceeded with the commissioning of Luggage Point trains 2 and 3, to transition mode, as this did not require ministerial approval. The decision to commence was based on rainfall forecast scenarios and their impact on reservoir storage and assumed little recharge of total storage. A 12-month recommissioning period was assumed, consistent with the period for the train 1 works. This will include the provision of new membranes.

The decision was consistent with the Water Security Program 2017 which provides for full recommissioning of WCRWS to start at 60% water grid storage levels.

Separately, we note that the decision to operate the Luggage Point trains should be dependent on demand for industrial water supply to Tarong and Swanbank power stations and Incitec Pivot. There is uncertainty in the future demand from industrial customers, including if they will take PRW when they can use their own water resources or potable water as demonstrated during the train 1 operating period. We comment in Section 2.2.1 above that industrial customers generally utilise their own sources and only take PRW when these are depleted.

We conclude that the decision taken in March 2021 to **commence recommissioning** of trains 2 and 3 of the plant at Luggage Point **was prudent** at that time. This is because:

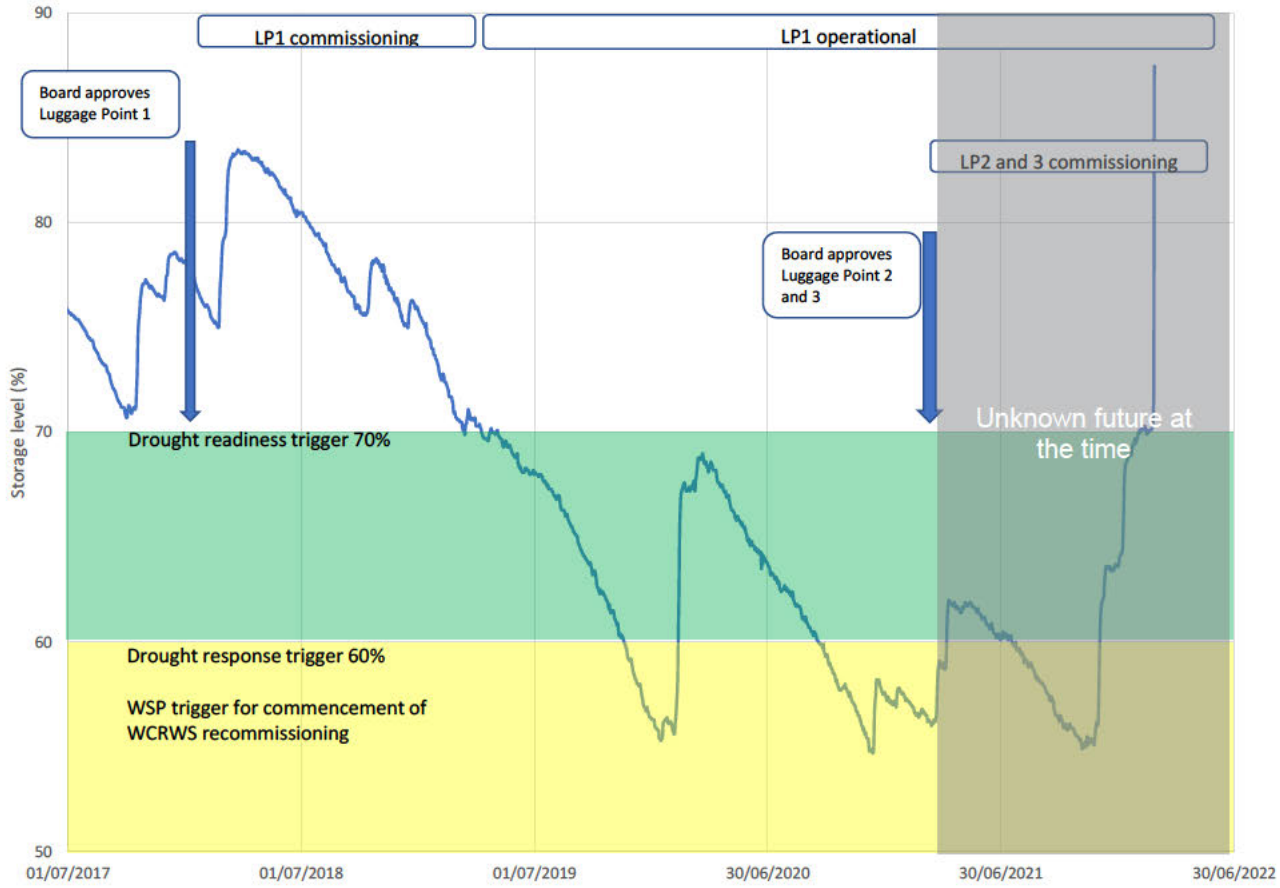
(i) at that time, reservoir dam storage was reported as 56% and forecast supply and storage depletion scenarios indicated that additional output should be commissioned;

(ii) the decision was consistent with the Water Security Program 2017.

However, given the recent significant shift in the drought situation, with storage levels in excess of 95% at the time of writing, we consider that Seqwater should urgently review the justification for continuing to incur any further recommissioning costs.

Figure 2-4 – Visibility of storage trend at the time of the decision to commission LP2 and LP3

[10] Drought Response WCRWS Restart Plan, Seqwater March 2021



The decision to operate trains 2 and 3 (operating mode)

A decision to operate the plant following commissioning needs to take into account the resource forecast and likely demand at that time. We suggest that any decision to operate all trains of the Luggage Point plant should be made towards the end of the commissioning period when the latest reservoir storage data and rainfall forecasts are available. If total storage is greater than 60% then industrial customers are likely to utilise their own resources as evidenced in historic data shown in Section 2.3.

It is not clear to us from the documents provided whether Seqwater has committed to any ongoing additional opex associated with the operation of trains 2 and 3. However, we conclude that, it **would not have been prudent in March 2021 to commit to significant additional ongoing opex** to operate trains 2 and 3 of the plant at Luggage Point. This is because:

(i) just because trains have been recommissioned this does not mean that they should then be operated. They are expensive to operate and the storage and resource position may differ significantly from when the decision to commission was made;

(ii) the output of the plant is dependent on demand from industrial customers. This is unlikely to be significant or continual when storage increases;

(iii) there is significant uncertainty in demand. As there is no government decision to discharge PRW into the Wivenhoe dam then demand on the plant is dependent on variable industrial demand;

(iv) operating the reverse osmosis plant with significant daily variation in output is not efficient where demand is variable and intermittent.

We recommend that the water resource and demand data is reviewed towards the end of the commissioning period to consider whether to move to operating mode or place the plant in standby mode. A move to hot or cold

standby will be dependent on the likely frequency of use of the full plant output and relative costs as discussed in Section 3.

2.4 Efficiency of review event actions

In this section we consider the allocative efficiency of decisions and consider the productive efficiency of processes.

2.4.1 WCRWS

The WCRWS includes three production trains at Luggage Point AWTP, each with a capacity of 23 Ml/d. It has been in cold standby since 2013. The Water Security Program states the recommissioning of the WCRWS scheme should occur when total reservoir storage falls below 60%. The Luggage Point plant is commissioned first with the full scheme recommissioned over 24 months. There are four operational modes applied:

- First train transition from cold standby to operational mode
- First train operational mode
- Second and third train transition from cold standby to operational mode
- Second and third train operational mode

Standby mode: prior to the decision to restart the first train at Luggage Point, the plant was in cold standby. Costs were included in base expenditure. The FY18 costs inflated to 19/20 price base was $11.0M. We understand that these costs relate to the activities needed to maintain the plant such as membrane maintenance and turning pumps. It is surprising to note that this is the same level of cost to maintain the GCDP in hot standby treating salt water, equivalent to a six-fold increase in capacity and higher loading. Most of the costs are driven by capacity so it is difficult to understand the significant higher costs for WCRWS. The comparison suggests that these costs may be inefficient.

The cold standby mode costs are greater than those of the Sydney Desalination Plant standby mode of $8.6M inflated to the same price base which is $2.4M (22%) less than the WCRWS costs. The capacity of the SDP plant is 250 Ml/d compared with 232 Ml/d for the full WCRWS scheme.[11] For comparison the GCDP in hot standby mode has an annual cost of $12.7M. The comparisons support our view that the WCRWS cold standby mode is likely to be inefficient. This is an opportunity for Seqwater to review these costs and seek efficiencies. We have reviewed base year efficiency in our main report.

Transition mode: this train was transitioned from cold standby to operation from February to November 2018; initially to supply 6 Ml/d to the Swanbank power station. This work was carried out by Veolia to a defined timescale and cost. Outturn operating costs of $1.5m were similar to the original estimate. This level of cost appears reasonable.

Operating mode: The works commenced in operating mode from November 2018. Output was increased although the maximum output was not achieved until April 2020. Between November 2018 and January 2020, the plant was not operational, or output was less than 5 Ml/d.

Operating expenditure

WCRWS marginal operating costs or FY20 and FY21 are summarised in Table 2-2 below.[12] Direct operating costs have been identified for LP1 and LP2 commissioning and operation to deliver PRW to Swanbank and

[11] Queensland Audit Office Report 2013
[12] Drought timeline till October 2021 Final.xls, Seqwater, February 2022

Tarong power stations. Expenditure excludes cold standby mode costs which are included in base operating expenditure.

Table 2-2 - WCRWS plant operating expenditure $k

$k year ending 20	FY18 actual	FY19 actual	FY20 actual	FY21 actual	FY22 to Oct 21	FY22 Seqwater forecast	FY22 Atkins forecast
LP1 Veolia commissioning	694	836	0	0	0	0	0
LP1 Veolia planning and mobilisation	0	0	500	0	0	0	0
LP 2 and 3 commissioning	0	0	0	569	57	2057	2057
Total opex – commissioning	694	836	500	569	57	2057	2057
LP1 Supply to Swanbank	0	2180	4351	3219	1243	7304	2486[1]
LP1 Supply to Tarong	0	0	0	2629	990	1436	1436[1]
Total opex –operating mode	0	2180	4351	5848	2253	8740	3922
Total operating expenditure	694	3016	4851	6417	2310	10797	5977

Source: Drought timeline until end Oct 21, Seqwater

Note: excludes some non-asset related costs

Note 1: forecasts assume that production will cease at the end of February 2022 when storage levels recovered significantly due to rainfall

The table reports actual expenditure with a forecast for FY22. We have adjusted this forecast to reflect the current total reservoir storage level and no output after February 2022. This results in a significant reduction in forecast costs for FY22 where only commissioning costs are included. We note that these figures remain inherently uncertain given the potential variability of demand of large individual customers and recent rainfall.

The plant output and related costs are summarised in Table 2-3 below. These data include commissioning and operating costs and outputs as it is not possible to disaggregate based on the data provided.

Table 2-3 - WCRWS first train outputs and variable costs

FY ending June	Total Output Ml	Average output Ml/d	Maximum output Ml/d	Days operating	Output % of capacity	Cost $M operating	Cost $/Ml	Comment
FY19 to Nov 18	671	4,4	23.2	92	19	0.8	1192	Commissioning
FY19 from Dec 18	1038	4.9	15.8	112	21	2.2	2100	Part year
FY20	1124	3.1	23.3	138	13	4.4	3870	Full year
FY21	2923	8.0	23.3	232	35	5.8	2000	Full year
FY22	2669	14.6	23.3	175	64	3.9	1469	6 months to end Dec 2021

Costs are variable operating in addition to fixed costs in cold standby mode.

Source: Drought expenditure from Seqwater 'drought timeline, Jan 22, output from RFI214

Comments on the analysis:

(I) The transition from cold standby to operating mode in FY18 and FY19 was carried out to time and budget

(II) It would be useful to draw a clearer distinction between the costs associated with transition mode and operating modes;

(III) The plant was operating at a low output in FY19 to FY21. The first day of maximum output was in April 2020, apart from commissioning, which was completed in November 2018.

(IV) A reverse osmosis system should be operated with a steady output to be efficient. Data from the WCRWS[13] shows a marked variation on output from zero to maximum over both FY20 and FY21 which suggest that the plant is not being operated efficiently. Where changes in output are required, then these should be managed gradually over time. It is unclear whether the variation is due to variance in demand or plant outage.

(V) Data shows that there were 210 outages in FY21 which reduced or closed production. Seqwater identified the failure of the Lowood balancing tank as one reason for reduced output.

Unit costs, excluding the commissioning mode vary from $1,648 per Ml to $3,825 per Ml. We note that a similar plant and output in Australia treating final effluent and of similar size to the WCRWS has an operating cost of $1,600/ Ml at FY21 price base.

Outputs and benefits

The justification for the Luggage Point plant on the WCRWS is that it provides additional resource to the Wivenhoe catchment. The WCRWS average unit cost $2,231/Ml over the years FY19 to FY21 and the first half of FY22 is significantly greater than the average cost of $600/Ml for the GCDP. This raises the question as to why the output from WCRWS could not be provided at significant lower cost by marginally increasing the GCDP output when there is spare capacity.

The benefit of the WCRWS is to provide an alternative source of water for industrial customers and reduce abstraction from the impounding reservoir at Wivenhoe. The volume saved over the three years Y19 to FY21 is 7754 Ml equivalent to 0.2% of annual storage.

This analysis asks the question whether the WCRWS is an efficient solution to resource substitution when the current demands are so variable, costs are high and resource substitution could be provided by alternative solutions. It supports the Water Security Program modelling which envisages that the WCRWS is to support the system in deeper droughts, with an operational target of 40% storage.

Contract with Veolia

Seqwater had engaged Veolia Water under an agreement dated July 2008[14] and Deed of Amendment in July2012. Seqwater provided these contracts, and we assume that there have been no later amendments or changes in the way the contract has been applied. We have taken an overview of the contract in the time available, focusing on the payment for services.

Clause 30 refers to payment for an 'establishment' phase and Clause 31 refers to the 'O&M phase. Costs for these phases are [redacted]

Schedule 8 covers establishment phase payments. These include for a [redacted] whichever is the greater. Key performance indicators (KPIs) are defined [redacted] The contract allows for [redacted]

13 RFI168

[14] SEQ contract, July 2008

operation. [redacted]

The Deed of Amendment dated July 2012 relates to the shutdown of the plant at that time.

The Veolia budget proposals for restarting LP2 and LP3 trains[15] [redacted] We compare these values with those applied to the GCDP in Section 2.4.2 below.

Our comments on the high-level review of the current contract are that

(i) The contract commenced in 2008 with an amendment in 2012. The costs appear to include [redacted] We question whether it is time to review and re-base the contract;

(ii) We are unclear on whether there has been a robust market testing for the contract. An appropriate method would be to benchmark particular activities having significant impact on total costs. Examples could include chemical use and sludge disposal;

(iii) [redacted]

(iv) Schedule 3 includes the requirement for Veolia to [redacted]

[redacted]

(vi) [redacted] All businesses in the private and public sectors would expect to make productivity gains over time as technology develops over time, recognised as continuing efficiency. This is significant with the extended length of the contract. For example, if a reasonable 0.5% per annum efficiency is gained over the period, this would amount to over 5% for the period. One way to address this is to apply an efficiency to target costs which would give Veolia the opportunity to seek these efficiencies; they would be further rewarded if they outperformed the target efficiency;

(vii) One way forward is to apply efficiency, and demonstrate that these are being actively pursued, is to apply efficiencies to agreed annual target costs.

It may be that, because of the difficulties in operating the plant with large swings in output and outages that agreeing target costs could be difficult. [redacted]

[15] RFI209 – WCR20 restart budget

There is an opportunity for Seqwater to seek efficiencies through a rigorous application of the tools available through the contract, and to clearly demonstrate the steps it is taking.

2.4.2 GCDP costs and benchmarking

The GCDP operates in response to drought events or operational shortfalls when there are outages on the conventional treatment works supplying the grid. The 133 Ml/d plant normally operates in hot standby. The Water Security Program requires the GCDP to increase to full production when reservoir storage reaches 60%. drought response. There is no fixed trigger in the Plan to return to 'hot' standby.

There are two principal modes of operation: hot standby and operational. As the plant is in hot standby the transition to full operation is required within 72 hours and transitional costs are assumed not to be significant. Varying operating expenditure is summarised in Table 2-4 below.

Table 2-4 - GCDP plant drought operating expenditure by mode ($k, prices FY20)

	FY18 actual	FY19 actual	FY20 actual	FY21 actual	FY22 to Oct 21	FY22 Seqwater forecast	FY22 Atkins forecast	Total
Readiness test	226	0	0	0	0	0	0	
Operation <60% storage	0	0	0	8107	2199	7676	7700[1]	
Operation > 60% storage	0	0	4035	1871	0	302	0	
Total	226	0	4035	9978	2199	8002	7700	

Source: Drought timeline until end Oct 21, Seqwater

Note 1: assumes GCDP operating for drought up to end February 2022

The GCDP moved to Operational mode in September 2020 and continued through the financial year to June 2022. The unit cost of operations for FY20 and FY21 are summarised in Table 2-5 below. Drought expenditure in both years includes elements of drought readiness and drought response. It is not clear when the GCDP transitions from readiness to response.

Table 2-5 - GCDP plant drought operating expenditure by output ($k, prices FY20)

FY ending June	Drought variable expenditure $M	Total Output Ml/a	Maximum Output Ml/d	Unit Cost $/Ml	Comment
20	4.0	9519	131	420	18 Nov19 to 31 Mar 20 when storage >60%. Total output may include grid support resulting in a low unit cost
21	10.0	19455	132	512	Full year; 232 days operational
15 Sep 20 to 31 Mar 21 [not a financial year]	7.9	14175	132	557	Detailed cost data available
FY22 to Oct 21	*2.1*	*3500*	-	*600*	*Forecast to Oct 21 by Seqwater. Volume interpolated*

Source: Drought expenditure from Seqwater 'drought timeline, Jan 22, output from RFI168, GCDP forecasts to Oct 21

We have compared these costs with the published Sydney Desalination Plant (SDP) costs related to standby and operational costs.[16] Both GCDP and SDP use seawater reverse osmosis. The cost comparison is shown in Table 2-6 below. We show the total unit cost comparison although these are strongly influenced by electricity costs. A more appropriate comparison of unit costs is to exclude power costs in the analysis.

Table 2-6 - Comparison of SDP and GCDP operational modes and costs

FY ending June 21	Maximum output Ml/d	Standby mode $M/a	Operational mode $/Ml		Comment
			Total variable	Excluding power	
GCDP	133	10.6 (hot standby)	558	212	Average cost used by Seqwater for forecasts
SDP	250	8.6 (cold standby)	625	174	Max output assumes 90% of rated capacity

Source: RFI168 and IPART report[17] - SDP standby costs exclude corporate and insurance costs

Note: SDP power source is from renewable energy with a cost premium; hence power costs are excluded

Contract with Veolia

Seqwater explained that the contract arrangements with Veolia [redacted]

16 Final Report Sydney Desalination Plant Pty, IPART, July 2017
17 Final Report Sydney Desalination Plant Pty, IPART, July 2017

ATKINS
Member of the SNC-Lavalin Group

[redacted]

There is an opportunity for Seqwater to seek efficiencies through a rigorous application of the tools available through the contract, and to clearly demonstrate the steps it is taking.

Standby mode costs

These are driven mainly by the extent of the plant to be maintained; this in turn relate to the size of the plant. Conversely the input to maintain a plant in hot standby is greater than cold; information from the WCRWS proposals suggest the latter is 65% greater than cold standby.

- SDP cold standby cost pro rata to the GCDP capacity = $5.3m
- GCDP hot standby cost pro-rata to cold (-65%) = 5.2m

We found that there is no significant difference between standby costs.

Operating mode costs

The unit cost, excluding electricity, in operational mode for the GCDP is 22% greater than SDP. Given the potential economies of scale, both SDP and GCDP costs are within an acceptable range. While some of this difference may be due to economies of scale, the analysis shows that there is potential for efficiency savings to be made when operating the GCDP. Our comments on the contract with Veolia in Section 2.4.1 also apply to the GCDP contract.

Operating strategy

In a drought situation, there is still need for a rational and efficient response to reducing storage levels. In 2021, the GCDP operational mode cost was $584/ Ml when delivering 44% of its output, assuming 90% of the 133 Ml/d rated capacity. For the same year, the WCRWS operational mode cost was $1,690/ Ml/d for 53% of the train one output. This analysis suggests that greater use of the GCDP would be more cost effective in supplementing reservoir storage than using both GCDP and the WCRWS, even allowing for some additional transfer costs in the grid system. There is an opportunity to review the current operating strategy to minimise total costs.

2.4.3 Opex

2.4.3.1 Offset costs

In our draft expenditure report to QCA[19] we recommended that the costs of producing water from conventional sources should be netted off from the higher costs of producing water from the WCRWS and/or GCDP. This was because up to 30 June 2021, the WCRWS substituted raw water use by power stations and did not commensurately reduce output from conventional sources until that date. We estimated these offset costs savings to be $6.7M between FY20 and FY22. QCA sought further information from Seqwater on this in its draft report. Seqwater accepted that there should have been an offset applied responded in its response that it calculated that *$3.765 million of operating costs were effectively saved at treatment plants through operation of the Gold Coast Desalination Plant (GCDP) in response to drought (incorporating operation of the GCDP up to 62%).*

Atkins and Seqwater have taken slightly different base costs to derive the estimates for the total offset costs although the approaches are broadly aligned. We conclude that the Seqwater approach is reasonable and that the $3.765M estimate is a fair representation of the costs that should be offset from the production of conventional water when the GCDP was operating up to 62% of capacity in response to the drought.

[19] Atkins Draft Seqwater Expenditure Review Report, November 2021

2.4.4 Recommended expenditure

Our recommended expenditure is set out in Table 2-7 below and is derived from the Seqwater revised expenditure presented in Table 6.1 of *Seqwater Response to the QCA's draft report*. We have focused on prudence and efficiency particularly for the bigger cost items related to operating expenditure for the WCRWS and GCDP.

We have recommended two adjustments:

(i) an adjustment for operating WCRWS in advance of the date when the 60% trigger was initially reached in November 2019) as discussed in Section 2.3.1; and

(ii) estimation of offsetting cost savings for FY22 on the same basis as Seqwater's estimates for FY21.

Table 2-7 - Drought Response Review Event Recommendations ($M nominal)

FY ending June	2018	2019	2020	2021	2022 to 31 October 21 only
Seqwater request ($)	1.9	3.2	13.3	22.1	6.6
Recommended adjustments for prudence and efficiency	None	Removal of costs of operating WCRWS before the 60% trigger	Opex for early start of WCRWS before the 60% trigger was initially reached.	None	None
Adjustment		-2.2	-1.5		
Recommended Prudent and Efficient Expenditure	1.9	1.0	11.8	22.1	6.6
Offsetting cost savings	-	-		-3.8	-1.3
Atkins recommended NET Drought Response Review Event	**1.9**	**1.0**	**11.8**	**18.3**	**5.3**

Source: Table 6.1 of Seqwater Response to the QCA's draft report.

Note 1: for details of the adjustments in FY19 and FY20 see Appendix C of the draft Report, themselves based on Seqwater document "QCA 2021 Drought Timeline Revised_v2"

Note 2: offsetting costs savings are based on Table 6.1 of Seqwater Response to the QCA's draft report for FY21 and pro-rata (4 of 12 months) for "FY22 to 31 October 21"

3 Drought allowance

3.1 Background

The Referral Notice requires QCA to recommend a drought allowance which could be applied in addition to prices under normal operating conditions:

> *"expected to provide Seqwater with total revenue sufficient to recover prudent and efficient costs where Seqwater is operating at or below the 'Drought Response' trigger per the published SEQ Water Security Program for the length of the Regulatory Period".*

We have therefore been asked to advise on an appropriate level of potential prudent and efficient costs for a period when Seqwater is below the drought response threshold of 60% water storage. This covers a significant range of drought scenarios for which prudent interventions are also likely to vary significantly. However, we understand that these expenditures will be subject to ex-post review.

In our draft expenditure review report we separated the drought allowance opex into two categories:

1. Recommended expenditure (GCDP drought opex, Luggage Point 3 opex and other drought contingent opex)
2. Expenditure which needed to be subject to further review (WCRWS recommissioning costs and incremental WCRWS drought opex)

In its Draft Report QCA stated that it expected Seqwater to provide greater detail and more justification on the prudency and efficiency of its cost forecast.

In its response to QCA's Draft Report, Seqwater provided additional information such as recent WCRWS production and demand data, an analysis of drought exit strategy options and the contracts in place for operation & maintenance of GCDP and WCRWS. Seqwater's response made no change to the drought allowance costs proposed in the August 21 Submission.

Seqwater proposed a total of $316 million in drought costs over the future regulatory period on the basis of continued drought conditions. The costs reflect the full recommissioning and then operation of the recycled water scheme and the operation of the desalination plant shown in Table 3-1. They do not include any wider drought response costs which are more uncertain.

Table 3-1 - Seqwater proposed drought allowance expenditure ($million, nominal) (2023 to 2026)

	2022–23	2023–24	2024–25	2025–26	Total
Capital charges: • WCRWS (recommissioning plants)			3.2	6.8	10.0
Operating costs:					
• GCDP (operating plant)	27.8	28.4	29.1	29.8	115.1
• WCRWS					
Recommissioning	22.0	22.5	23.0	0	67.6
Operating plant	16.3	16.6	30.8	59.6	123.4
Total	65.5	67.2	86.0	96.1	315.0

Source: Seqwater spreadsheet "Submission Drought Calculations 2021-08-30 POI"

3.2 Drought allowance costs

Having reviewed Seqwater's response and the additional information provided, we have adopted a slightly different approach to our draft Report. Recognising that (1) the drought allowance is to cover a very wide range of potential drought scenarios and therefore potentially prudent expenditure, (2) Seqwater has greater visibility of expenditure and activities than we do and (3) the expenditure will be subject to ex post review, **we have adopted the approach of accepting Seqwater's proposed expenditure except where we consider there is a potentially significant omission or variance from the costs which we would expect**.

For clarity, we would note that the estimates should not be taken as a form of prior approval of the level of spend.

Below we comment on each of the significant expenditure items that make up the components of the drought allowance and provide an indicative drought allowance expenditure. These are namely:

- GCDP operating expenditure
- WCRWS operating expenditure
- Other operating expenditure
- Capital expenditure including renewals

3.2.1 GCDP Opex

In our draft Report we carried out an assessment of the incremental costs of operating GCDP at full production. This resulted in nominal expenditure estimates in the range of $24.8 to $27.8M p.a. This is broadly consistent with Seqwater's proposed expenditure as summarised in Table 3-1 above. **As such, we have recommended accepting Seqwater's proposed expenditure.**

3.2.2 WCRWS Opex

Based on the Drought Calculations provided, we understand that Seqwater's projected costs for recommissioning & operating WCRWS are based on average production of 70Ml/d in FY23 and FY24 and eight months of FY25 before ramping up to 162Ml/d. We understand that the recommissioning costs are based on moving to a full production capacity of 180 Ml/d[20].

As we stated in our draft report, stepping up to full production during the drought response phase appears to be consistent with the WSP which sets out a trigger for recommissioning of the WCRWS at 60%. However, as previously discussed, these recommissioning and operating costs should be subject to having confidence in the beneficial end use of the water produced.

Seqwater's proposed costs are made up of three components[21]:

i. **"WCRWS Recommissioning Costs (OPEX - Project)":** based on $56.2M (in $FY21) recommissioning costs divided over three years.

ii. **"WCRWS Recommissioning Costs (OPEX - Owners)":** based on $6.2M (in $FY21) recommissioning costs divided over three years.

iii. **"Incremental WCRWS Drought Costs (OPEX)":** which is based on the difference between the costs of anticipated production ($33.6M p.a. for 70 Ml/d ramping up to $70.3M p.a. 162 Ml/d) and the costs of care and maintenance mode ($11.2M p.a.) and the "incremental LP3 costs in fairweather price".

Recommissioning opex

The total proposed recommissioning opex is $62.4M to increase production capacity by 110Ml/d (in addition to the $100.7M capex, discussed below). This appears high and is equivalent to $0.6M per Ml/d of capacity recommissioned. To put this in context, the combined recommissioning opex for trains 1, 2 and 3 was $4.0M for a 70Ml/d increase in output i.e. $0.06M per Ml/d of capacity.

Table 3-2 – Recommissioning opex cost comparison (nominal)

	Opex cost ($M)	Capacity increase (Ml/d)	Unit opex ($000k per Ml/d)
LP1 recommissioning	2.0	23	88
LP2 & 3 recommissioning	2.6	46	41

[20] Source: Seqwater spreadsheet "Submission Drought Calculations 2021-08-30 POI"
[21] Source: Seqwater spreadsheet "Submission Drought Calculations 2021-08-30 POI"

Remainder of WCRWS	62.4	110	567

Source: Drought timeline until end Oct 21 and "Submission Drought Calculations 2021-08-30 POI", Seqwater; Atkins analysis

We understand that there may be reasons that it would be more costly to recommission the full production of WCRWS, such as the spread of recommissioning activities across multiple sites. We have reviewed the spreadsheet which has been used to derive the $62.4M estimate[22]. It provides monthly scheduling of inputs such as labour and power and gives a breakdown of fixed and variable costs. However, it doesn't explain why it would be approximately ten times more costly than the recommissioning of trains 1, 2 and 3.

The cost calculations provided by Seqwater also include a detailed estimate for the recommissioning opex of Luggage Point 1, 2 and 3 of $16.9M[23]. It therefore appears that the calculations overestimated the outturn costs ($4.0M) by a factor of four . This supports our understanding that the cost calculations underlying the WCRWS recommissioning opex are overestimates.

We have derived what we consider a more realistic view of WCRWS recommissioning opex by assuming that the remaining recommissioning costs have also been overestimated by a factor of four, in line with the Luggage Point 1, 2 and 3 outturn costs. This provides an estimate of $16.0M for full WCRWS recommissioning opex. We consider this to be more realistic than the estimate of $64.0M.

WCRWS production costs

We have reviewed the figures underlying Seqwater's WCRWS production costs (labelled as "Incremental WCRWS Drought Costs (OPEX)"). They do not appear unreasonable at this level of scheme understanding so we have **recommended accepting Seqwater's proposed costs.**

3.2.3 Other opex and offset savings

In our draft report, we recommended incorporating "other opex" such as communications and off-grid activities. We also recommended reducing opex to take account of the savings associated with lower production from conventional sources at a time of drought. The two adjustments affected opex in opposite direction and were of a comparable order of magnitude, meaning that the combined effect was minor.

Given this, and the potential sense of artificial precision, in this report, **we have not recommended making adjustments for "other opex" or "offset grid production costs".**

3.2.4 Capex

Luggage point renewals

In our draft expenditure review report we identified that expenditure on the ongoing renewals at Luggage Point should be part of any drought allowance expenditure rather than included in the fairweather capital program. This expenditure would be contingent and treated in the same way as the other drought allowance expenditure.

We requested more details from Seqwater on what this expenditure was for and the efficiency challenge process. Seqwater advised that the level of detail for capex renewals is higher in the first couple of years and indexed for the outer years and the renewals are driven by expenditure requirements on a range of 80 different asset types driven by Veolia's Lifecycle Asset Management Planning Tool. We are informed that the detailed expenditure requirements are workshopped regularly and with adjustments to the timing of asset intervention is undertaken based on the actual condition and performance of assets, which is determined from asset inspections and operating performance, along with current and forecasted plant production levels. We consider this is a reasonable basis by which to reprioritise however it would be prudent to have detailed expenditure forecasts rather than only index linked expenditure proposals. Our recommended expenditure (Table 3-3) has not changed since out draft report.

[22] Seqwater spreadsheet "Submission Drought Calculations 2021-08-30 POI"
[23] The sum of "O&M Variable", "O&M Fixed" and "Energy Variable" on tab "LP" of Seqwater's Drought Calculations spreadsheet as indicated in QCA RFI 209.

Table 3-3 - Luggage Point 3 capital expenditure in the future period ($000k, capitalised, nominal)

FY ending June	2023	2024	2025	2026	2027	2028
Seqwater proposed expenditure	2,968	3,024	3,087	3,159	3,234	3,312
Atkins recommended expenditure – Drought continues	2,968	3,024	3,087	3,159	3,234	3,312
Atkins recommended expenditure – Drought breaks	0	0	0	0	0	0

Source: Seqwater pricing submission, August 2021; Atkins analysis

We recommend including this expenditure within the drought allowance.

3.2.4.1 Full recommissioning of WCRWS

Seqwater is proposing that the WCRWS is fully recommissioned to increase water production from 70Ml/d in 2023 ramping up to 162Ml/d in 2026. Within Seqwater's supplementary drought cost allowance submission it has proposed $109M (nominal) capital expenditure for the WCRWS recommissioning between FY23 and FY25. This is based on a FY21 real $ input of $101M for the recommissioning.

Seqwater provided a breakdown of inputs from the contractor which were last updated and indexed in March 2021 as follows

Table 3-4 - WCRWS estimated capital costs for ramping up production from 70Ml/d to 162Ml/d

Capital Cost	Amount ($k, 20/21)
Non-Fixed Assets	$ 679
Fixed Assets (ARRP)	$ 8,542
Pre-Trigger	$ -
Preliminaries	$ 2,372
Luggage Point	$ 9,878
Gibson Island	$ 12,344
Bundamba AWTP	$ 12,445
Networks	$ 993
Restart Labour	$ 31,001
ARRP (during Remob / Restart)	$ 8,505
O&M Re-Establishment	$ 5,042
Risk Allowance	$ 8,876
Total capex	$ 100,677

We have been provided the capital costs of recommissioning of Luggage Point which are $18.1M for an output of 23Ml/d. Scaling this up from 70 Ml/d to 162 Ml/d would indicatively require around $116M of capital expenditure so on this basis Seqwater's estimated costs of $101M does not seem unreasonable. We have therefore not changed our view from our draft report where we included these costs within the drought allowance which have been spread over three years.

Table 3-5 - WCRWS capital expenditure in the future period ($000k, capitalised, nominal)

FY ending June	2023	2024	2025	2026	2027	2028
Seqwater proposed expenditure	35,564	36,334	37,219	0	0	0
Indicative drought allowance	35,564	36,334	37,219	0	0	0

Source: Analysis of Seqwater spreadsheet " Submission Drought Calculations 2021-08-20 sent to QCA "

The costs shown above are inflated to a nominal price base so over three years total $109.1M.

3.2.5 Efficiency

Given the uncertainty around the costs and the detailed business processes used to estimate expenditure we have not applied any efficiency challenge. We have made a number of observations throughout the review which we comment on in Section 4 which may guide efficient expenditure outcomes in the future.

3.2.6 Indicative drought allowance expenditure

This Supplementary review has enabled us to take a better view on the appropriate costs of WCRWS recommissioning. Our amended drought allowance expenditure estimates are summarised below.

Table 3-6 – Amended drought allowance expenditure ($million, nominal) (2023 to 2026)

	2022–23	2023–24	2024–25	2025–26	Total
Capital expenditure:					
• WCRWS (Luggage Point renewals)	3.0	3.0	3.1	3.2	12.2
• WCRWS increasing production capacity from 70Ml/d to 180Mld	35.6	36.3	37.2	0.0	109.1
Operating costs:					
• GCDP (operating plant)	27.8	28.4	29.1	29.8	115.1
• WCRWS (recommissioning)	5.2	5.3	5.5		16.0
• WCRWS (operating)	16.3	16.6	30.8	59.6	123.4

Source: Atkins analysis of Seqwater data presented in Tables above

As previously discussed, there is considerable uncertainty and a range of scenarios which may impact on this actual expenditure.

4 Other observations

Throughout the course of the review we have identified a number of broader observations that may be useful to assist any ex-post review of a drought allowance; improve the approach to drought allowance cost allocation and plant operating rules; and opine on Seqwater's proposed drought exit strategies.

4.1 Recommendations to assist ex-post review of drought allowance

We understand that drought response review event expenditure is likely to be subject to ex-post review. To aid a future review we suggest it would be helpful for Seqwater to be able to demonstrate at any ex-post review:

i) **Cost efficiency**:
   a. enforcement of the contractual requirements to source multiple supplier quotes in order to demonstrate efficiency
   b. benchmarking of all significant costs and explanation of any significant variances
   c. demonstration of efficiencies from target costs derived from the Veolia contract

ii) **Modes**:
   a. the definition and justification of operating modes of each plant: cold or hot standby, transition, operating and shutdown.
   b. setting out clear operating rules for changing modes, linked to milestones in the Water Security Program. We consider that, given the significant costs involved, the rules (both to commence and exit operating model) should be grounded in robust hydro-economic modelling and likelihood of beneficial use (see below).
   c. evidence that decision making aligns with the Water Security Program and relevant triggers.

iii) **Beneficial use**: it is essential that confidence in the beneficial use of the water is demonstrated before incurring significant cost.

iv) **Governance**: evidence of robust justification and cost challenge being applied to all significant drought expenditure.

v) **Cost allocation**:
   a. clear and defined activity-based cost allocation with clear definition of different plants and network
   b. provide clarity in defining capitalisation of costs using established definitions, particularly for membranes;
   c. costs should be allocated to the operating modes using codes to be established in the general ledger.

4.2 Cost allocation and operating rules

We have been asked by QCA to advise on an appropriate approach to carry out an ex-post prudency and efficiency assessment of drought allowance costs, through the review event mechanism, at the next price and expenditure review. This is a high level assessment given the time available and the future review will consider outturn costs.

We found from our review of drought costs in the current period that the presentation and justification is not satisfactory. It is difficult to confirm decisions as prudent and expenditure efficient as documents and worksheets lack the clarity needed to confirm or otherwise the prudency and efficiency of costs.

We consider that there should be a robust framework to assess the prudency of decisions and clear statements of costs. This could be set out in a guidance document. Furthermore, terminology applied needs to be consistent and clearly defined to avoid ambiguities. The framework should relate to

(i) The definition of plants and networks;

(ii) The definition of operating modes of each plant: cold or hot standby, transition, operating and shutdown. Costs should be allocated to these modes using codes to be established in the general ledger;

(iii) Provide clarity in defining capitalisation of costs using established definitions;

(iv) Setting out clear operating rules for changing modes, linked to milestones in the Water Security Program

We also found that terminology is loosely applied and sometimes inconsistent. A good example is recommissioning which is sometimes confused with operating activities. There needs to be clear distinction between recommissioning (transition mode) and operating (operating mode) with a clear date when recommissioning has been completed.

A good comparator, Sydney Desalination Plant (SDP), has clearly defined operating rules and modes where costs can be clearly allocated to one or more modes.

The operating rules are linked with the Water Security Program, but these need greater clarification when updating the Plan. For example:

- It would be useful to explicitly set out the duration for commissioning (transition) time from standby to operating mode should be specified. We understand there is an assumption of 24 months in the Water Security Program;
- The return to standby mode, either cold or hot, should be determined from the likely frequency of operation determined by hydro-economic modelling. The decision should also be influenced by the level of confidence in PRW demand.

Costs should be allocated to activity codes to show clear links between the operating modes and supported by the rigour of the Seqwater's internal accounting rules. We noted in RFI 62-66 that a greater part of the WCRWS costs were coded to administration which is not helpful in relating costs to activities. We suggest that this cost allocation is revisited for future years.

4.3 Exit strategies for WCRWS

It is important to consider how WCRWS should be managed when the system is not in drought.

The benefits of WCRWS is to safeguard reservoir storage by providing PRW to industrial customers. The WCRWS operation and related costs assume there is demand to be met from industrial customers. This is when reservoir storage falls below 60% and industrial customers rely on PRW to make up the shortfall in their

own resources. Demand forecast for PRW to industrial customers was an average 5.3 Ml/d at March 2021, Seqwater states that maximum daily demand is up to 70Ml/d.[24]

We consider it would not be prudent to recommission elements of the WCRWS for which there is no demand. As discussed in Section 2 demand has been variable and heavily influenced by customer specific factors and availability of other sources.

Operating rule for drought exit

A key challenge for Seqwater and opining on the prudency and timing of interventions and expenditure is identifying the drought exit trigger point. The Water Security Program 2017 (p93), states that:

> *"Drought exit triggers have not been prescribed. South East Queensland will exit drought adaptively for the drought situation at the time. Drought exit will not be the same trigger as drought entry and it will be a stepped exit. At the time of each potential stepped drought exit consideration needs to be given to the climatic conditions, demand, probability of again reaching the drought response entry trigger, drought response action and other relevant matters.*

Seqwater's original submission to QCA included drought costs until end March 2021, at that time dam storage levels were less than 60%. Storage levels increased to a high of 62% on 9 April 2021. Based on the climatic conditions and likelihood of storage levels reducing back to below the trigger point soon, Seqwater took the decision to maintain the plan to stay in drought response mode including continuing recommissioning of the WCRWS. The WSP states that:

> *"as total water demand grows over time a higher trigger to commence operation will be required to maintain water security and compliance with the levels of service objectives. The increased frequency of use means there is unlikely to be a financial benefit gained from decommissioning the WCRWS between droughts. Decommissioning would only be of benefit where the WCRWS would not be operational for a long period of time. Once recommissioned, the WCRWS will remain in hot standby"*

In its response to QCA's draft report Seqwater infer that "*once recommissioning commences, the full 180 ML/day of WCRWS production capacity will become available for supply into Lake Wivenhoe"*

At the time of writing this supplementary report in February 2022 the average Seqwater dam levels increased from 70% on 25 February to over 95% on 28 February. As far as we are aware there had not yet been any ministerial approval to commence recommissioning of the wider scheme. The remaining WCRWS assets (e.g., Gibson Island and Bundumba AWTP) are yet to commence recommissioning and based on the current dam storage levels it is unlikely that continuing with the recommissioning of those remaining assets would be prudent.

As discussed in Section 2.3.1 above, where dam storage levels sit above 60% there appears to be little to no reliable demand for the water produced from the WCRWS.

In its response to QCA's draft report Seqwater identified four options for an exit strategy based on the current maximum output of Luggage Point now that trains 1, 2 and 3 are operational. These are reproduced below in Table 4-1 and we provide comment against each.

[24] Supplementary information on the WCRWS. Seqwater, February 2022

Table 4-1 – Atkins view on Seqwater's exit strategy options for Luggage Point (70Ml/d capacity)

Options	Description	SEQ cost estimate $M p.a.	SEQ comment	Atkins comments
Option 0	Care and Maintenance only (basis of 2018 QCA review estimate)	11.0[1]	In base opex. Not considered further as inconsistent with WSP 3 and would not maintain membranes etc.	Care and maintenance mode may be an economical option and be further considered after the existing membranes have reached the end of their useful life. This is dependent on the likely frequency of restart.
Option 1: Flushing only	Production only to maintain membranes and chlorine residual in pipeline.	19.5 (18.2 in the Aug-21 submission)	Step change of $8.5m p.a. relative to care and maintenance base	This is a significant additional recurrent costs. Output to industrial customers is considered unlikely given it relates to flushing only. This means that the beneficial use of the water produce is likely to be limited. It is therefore only likely to be prudent to incur the additional cost if the "expected savings"[25] of restarting from this mode compared to restarting from care and maintenance mode exceed $8.5M p.a.
Option 2: 6ML/day to industry	Production only to maintain chlorine residual in pipeline and to maintain a nominal supply of PRW to industry	20.0[2]	Seqwater's recommended option on the basis that it allows for continued maintenance of the WCRWS assets and meets minimum requirements of industrial customers requiring PRW	Equivalent to 'hot standby'. This is only likely to be prudent if 1) There is confidence there will be beneficial use of the water produced 2) there is a need to transition the plant to the operating mode over a short period of time e.g. if the system is close to but above the drought response trigger. Robust hydro-economic modelling would be required to determine the level at which it makes sense to maintain this Option. However, it would seem unlikely that it would be justifiable at high storage levels. We find that this option is not prudent at the current time with storage in excess of 95%.
Option 3: 23ML/day to industry	Equivalent to full production from one train, production would alternate from the different trains. This level of	22.0[2]	As recommended in consultancy for whole WCRWS exit strategy	We agree with Seqwater's view that this is not prudent at the current time given the current storage levels and minimal and variable industrial demand.

[25] Cost saving multiplied by probability of restart. As a hypothetical example, if restart cost savings as a result of being in flushing mode rather than care and maintenance are $20M with a 10% probability of needing a restart (per annum), this would give an equivalent expected cost saving of $2.0M p.a.

Options	Description	SEQ cost estimate $M p.a.	SEQ comment	Atkins comments
	production would allow chlorine residual in pipelines to be maintained as well as a more generous supply to industry.			
Option 4: 70ML/day to industry	Full production from the three trains	30.0[2]		We agree with Seqwater's view that this is not prudent at the current time given the current storage levels and minimal and variable industrial demand.

Source: (i) RFI 6-66 (2)-Costs interpolated from Supplementary information on the WCRWS Figure 6, February 2022

Seqwater notes that

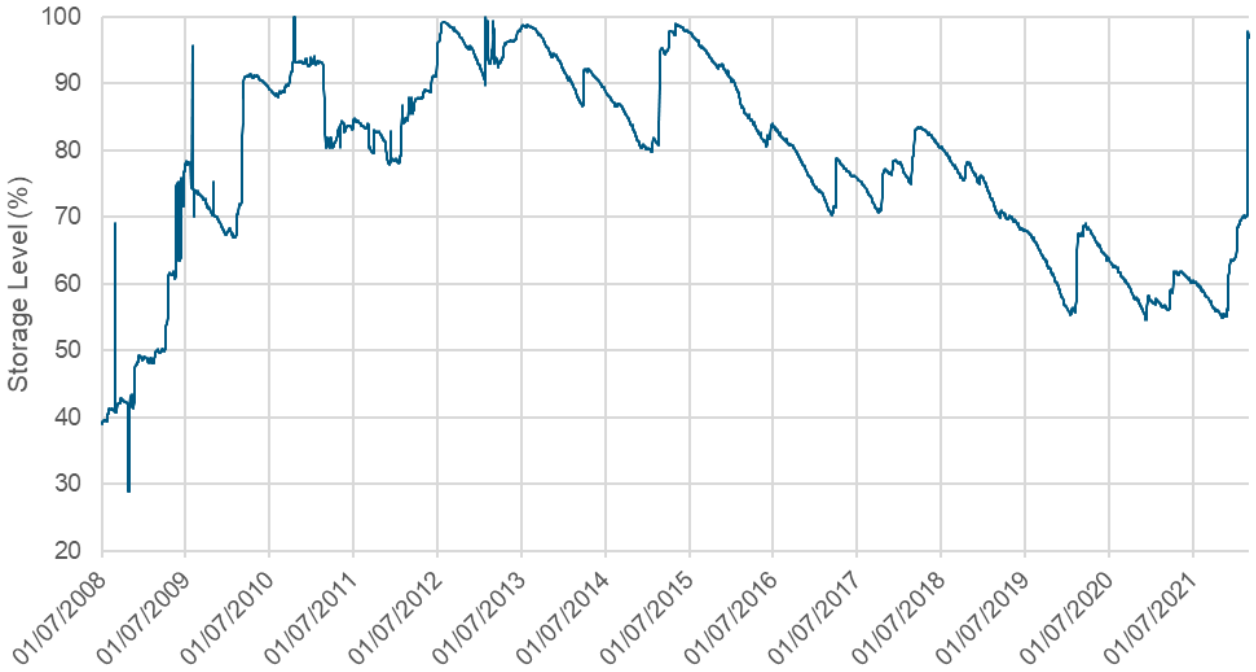
> "*the most recent modelling completed to support the updated Water Security Program (2022), assumed that PRW would be available from all 3 trains at Luggage Point AWTP at least as soon as the 60% trigger was reached."* And that "*it would be inconsistent with the new WSP for these assets to be returned to care and maintenance."*

We are not convinced that it is prudent to assume that all three trains at Luggage Point would be required to be at maximum capacity as soon as the 60% trigger is reached given the fluctuations in PRW demand we have seen through the 2021/22 drought break situation. The significant reduction in industrial demand when these customers can use their own resources at higher storage levels questions the need for continuing at maximum output.

We note that the last time prior to the recent drought that the dam storage levels were at 60% was in 2009 (shortly after the initial commissioning of the WCRWS) after which time the plant were switched to care and maintenance mode. This suggests, on inspection, that reservoir storage fell below 60% in four of the last 14 years and only once did it fall below the 40% operating threshold.

Given the high incremental costs of being in hot standby, the variability of PRW demand, the high storage levels at the time of writing (in excess of 95%) and the 24 month allowance in the Water Security Program to recommission WCRWS, we consider it prudent that Seqwater should move the WCRWS to a care and maintenance mode.

Figure 4-1 - Seqwater historical dam storage levels to 2008



Cold standby costs

Expenditure to maintain the Luggage Point in care and maintenance is included in base operating expenditure. For the base year 2019/20 the cold standby cost was $11.0m.[26] This compares with $12.7M for the GCDP in hot standby in the same year. This also compares with the $8.6m for the SDP, a larger plant, in cold standby.

Our recommendation is to transition the Luggage Point plant to care and maintenance mode as per Option 0 in Table 3.1 above. We are not able to support the $8.5M increase above the base opex without:

1. further explanation of the reasons for the increased activities and significant increase in recurrent costs
2. understanding of why the cost is significantly greater than suggested by the benchmarks
3. justification of the “expected savings” as set out above.

[26] RFI62-66 Recon to opex model

Simon Ingall
WS Atkins International Limited
Level 17
55 Clarence Street
Sydney
NSW 2000
Australia

graydon.jeal@atkinsacuity.com